Wendy Anderson

From: Wendy Anderson
Sent: Thursday, August 28, 2014 11:40 AM
To: contact@knudehansen.com
Cc: 'dof@knudehansen.com'
Subject: Certificate of Authorization - Complaint #2014035737

Mr. Hansen:

This email is to notify you that the complaint opened against Knud E. Hansen USA Inc. has been closed. I appreciate Mr. Frongillo providing the requested email to Ms. Valentine requesting that the CA be closed. No further action will be taken against Knud E. Hansen USA Inc.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

Wendy Anderson

From: Rebecca Valentine
Sent: Thursday, August 28, 2014 8:15 AM
To: Douglas Frongillo
Cc: Wendy Anderson
Subject: RE: Cert. Of Autorization Knud E. Hansen USA Inc.

The certificate of authorization for Knud E. Hansen USA Inc CA# 30452 is now Closed.

From: Douglas Frongillo [mailto:dof@knudehansen.com]
Sent: Thursday, August 28, 2014 7:13 AM
To: Rebecca Valentine
Cc: Finn Wollesen; ron@taxreliefcpa.com; Tom Johannesen
Subject: Cert. Of Autorization Knud E. Hansen USA Inc.

Dear Ms. Valentine,
On behalf of Knud E. Hansen A/S, the parent company of Knud E. Hansen USA Inc., kindly close the respective certificate of authorization issued.

Regards,

Douglas L. Frongillo
General Manager USA
MSc. Naval Architect / Marine Engineer

Mobile : +1 954 383 5354
Email : dof@knudehansen.com
Skype : dof-keh

KNUD E. HANSEN USA Inc.
Naval Architects - Designers - Marine Engineers

1850 SE 17th St.
Suite 102
Ft. Lauderdale, FL 33316

www.knudehansen.com

Wendy Anderson

From: Rebecca Valentine
Sent: Thursday, August 28, 2014 8:16 AM
To: Christian G Damsgaard
Cc: Wendy Anderson
Subject: RE: 2nd Notice****Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

The certificate of authorization for Knud E. Hansen USA Inc CA# 30452 is now Closed.

From: Christian G Damsgaard [mailto:CHD@knudehansen.com]
Sent: Thursday, August 28, 2014 4:43 AM
To: Rebecca Valentine
Subject: RE: 2nd Notice****Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Dear Rebecca,

I do not know if you have received the message, it seems that you have not? However, we confirm that we will not have a PE in the office in the near future and as a consequence the authorization will have to be withdrawn.

Best regards
Christian Damsgaard

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

From: Rebecca Valentine [mailto:RValentine@fbpe.org]
Sent: 23. juli 2014 16:35
To: Christian G Damsgaard
Subject: 2nd Notice****Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Please note that is you are wanting to close the certificate of authorization you will need to send in a written request to our office. It will need to be closed or you will need to send in a request to have a new engineer listed within 15 days of receipt of this email.

June 5, 2014

Knud E. Hansen USA Inc.
1850 SE 17th Street, Ste. 102
Fort Lauderdale, FL 33316

RE: Certificate of Authorization: No. **30452**

This is to notify you that the principle officer of your **John Dixon** has notified the Board the he is no longer with the company. The company has **30 days** from **06/05/2014** to have another Principle officer listed on the record.

If you have any questions please feel free to contact me at:
rvalentine@fbpe.org or by calling 850-521-0500

If you have any questions please feel free to contact me.

Rebecca Valentine
Licensure Analyst

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
Phone: 850.521.0500 ext. 105
Fax: 850.521.0521
Email: rvalentine@fbpe.org
www.fbpe.org

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

August 27, 2014

Knud E. Hansen USA Inc.
1850 SE 17th Street, Suite 102
Ft. Lauderdale, Florida 33316

Re: Case #2014035737

To Whom It May Concern:

Pursuant to Sections 455.225 and 471.038, Florida Statutes, the Board of Professional Engineers is required to investigate legally sufficient complaints that allege violations of the Engineering Practice Act. Section 455.225(1), Florida Statutes, further states that when an investigation is undertaken, the Board shall promptly furnish to the person or his/her attorney a copy of the complaint or document which resulted in the initiation of the investigation.

Attached for your review is a copy of the complaint or document received by the Board. This complaint was opened due to the fact that the qualifying engineer for Knud E Hansen USA Inc. resigned and no new qualifying engineer has been appointed as required by Section 471.023, Florida Statutes. You have the option of submitting a written response to the complaint for consideration by the Board's legal staff and by the Probable Cause Panel for the Board. Please submit this response to the Board office within twenty (20) days. You may also submit a written request for a copy of the Board's investigative file. This file will be provided to you once the investigation is completed.

Thank you for your cooperation in this matter.

Sincerely,

Wendy Anderson
Investigator

/wsa
Enclosure

Wendy Anderson

From: Wendy Anderson
Sent: Wednesday, August 27, 2014 8:40 AM
To: 'contact@knudehansen.com'
Cc: Rebecca Valentine
Subject: Certificate of Authorization

Importance: High

Mr. Hansen:

This email follows our telephone conversation of August 14, 2014. During that conversation I advised you that the Certificate of Authorization issued to Knud E. Hansen USA, Inc., was out of compliance because the qualifying engineer had resigned and a new qualifier had not been established as required by Statute. Also during that conversation, you advised me that you would contact Rebecca Valentine (rvalentine@fbpe.org) and advise her that you wished to close the Certificate of Authorization. I advised you that if this had not been accomplished within 7 days of the date of our conversation, that a complaint would be opened against Knud E. Hansen USA, Inc. To date, no such correspondence has been received by Ms. Valentine. Please be advised that a complaint will be opened this morning and notice of the complaint will be forwarded to you for response.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

Wendy Anderson

From: Rebecca Valentine
Sent: Tuesday, August 26, 2014 1:10 PM
To: Wendy Anderson
Subject: FW: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Knud E. Hansen USA has not sent me anything as of today.

From: Rebecca Valentine
Sent: Wednesday, August 13, 2014 3:00 PM
To: Wendy Anderson
Subject: FW: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

From: Rebecca Valentine
Sent: Friday, June 27, 2014 1:49 PM
To: Christian G Damsgaard
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

You want to close the certificate of authorization you will ned to send in a letter requesting that the certificate of authorization be closed.

From: Christian G Damsgaard [mailto:CHD@knudehansen.com]
Sent: Thursday, June 26, 2014 3:44 PM
To: Rebecca Valentine
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Hi Rebecca,

My colleague has pursued the same matter with one of your colleagues, and here we got a complete opposite answer. Please see below.

I expect that it's safe to say that we do not need a PE to operate as a Naval Architecture and Marine Engineering company and hope you can agree in this?

Best regards
/Christian

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

From: Rebecca Valentine [mailto:RValentine@fbpe.org]
Sent: 10. juni 2014 15:08
To: Christian G Damsgaard
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Yes, Naval Architecture and Marine Engineering is considered a type of engineering.

From: Christian G Damsgaard [mailto:CHD@knudehansen.com]
Sent: Monday, June 09, 2014 3:11 PM
To: Rebecca Valentine
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Hi Rebecca,

Could you please advise the status of below?

Thank you in advance.

/Christian

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

From: Christian G Damsgaard
Sent: 5. juni 2014 17:15
To: 'Rebecca Valentine'
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Hi Rebecca,

Thank you for your quick response.

Could you please clarify whether Naval Architecture and Marine Engineering is considered engineering?

Looking at Florida Department of Business Professional Regulation under "Services Requiring a DBPR License" I cannot see that our field is mentioned. I see Architects, Construction Industry and Yacht and Ship Brokers –however none fit what we are doing in the marine business.

I therefore wonder whether we need a Certificate of Authorization for our business.

Again, looking forward to your response.

Best regards
/Christian

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

From: Rebecca Valentine [mailto:RValentine@fbpe.org]
Sent: 5. juni 2014 15:55

To: Christian G Damsgaard
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

You will either need to obtain a new PE or close the certificate of authorization out.
You need a certificate of authorization if you are offering engineering services through a business organization, including partnership, corporation, fictitious names, etc. You will not need a certificate of authorization if you are offering engineering services in your given name. Please see Fla. Stat. 471.023 and Rule 61G15-18.011 for further information on certificate of authorizations.

From: Christian G Damsgaard [mailto:CHD@knudehansen.com]
Sent: Thursday, June 05, 2014 2:03 PM
To: Rebecca Valentine
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Hi Rebecca,

Thank you for your mail.

John Dixon was also our manager and we are now searching for his replacement, both as manager and as PE, however it is doubtful we will manage to have this in place within 30 days. So, could you please explain to me what will happen in this case? As I understand it you will remove our PE license but from your Minutes of 2008 (see link below) the marine business does not require to have a PE?

I would like to underline that even it is not required we are striving to get a PE.

Looking forward to your response.

Best regards
/Christian

(http://www.fbpe.org/documents/published/Meetings%20and%20Information/Agenda%20and%20Minutes/Agenda%20and%20Minutes%202008/June/june_2008_fbpe_board_minutes_final_092908.pdf)

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

From: Rebecca Valentine [mailto:RValentine@fbpe.org]
Sent: 5. juni 2014 09:49
To: Christian G Damsgaard
Subject: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

June 5, 2014

Knud E. Hansen USA Inc.
1850 SE 17th Street, Ste. 102
Fort Lauderdale, FL 33316

RE: Certificate of Authorization: No. **30452**
This is to notify you that the principle officer of your **John Dixon** has notified the Board the he is no longer with the company. The company has **30 days** from **06/05/2014** to have another Principle officer listed on the record.

If you have any questions please feel free to contact me at:
rvalentine@fbpe.org or by calling 850-521-0500

If you have any questions please feel free to contact me.

Rebecca Valentine
Licensure Analyst

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
Phone: 850.521.0500 ext. 105
Fax: 850.521.0521
Email: rvalentine@fbpe.org
www.fbpe.org

Wendy Anderson

7 days From today
8-14-14

From: Rebecca Valentine
Sent: Wednesday, August 13, 2014 3:00 PM
To: Wendy Anderson
Subject: FW: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

From: Rebecca Valentine
Sent: Friday, June 27, 2014 1:49 PM
To: Christian G Damsgaard
Subject: RE: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

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I expect that it's safe to say that we do not need a PE to operate as a Naval Architecture and Marine Engineering company and hope you can agree in this?

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Senior Naval Architect

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/Christian

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

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Looking at Florida Department of Business Professional Regulation under "Services Requiring a DBPR License" I cannot see that our field is mentioned. I see Architects, Construction Industry and Yacht and Ship Brokers –however none fit what we are doing in the marine business.

I therefore wonder whether we need a Certificate of Authorization for our business.

Again, looking forward to your response.

Best regards
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Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

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To: Rebecca Valentine
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I would like to underline that even it is not required we are striving to get a PE.

Looking forward to your response.

Best regards
/Christian

(http://www.fbpe.org/documents/published/Meetings%20and%20Information/Agenda%20and%20Minutes/Agenda%20and%20Minutes%202008/June/june_2008_fbpe_board_minutes_final_092908.pdf)

Christian Damsgaard
Senior Naval Architect

Mobile : +45 2886 0747
Email : chd@knudehansen.com

From: Rebecca Valentine [mailto:RValentine@fbpe.org]
Sent: 5. juni 2014 09:49
To: Christian G Damsgaard
Subject: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

June 5, 2014

Knud E. Hansen USA Inc.
1850 SE 17th Street, Ste. 102
Fort Lauderdale, FL 33316

RE: Certificate of Authorization: No. **30452**
This is to notify you that the principle officer of your **John Dixon** has notified the Board the he is no longer with the company. The company has **30 days** from **06/05/2014** to have another Principle officer listed on the record.

If you have any questions please feel free to contact me at:

rvalentine@fbpe.org or by calling 850-521-0500

If you have any questions please feel free to contact me.

Rebecca Valentine
Licensure Analyst

FBPE
FLORIDA BOARD OF

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
Phone: 850.521.0500 ext. 105
Fax: 850.521.0521
Email: rvalentine@fbpe.org
www.fbpe.org

Wendy Anderson

From: Rebecca Valentine
Sent: Wednesday, August 13, 2014 2:59 PM
To: Wendy Anderson
Subject: FW: 2nd Notice****Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc
Attachments: Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

From: Rebecca Valentine
Sent: Wednesday, July 23, 2014 10:34 AM
To: 'chd@knudehansen.com'
Subject: 2nd Notice****Knud E. Hansen USA Inc. 30 day notice 06_04_14.doc

Please note that is you are wanting to close the certificate of authorization you will need to send in a written request to our office. It will need to be closed or you will need to send in a request to have a new engineer listed within 15 days of receipt of this email.

June 5, 2014

Knud E. Hansen USA Inc.
1850 SE 17th Street, Ste. 102
Fort Lauderdale, FL 33316

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rvalentine@fbpe.org or by calling 850-521-0500

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Rebecca Valentine
Licensure Analyst

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street

Suite B-112
Tallahassee, FL 32303
Phone: 850.521.0500 ext. 105
Fax: 850.521.0521
Email: rvalentine@fbpe.org
www.fbpe.org

FLORIDA DEPARTMENT OF STATE
DIVISION OF CORPORATIONS

Sunbiz

Detail by Entity Name

Florida Profit Corporation

KNUD E. HANSEN USA, INC.

Filing Information

Document Number	P13000055098
FEI/EIN Number	61-1715875
Date Filed	06/24/2013
State	FL
Status	ACTIVE

Principal Address

1850 SE 17TH ST STE 102
FT LAUDERDALE, FL 33316

Changed: 02/19/2014

Mailing Address

1700 East Las Olas Blvd, Suite 207
FT LAUDERDALE, FL 33301

Changed: 06/23/2014

Registered Agent Name & Address

MUSCARELLA, RONALD A
1700 EAST LAS OLAS BLVD.
SUITE 207
FT LAUDERDALE, FL 33301

Name Changed: 06/23/2014

Address Changed: 06/23/2014

Officer/Director Detail

Name & Address

Title COB

PETERSON, FINN W
1850 SE 17TH ST STE 102
FT LAUDERDALE, FL 33316

Title CEO

PETERSON, FINN W
1850 SE 17TH ST STE 102
FT LAUDERDALE, FL 33316

Annual Reports

Report Year	Filed Date
2014	02/19/2014
2014	05/27/2014
2014	06/23/2014

Document Images

06/23/2014 -- AMENDED ANNUAL REPORT	View image in PDF format
06/09/2014 -- Off/Dir Resignation	View image in PDF format
05/27/2014 -- AMENDED ANNUAL REPORT	View image in PDF format
02/19/2014 -- ANNUAL REPORT	View image in PDF format
06/24/2013 -- Off/Dir Resignation	View image in PDF format
06/24/2013 -- Domestic Profit	View image in PDF format

2014 FLORIDA PROFIT CORPORATION AMENDED ANNUAL REPORT

FILED
Jun 23, 2014
Secretary of State
CC0247245414

DOCUMENT# P13000055098

Entity Name: KNUD E. HANSEN USA, INC.

Current Principal Place of Business:

1850 SE 17TH ST STE 102
FT LAUDERDALE, FL 33316

Current Mailing Address:

1700 EAST LAS OLAS BLVD, SUITE 207
FT LAUDERDALE, FL 33301 US

FEI Number: 61-1715875

Certificate of Status Desired: No

Name and Address of Current Registered Agent:

MUSCARELLA, RONALD A
1700 EAST LAS OLAS BLVD, SUITE 207
FT LAUDERDALE, FL 33301 US

The above named entity submits this statement for the purpose of changing its registered office or registered agent, or both, in the State of Florida.

SIGNATURE: RONALD A. MUSCARELLA 06/23/2014

Electronic Signature of Registered Agent — Date

Officer/Director Detail :

Title	COB	Title	CEO
Name	PETERSON, FINN W	Name	PETERSON, FINN W
Address	1850 SE 17TH ST STE 102	Address	1850 SE 17TH ST STE 102
City-State-Zip:	FT LAUDERDALE FL 33316	City-State-Zip:	FT LAUDERDALE FL 33316

I hereby certify that the information indicated on this report or supplemental report is true and accurate and that my electronic signature shall have the same legal effect as if made under oath; that I am an officer or director of the corporation or the receiver or trustee empowered to execute this report as required by Chapter 607, Florida Statutes; and that my name appears above, or on an attachment with all other like empowered.

SIGNATURE: FINN W PETERSON CEO 06/23/2014

Electronic Signature of Signing Officer/Director Detail — Date

Domain **09 - Board of Professional Engineers** Logged in as: **wgregory**

Lic Type **0902 - Certificate of Authorization** Entity # **10240292**

Fed Tax # [redacted] Fed Tax Type **PIN #** Name **KNUD E. HANSEN USA INC.**

Org Name **Knud E. Hansen USA Inc.**

Org Type

Mailing Address Private Address Preferred Name

Street # **1850** Street **SE 17TH STREET**

Line 2 **SUITE 102**

Line 3

City **FORT LAUDERDALE** County **Broward**

Zip **33316** State **Florida** Country **United States**

Routing

Phone # **954-249-0127** Ext E-Mail **chd@knudehansen.com**

Insp Region Receive Email

Updated **06/05/2014 08:48:57** By **rvalentine**

Notes | Notes History | Fix | Change | Save | OK | Cancel | Back

Lic Type **0902 - Certificate of Authorization** Status **10 Initial Review** Status Date **08/27/2014**

Complaint # **2014035737** Case Type **CMP - Complaint** Disposition Disposition Date

Docket# Respondent **KNUD E. HANSEN USA INC.** Responsible **wgregory - GREGORY, WENDY** **Private Case**

Complaint | Respondent | Complainant | Addt'l Info

Source **INTN - Internal** Security Level **1**

Form **INTR - Internal** Priority

Class'n **LIC - Licensed Activity** Complexity **R - Regular**

Security **STND - Standard** Incident

Region Received **08/27/2014**

Reference

Entered **08/27/2014** Entered By **wgregory**

Summary **Allegations that subject is offering engineering through a company with a Certificate of Authorization that has no qualifying engineer as required by Section 471.023, FS.**

Updated **08/27/2014 10:18:39** By **wgregory**

Parties | Activities | Allegations | Discipline | Violations | Compliance | Related | Disposition | Inspection | Costs | Time Tracking | Auto Assign | Attachments | History | Work Notes | Print Report

Change | Save | OK | Cancel | Back

Wendy Anderson

From: Drew Hains <dhains@murrayna.com>
Sent: Monday, September 08, 2014 10:46 AM
To: Wendy Anderson
Subject: RE: Rolando R. Santos

Wendy:

That was my error, I am not sure how I missed it as I always check before send the complaint in. But I do see it now and also see that "Alpha Marine Surveyors" does not have C/A.

Best,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Monday, September 08, 2014 10:40 AM
To: Drew Hains
Subject: RE: Rolando R. Santos

Mr. Hains:

In the process of opening this complaint, I came across PE License Number 12627 for Rolando R. Santos, P.E. Because I was able to locate a Professional Engineer License for Mr. Santos, he is not in violation of any Statute or Rule by utilizing that title. However, the company, Alpha Marine Surveyors, does not hold a Certificate of Authorization in the State of Florida, and this will be reviewed.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, September 08, 2014 10:25 AM
To: Wendy Anderson
Subject: RE: Rolando R. Santos

Wendy

Many thanks for the below. As I was in attendance in 2008, I am aware of the board's position to selectively enforce the laws and rules.

Kind Regards,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Monday, September 08, 2014 10:20 AM
To: dhains@murrayna.com
Subject: Rolando R. Santos

Mr. Hains:

Thank you for your email. This complaint will be processed and you will be notified of the complaint number assigned.

Please be aware that in April 2008, at a regularly scheduled FBPE Board Meeting, it was determined:

Upon a motion by Mr. Rebane, seconded by Dr. Bauer, it was moved uphold the laws and rules dealing with protective titles and to refrain attempting to regulate naval architecture and marine engineering in Florida

If you have additional questions, please let me know.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, July 28, 2014 3:20 PM
To: John Rimes
Subject: Complaint 20080022965 - Robert A. Schofield

Mr. Rimes:

I hope this message find you well. I am following up on very old matter where I have recently discovered new information. Specifically, I am in receipt of a letter from Mr. Jack Beamish dated Feb 4, 2008 (see attached email transmitting the subject letter me), whereby I was notified that a Notice to Cease & Desist from identifying himself as "marine structural engineer" was issued to Mr. Robert A. Schofield . Further, I am in receipt of the attached recent report of Mr. Schofield whereby on page 9 he states:

> All of the structure is marine grade and suitable for years of immersion in sea water. This is one of those categories of structural details where using the class rules verbatim without disgression can border on the ludicrous. As a naval structural engineer, I can see that the beam cut thus is just fine structurally, and the cutout is nicely finished. The beam obviously is grossly oversized, and might even be structurally redundant. The deck plating there is heavy thick-cored fiberglass

I note the slight change in the wording from "**marine** structural engineer" to "**naval** structural engineer." I further note the wording of FS 471.031 (1) which states (bold emphasis added):

(1) A person may not:
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"transportation engineer," "software engineer," "computer hardware engineer," or "systems engineer."

Considering the wording of the above and specifically the language I have placed in bold type, it would appear, at least to me, that Mr. Schofield has not only violated the aforementioned Florida State Statue but also the intent of your organization's January 25, 2008 Notice to Cease and Desist. Therefore, I kindly ask you to review the attached, take appropriate action and advise me of your findings and the outcome accordingly. If Mr. Schofield, sought and received permission to use the term, "**naval** structural engineer," my apologies as I have been unable to obtain an public record of such action.

In the interest of public safety,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

Wendy Anderson

From: Wendy Anderson
Sent: Monday, September 08, 2014 10:40 AM
To: 'Drew Hains'
Subject: RE: Rolando R. Santos

Mr. Hains:

In the process of opening this complaint, I came across PE License Number 12627 for Rolando R. Santos, P.E. Because I was able to locate a Professional Engineer License for Mr. Santos, he is not in violation of any Statute or Rule by utilizing that title. However, the company, Alpha Marine Surveyors, does not hold a Certificate of Authorization in the State of Florida, and this will be reviewed.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, September 08, 2014 10:25 AM
To: Wendy Anderson
Subject: RE: Rolando R. Santos

Wendy

Many thanks for the below. As I was in attendance in 2008, I am aware of the board's position to selectively enforce the laws and rules.

Kind Regards,

Drew B. Hains, PE
Vice President, Engineering

Naval Architect/Marine Engineer
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4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Monday, September 08, 2014 10:20 AM
To: dhains@murrayna.com
Subject: Rolando R. Santos

Mr. Hains:

Thank you for your email. This complaint will be processed and you will be notified of the complaint number assigned.

Please be aware that in April 2008, at a regularly scheduled FBPE Board Meeting, it was determined:

Upon a motion by Mr. Rebane, seconded by Dr. Bauer, it was moved uphold the laws and rules dealing with protective titles and to refrain attempting to regulate naval architecture and marine engineering in Florida

If you have additional questions, please let me know.

Wendy Anderson
Investigator &
Public Records Requests

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2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, July 28, 2014 3:20 PM
To: John Rimes
Subject: Complaint 20080022965 - Robert A. Schofield

Mr. Rimes:

I hope this message find you well. I am following up on very old matter where I have recently discovered new information. Specifically, I am in receipt of a letter from Mr. Jack Beamish dated Feb 4, 2008 (see attached email transmitting the subject letter me), whereby I was notified that a Notice to Cease & Desist from identifying himself as "marine structural engineer" was issued to Mr. Robert A. Schofield . Further, I am in receipt of the attached recent report of Mr. Schofield whereby on page 9 he states:

> All of the structure is marine grade and suitable for years of immersion in sea water. This is one of those categories of structural details where using the class rules verbatim without disgression can border on the ludicrous. As a naval structural engineer, I can see that the beam cut thus is just fine structurally, and the cutout is nicely finished. The beam obviously is grossly oversized, and might even be structurally redundant. The deck plating there is heavy thick-cored fiberglass

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Wendy Anderson

From: Drew Hains <dhains@murrayna.com>
Sent: Saturday, September 06, 2014 3:21 PM
To: John Rimes
Cc: Wendy Anderson
Subject: 1187 Complaint -- Rolando R Santos - Possible violation of FS 471.031 (1) use of the title "Marine Engineer"
Attachments: Preliminary Report.pdf

John

Attached please find in PDF report of a Mr. Rolando R. Santos in which he identifies himself as a "Marine Engineer." I believe this might be a possible violation of FS 471.031 (1) (b)1. I researched www.myfloridalicense.com and was not able to locate a professional engineering license for Mr. Santos or any indication that he would be entitled to use "marine engineer" on the basis of the exemption provided in 471.031 (1) (b) 3. (for example as a subordinate of a professional engineer) as I found no record of a certificate of authorization for the firm indicated.

I also note that http://alphamarine.com/ indicates that:

> Alpha Marine Surveyors is a professional organization comprised of Marine Engineers, Port Captains, USCG Merchant Marine Officers, Retired USNR Officers, and Hull & Cargo Surveyors.

Please review the above and the attached and take appropriate action.

Kind Regards,

Drew B. Hains, PE
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ALPHA MARINE SURVEYORS

Corporate Office
1330 N.W. 7th Street Miami, Florida 33125
Local Phones: (305)324-1555 / Fax: (305)324-1525
Toll Free - Phone: (866)812-5742 / Fax: (866)512-5742
Main Email - MarineSurveys@AlphaMarine.com

Miami, FL	Savannah, GA	Chicago, IL	Fort Worth, TX	Philadelphia, PA
Pt. Everglades, FL	Charleston, SC	Mentor, OH	Dallas, TX	Norfolk, VA
West Palm Bch, FL	Raleigh, NC	Houston, TX	Medford, NJ	Baltimore, MD
Jacksonville, FL	Mobile, AL	Nashville, TN	Galveston, TX	Newark, NJ
Tampa, FL	Anderson, AL	Freeport, TX	Long Island, NY	Hampton, NH
Key Largo, FL	Gulfport, MS	Saint Louis, MO	New Haven, CT	Bronx, NY
Tavernier, FL	New Orleans, LA	Louisville, KY	Wilmington, DE	Boston, MA
Republic of Panama	Baton Rouge, LA	Southaven, MS	Shawnee, KS	Humacao, P.R.

ESTABLISHED IN 1982

August 12, 2014

Law Offices of Peter M. Commette, P.A.
1323 S.E. 3rd Avenue
Fort Lauderdale, FL 33316

Attn: Peter Commette, P.A.
Email: pmc@commettelaw.com

From: Rolando R. Santos, Marine Engineer
Email: Roland_Santos@AlphaMarine.com

Reference:

PRELIMINARY REPORT # 1
Our File No.: 0514/038RRS
US Court Case No.: 14-CV-61057-WPD
Insured/ Owner: Michael Triggiano
Claim Unit No.: 8003139959-1-1
Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
Date of Joint Survey: June 30th, 2014
Page: 1

This is to certify that on June 30th, 2014 the undersigned did at your request investigate the circumstances regarding the above referenced boat located at Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409.

We report our findings as follows:

PARTIES IN ATTENDANCE:
Rolando Santos, Marine Surveyor - Alpha Marine Surveyors c/o Law Offices of Peter M. Commette, P.A.
Brian Donnalley, Marine Surveyor – Donnalley Marine Services c/o Foremost Insurance
Joe Rose, Service Manager, Bellhart Marine

BACKGROUND:
On 5/28/14 we were provided with numerous documents on the matter. Documents provided and/or gathered came from various sources and we have listed them below. Photographs and references in the body are also incorporated:

5/28/2014 – Emails from Peter Commette - Attachments Received:

Email # 1:

- Complaint
- Answer to Complaint

Email # 2:

- Notice of Removal to Federal Court as Filed

Email # 3:

- 2002 3372 Invoice for Purchase
- Brian Donnalley Phone Calls
- Foremost Family Boater's Policy
- Foremost Policy Declaration
- Foremost Survey Report 01-21-14
- Maint Schedule
- Water Pump – Maintenance Schedule Seawater Pump
- Water Pump Housing Receipt (Landscape, Ex D)
- Water Pump Housing Receipt

Email # 4:

- 01-07-14 from Pirok
- 01-13-14 from Pirok
- 01-17-14 from Pirok
- 01-23-14 from Pirok
- 01-24-14 from Pirok
- 01-24-14 to Pirok
- 01-29-14 from Pirok
- 02-24-14 from Donnalley
- 02-28-14 from Donnalley
- 03-02-14 to Donnalley
- 03-18-14 from Pirok
- Denial Letter from Foremost
- Denial Letter

6/11/2014 – Email from Joe Rose - Attachments Received:

Email # 1:

- IMG_8726
- IMG_8748
- IMG_8749
- IMG_8750
- IMG_8751
- IMG_8752

6/18/2014 – CD from Peter Commette – Attachments Received:

CD Labeled: Rule 26 Disclosures:

- IMG_1934 to IMG_2061 (Shows Date Modified 1/4/14)

- IMG_2242 to IMG_2257 (Shows Date Modified 1/10/14)
- IMG_2420 to IMG_2457 (Shows Date Modified 1/19/14)

6/20/2014 – Email from Mike Triggiano – Attachments Received:

Email #1:

- Diagram of How Boat is Tied to Dock – Triggiano
- Photographs taken and provided by Mr. Tripper McShane on 7/24/14
- Photographs & video provided by Mr. Dwayne Dehart of Bellhart Marine
- Photographs provided by Mr. Moore & Mr. Rose

From the documentation we surmised that the Marine Surveyor for Foremost had concluded that the proximate cause of loss was associated with an alleged failure of the raw water pump via an alleged corrosion mechanism. Communication between our principal and the Foremost Marine Surveyor indicated that there were potentially some areas that were not properly documented and/or investigated.

June 6th 2014:
After the preliminary review of the materials we contacted Marine Surveyor Brian Donnalley (BD) and after disclosing our involvement on behalf of the Mr. Triggiano he agreed to answer only based on the content of his report:

1. Raw water pump was found leaking – proximate cause of loss was in his opinion associated with corrosion causing the housing to crack and leak. He confirmed that the ingress rate was never verified and that he was of the opinion that it was dependant on the position of the impeller
2. BD further confirmed that the raw water pump was pressurized with city water hose
3. BD stated that he found no other source of ingress
4. BD would not elaborate much more stating that most was in the report and stood "as is"
5. We discussed dates of attendance for a joint inspection and coordination was turned over to Donna Meredew in our office

On 6/18/14 we were informed by Mr. Triggiano that his boat has been kept at berth Nr 7 for over 10 years. That the boat was last used December 14 & 15th 2013 and was reported to have partially sunk on 12/27/13. Mr. Triggiano explained that the area where his boat was being berthed was under construction and he was aware that his boat and others were being moved around to accommodate the construction.

Mr. Triggiano explained that he had replaced the raw water pump on the engines less than (3) years ago which was well within the prescribed maintenance period and that when last used he confirmed that his aft bilge pump was working properly.

Mr. Triggiano explained that his boat was always secured with spring lines and that shore power was always connected to maintain the integrity of his onboard batteries.

Mr. Triggiano states that the marina employee Troy Moore at about 1300hrs noticed that the boat was sitting low and

Bellhart Marine was dispatched and recovered the boat.

Photo provided by Mr. Triggiano taken by Mr. Joe Rose - Picture taken 12/27/13 @ 1322hrs

Mr. Triggiano stated that water reached the top of the valve covers. Mr. Triggiano through his own efforts became aware that during the construction/renovation of the docks in his area that boats were being moved around and that power was being shut off for indeterminate amounts of time.

We had spoken to Mr. Darren Anderson, Assistant Manager for Inlet Watch Marina and he stated that the primary Electrical contractor was Mead Electric c/o Brian Mead. We spoke to Mr. Mead who stated that the entire bulkhead in the area had collapsed and that all of the boats in the immediate area had been removed.

He further stated that there were (2) other contractors working in the area one for the walkways and ramps and the other was a Marine Contractor with a large barge and work boats installing the new sheet piles and bulkhead.

Mr. Mead stated that he was unaware where the displaced boats were being kept but that most of his work was completed by October 2013.

We later spoke with Mr. Troy Moore, Manager of Inlet Watch Marina (who was on vacation during our attendance) and he elaborated further.

Mr. Moore stated that the bulkhead collapsed last year around thanksgiving of 2012 and that it took some time to obtain the correct permits, bids etc. but that it was his goal to have all repairs completed before the anniversary of the problem.

Mr. Moore explained that there were (3) contractors involved but that all work was completed in October to very early November 2013 and that the repairs would not have physically impacted slip 7 where Mr. Triggiano kept his boat.

Mr. Moore did confirm that during the repairs boats were moved and he did state that there were localized power outages associated with the repairs but the disruption was kept to a minimum.

Mr. Moore understood that we were investigating this matter for Mr. Triggiano since his primary insurance had denied

coverage. Mr. Moore confirmed that he knew and considered Brian Donnalley (BD) to be a friend.

Mr. Moore confirmed that BD never approached him to ask or investigate potential circumstances regarding the care & custody at the dock, marina or slip 7. Mr. Moore confirmed that he never gave BD any photographs of Mr. Triggiano's boat as found since BD had not approached him about the matter.

We asked Mr. Moore regarding the circumstances when he was made aware of the problem and he stated that he was alerted by one of the home owners that the Triggiano boat appeared to be sinking. It was then that Mr. Moore went and personally investigated the matter and started to contact parties to have the boat tended to.

In our conversations with Mr. Moore we confirmed the following about the marina:

1. Cameras are present but not working for the area where slip 7 is located due to corroded wiring. Mr. Moore indicated that future plans are to install wifi powered units to restore video surveillance
2. The marina maintains a live watch from 0800hrs to 1700hrs (7) days a week. For (15) hrs in the evening to the next morning there is no watch and there is no record of who potentially comes & goes from the marina via water.
3. The marina does not accept transient boats from the ICW but they have found this activity to exist; mostly discovered on the next day when marina personnel arrive. Mr. Moore states that this week such an event occurred but was later found to be an owner who had leased a slip and not reported the activity
4. There have been thefts at the marina where access was gained by water presumably the ICW
5. There have been periods of power outages although not well documented
6. And that this event was not discovered by Inlet Watch personnel but brought to the attention by a neighbor/home owner who alerted Inlet Watch near the afternoon of the 27th.

Mr. Moore did confirm that the boat that would have normally been in slip nr 8 next to Mr. Triggiano's boat was not there during the month of December since it had been involved in an accident and was dry hauled.

Mr. Moore states that he was not aware of any other boat being kept at slip 8.

Mr. Moore in our conversation did state that he did not believe that the contractors had anything to do with the problems with Mr. Triggiano's boat and he did state that he was unaware of any other unauthorized boat activity in the area that could have resulted in the problem.

Mr. Moore did sight the damages to the port bow and the transom swim platform to Mr. Triggiano's boat.

Mr. Moore researched his file and found (2) additional pictures of the boat as found. The two pictures are below and a cropped portion showing that the thru hull fittings were submerged:

ALPHA MARINE SURVEYORS

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Claim Unit No.: 8003139959-1-1
Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
Date of Joint Survey: June 30th, 2014

Photograph taken 12/27/13 @1230hrs

Cropped out area of the photograph provided

The photo shows that the port list was so extreme that it submerged the aft bilge pump discharge, generator exhaust and the weather deck scupper drain.

All of these through hull fittings were 13" above the painted top edge of the bottom paint and 17" above the normal static waterline sighted on the hull.

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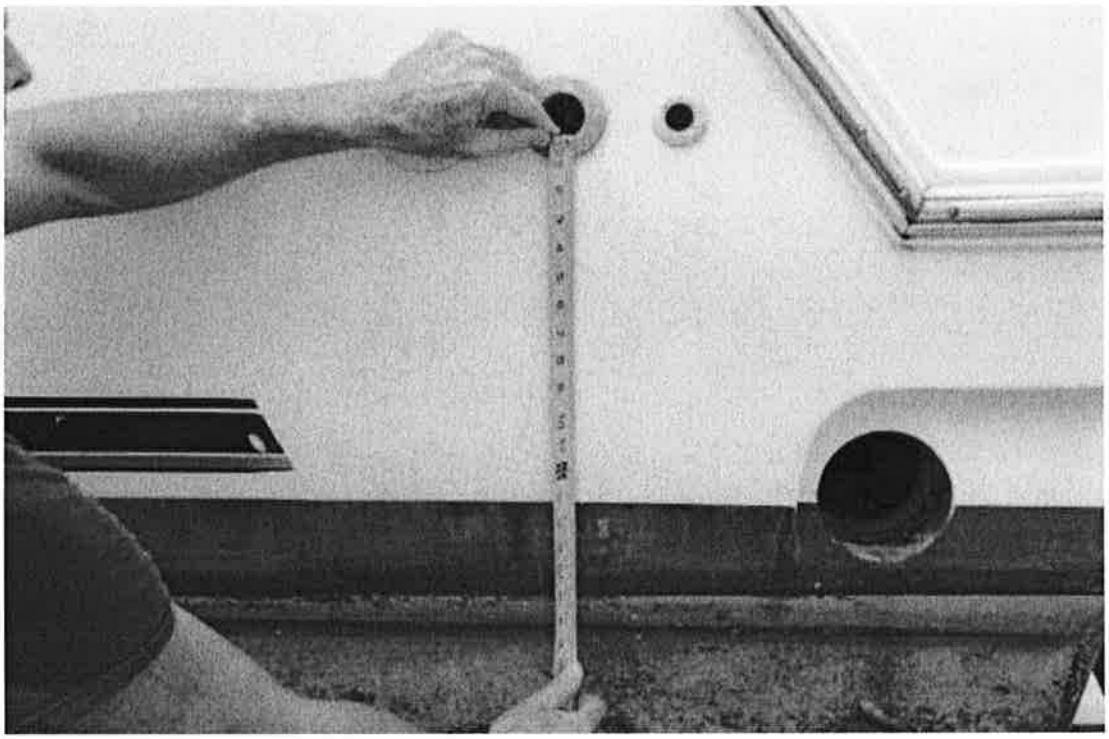

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Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
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Photograph taken 12/27/13 @1230hrs
The pictures which were produced after our attendance clearly show that this boat sank much further than indicated by the static waterlines visible on the hull.

Interestingly enough the pictures show that this boat sank with a strong port list which is 100% contrary to BD's hypothesis of how this vessel foundered. This boat in the engine room contains several longitudinals that although modified with small diameter drain holes would have caused a favored list depending on the point of ingress.

If this sinking would have been the result of the stbd engine raw water pump we would have expected a stbd list when 1st discovered NOT a port side list as found. Below is a general diagram of the boat from the owner's manual and we have added the proximate location of the longitudinal as sighted and we also took the liberty to show the proximate location of the raw water pumps on each engine (red lines = longitudinal, red boxes = raw water pumps). As noted the raw water pump on the stbd engine would have been on the stbd longitudinal accumulating water in that area. Located centerline between the P&S engines & longitudinal was the aft bilge pump. The "house" battery was found completely drained indicating that the aft bilge pump was working and functioned until the battery was drained and/or rapidly submerged:

ALPHA MARINE SURVEYORS

PRELIMINARY REPORT # 1
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US Court Case No.: 14-CV-61057-WPD
Insured/ Owner: Michael Triggiano
Claim Unit No.: 8003139959-1-1
Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
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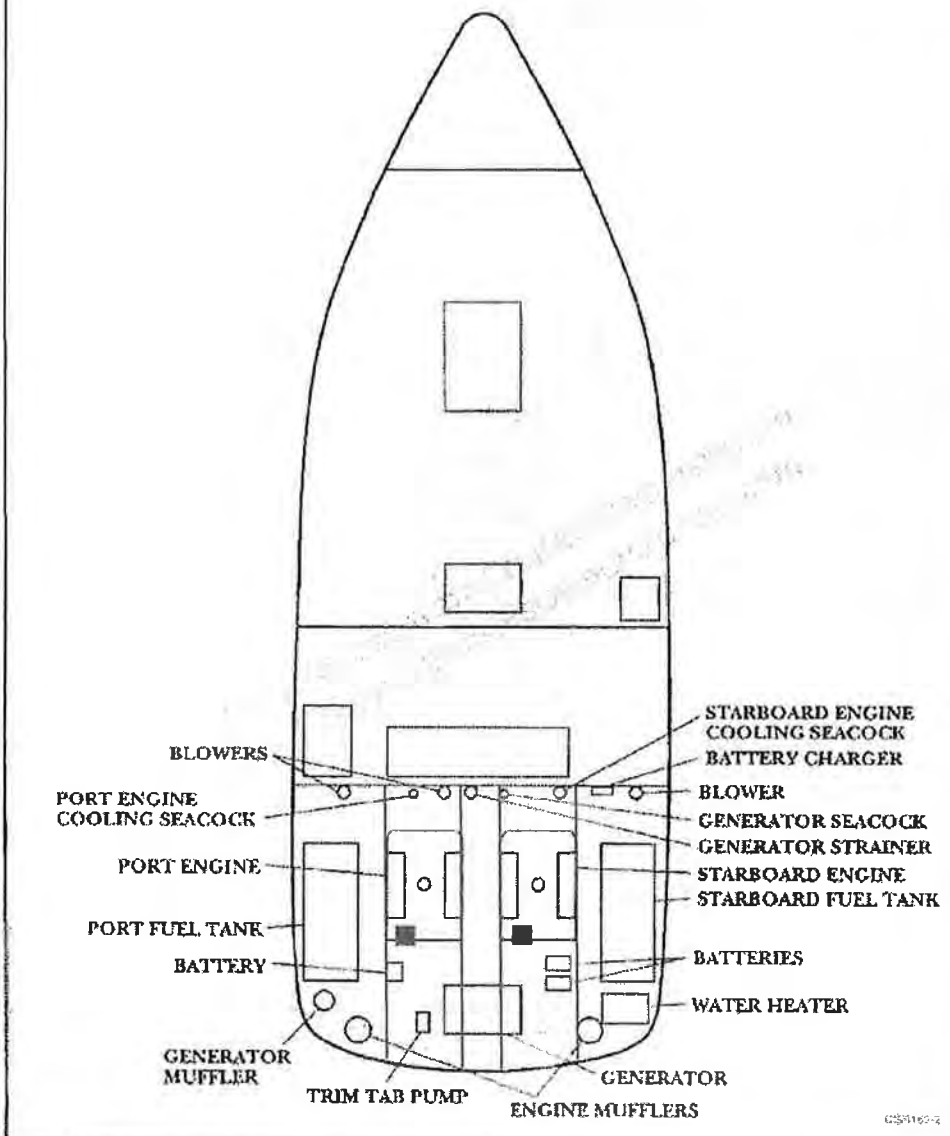
GENERAL LAYOUT
Inboard V-Drive Installation



Cruisers yachts

2-4

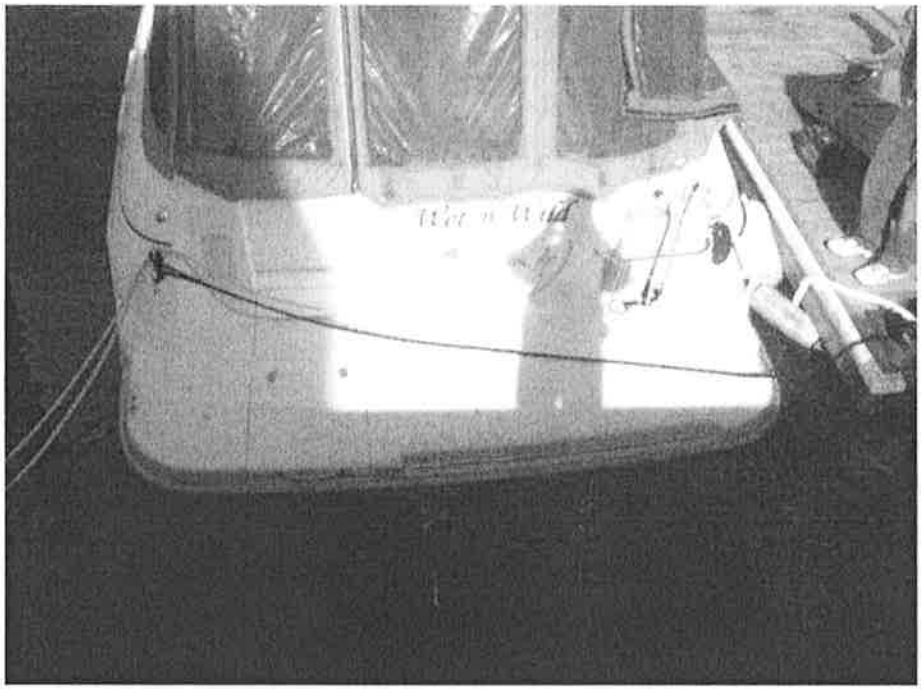
Stbd side provided by Mr. Joe Rose showing that it is high – we presume that the boat at this point may have been pumped out. Photograph submitted by Mr. Triggiano

(3) thru hull fittings – genset, bilge pump & weather deck scupper drain

On 7/23/14 we spoke to Mr. Dwayne Dehart, owner of Bellhart Marine. We had met Mr. Dehart the morning of our attendance but he was unable to remain or be interviewed by the undersigned due to a prior commitment. Mr. Dehart explained that he was present when the boat was refloated on 1/9/14 and that BD was as well. He states that when the boat was launched early in the morning BD went into the boat to search for leaks. No leaks were found and that he left BD on the boat for a significant period of time. Returning to the boat Mr. Dehart states that BD approached him and stated that he could find no leaks.

It was then after some discussion that the raw water pump inlets were pressurized and the alleged leak in the stbd engine raw water pump was allegedly discovered. Mr. Dehart explained that he told BD that the inlet lines were likely "Air locked".

Mr. Dehart sent us the only picture he had of the boat the day it was discovered and it shows that there is activity such as hoses, batteries and the canvas is pulled back. There is a person standing next to the transom area on the dock with what appears to be tools:



Below we have added a series of pictures of Inlet Watch Marina taken from Google Maps which show the inlet area, marina and the berth with Nr. 8 unoccupied. Coincidentally Triggiano's boat is in slip 7:

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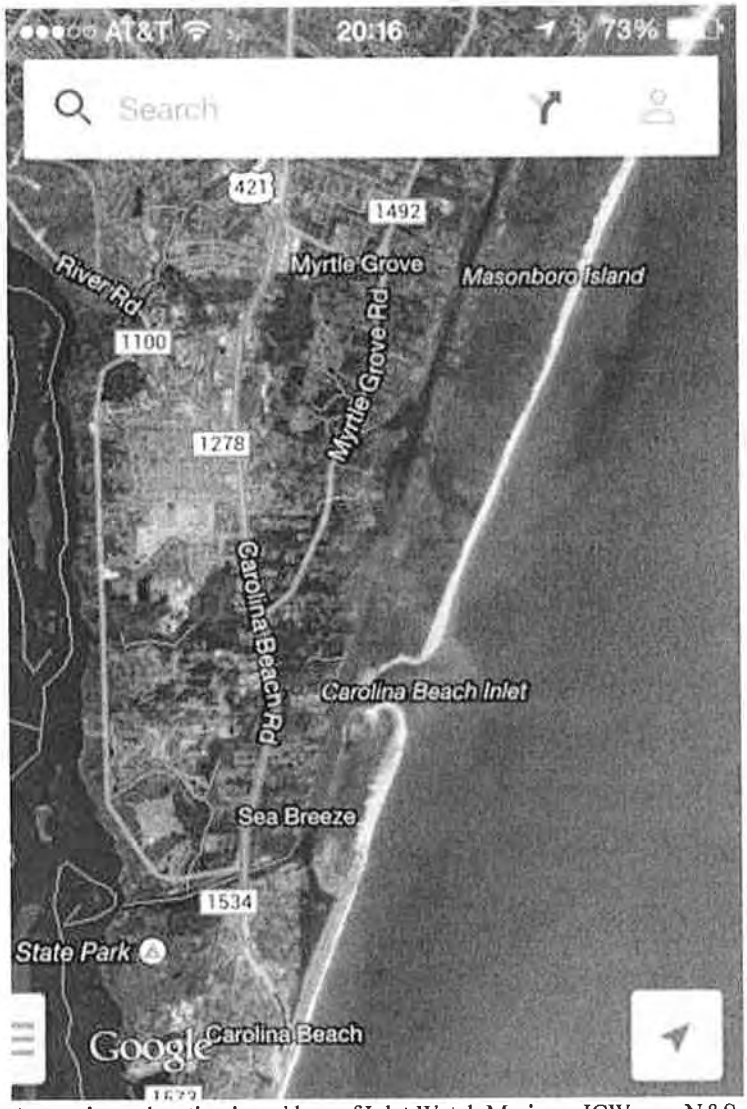

Approximate location in red box of Inlet Watch Marina – ICW runs N&S

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Inlet Watch Marina – approximate location of slip 7 indicated

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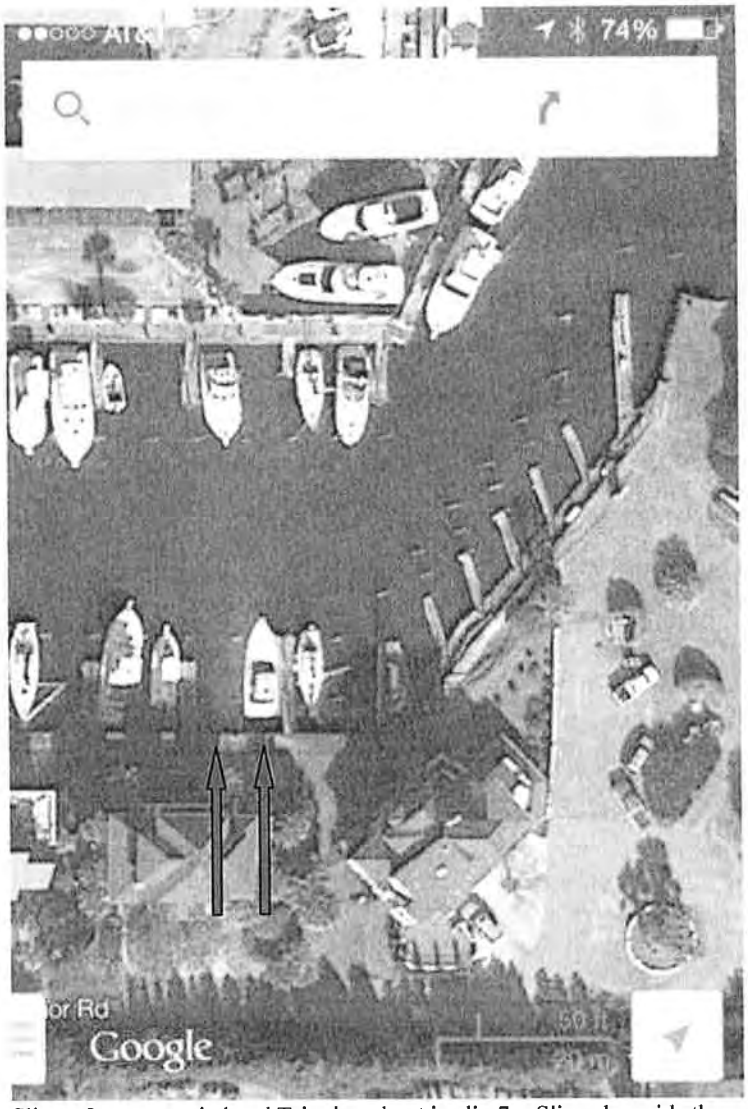

Slip nr 8 not occupied and Triggiano boat in slip 7 – Slips alongside the construction area are empty indicating that this area was still under repairs or near completion

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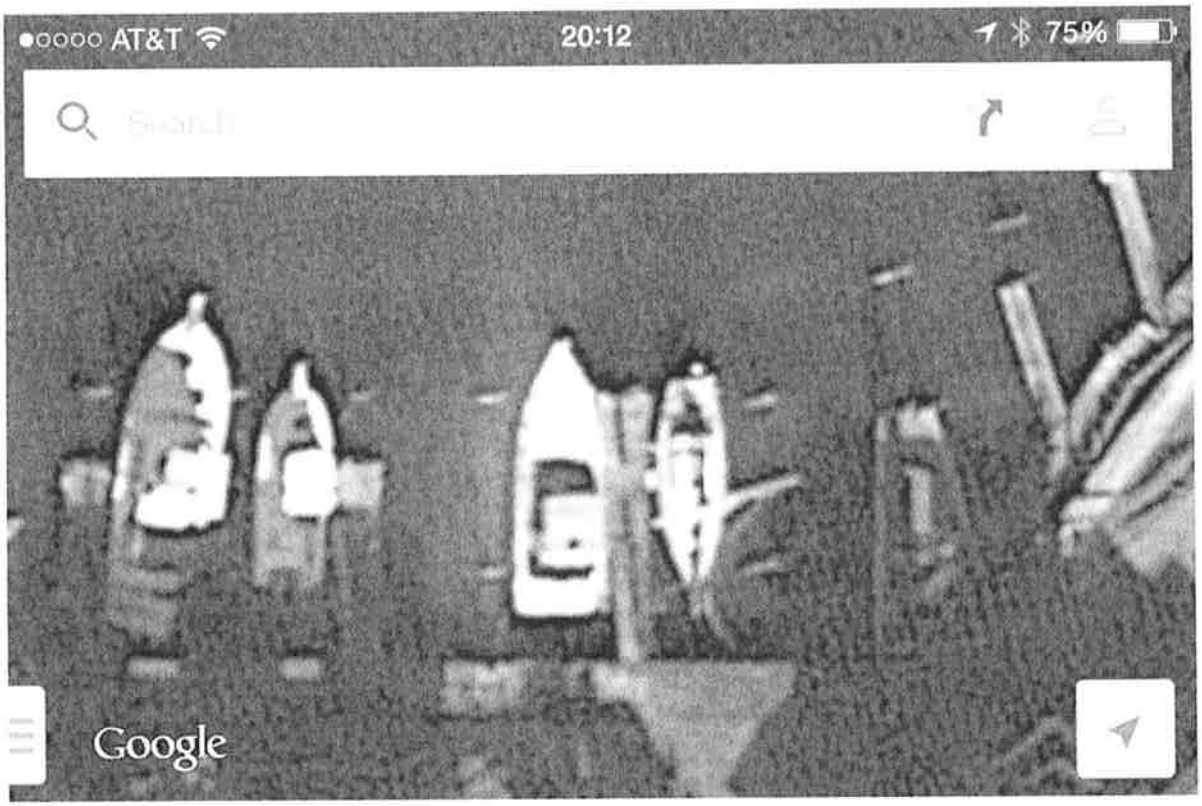


Alternate picture of the above

SURVEYORS FINDINGS:
The undersigned completed the joint inspection on June 30th, 2014 with Mr. Brian Donnalley. Findings & conclusions are as follows:

1. Repairs to the bulkhead area that included slips 301 thru 7 (Triggiano's slip) took place and was completed prior to the loss. We know that during this period of construction there were a total of (3) contractors working in the area and that the boats up to slip 7 had been moved to alternate slips. The exact details are not known at this time but the port side of Mr. Triggiano's boat clearly shows fendering marks something that would not have been readily visible to our client since his boat was secured stbd side to slip 7. The fendering action resulted in the failure of (2) out of (4) thru hull fittings which would have easily allowed rapid flooding of the boat if forced under. The exact time/date and how these thru hull fittings came to be damaged cannot be established at this time but what can be said is that this damage did exist the day of the loss and is a clear path for allowing rapid water ingress into the hull.

    a. BD admitted to the undersigned that he had not seen the failed thru hull fittings and that he had not investigated this area.

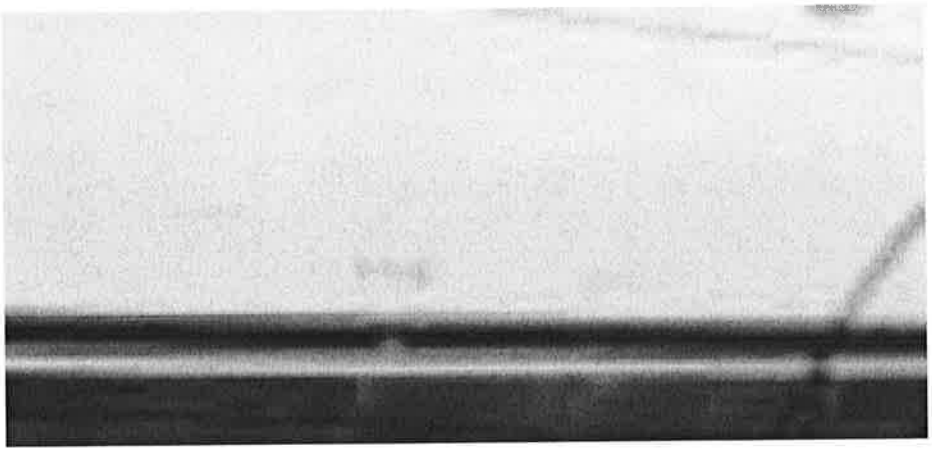
    b. A perusal of the photographs taken by BD show that only (1) photograph was taken of the port side bow area. The picture provided to us is low resolution and it is a profile view of the port side. The picture shows the horizontal fendering marks in and around the (4) thru hull fittings. Due to the low

resolution we were unable to clearly view the (4) thru hull fittings. But BD also admitted to the undersigned that he did not inspect these fittings and there are no additional photographs of this area.

c. BD also admits that he never inspected the berth/slips and was completely unaware that there had been construction in the area of Mr. Triggianno's slip/berth

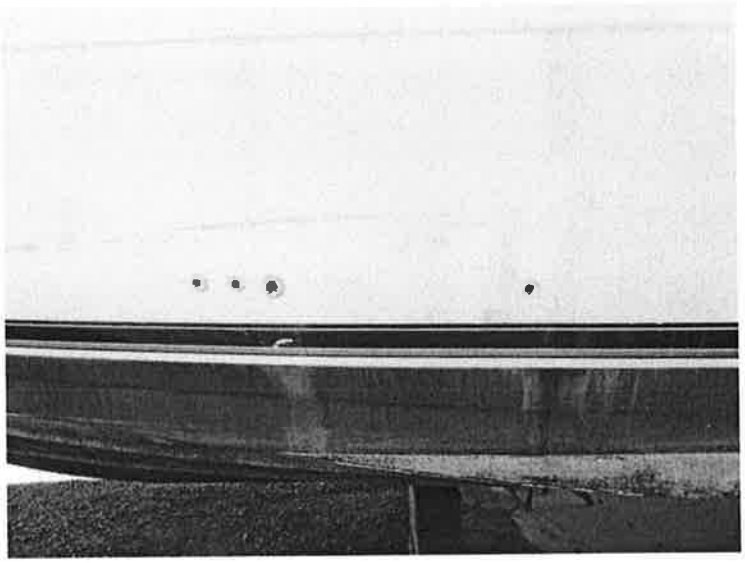
d. BD also admits that he did not realize that during this construction period power to the slips had been renewed resulting in blackout periods and the possibility that boats were being moved in/out of the area to accommodate the construction.

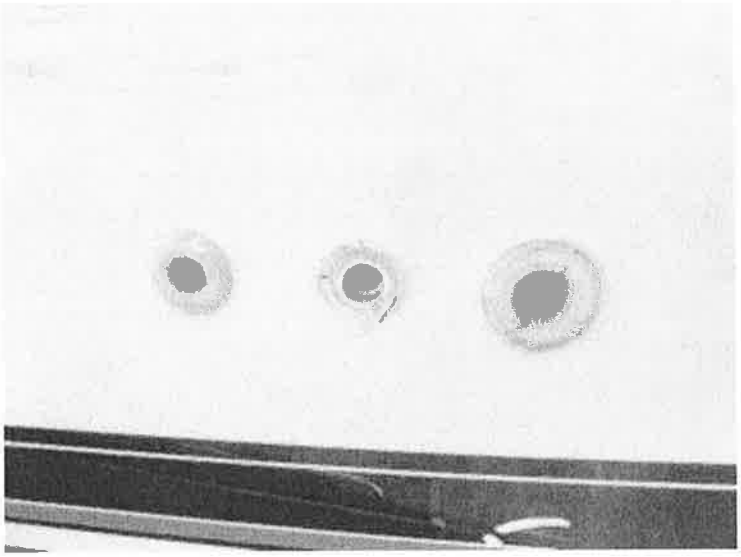
Picture provided by BD

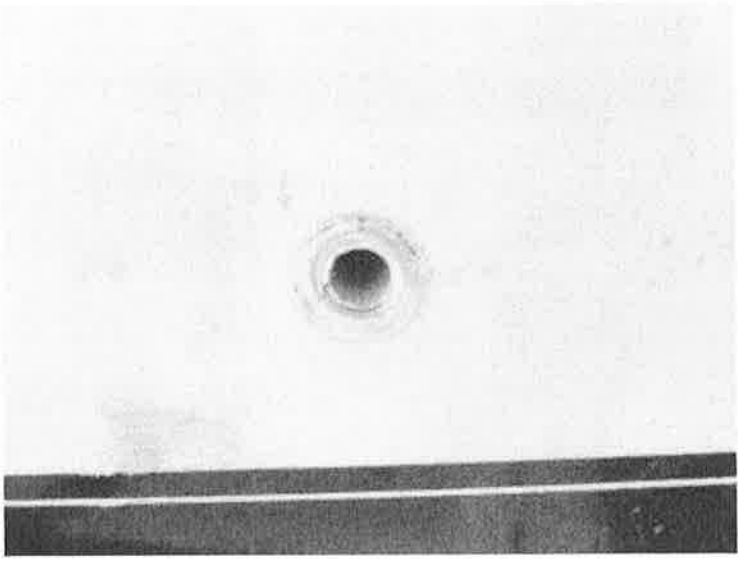


Portion cropped from the above picture to show the fendering marks that were captured by BD. Resolution is too low to determine condition of thru hull pictures from this picture

Below (3) pictures were taken by the undersigned and show the same area except with greater detail







2. We jointly inspected the (4) thru hull fittings which BD admits he never looked at during his inspection and confirmed that they belonged to:

    a. Galley sink

    b. Head sink

    c. Shower sump

    d. Bilge pump

3. The damaged thru hull fittings are an open hole in the hull in this area and if forced under will sink the boat very quickly. BD admits that he never inspected this area during his inspection so therefore it was never considered as part of his investigation

4. Next we made observations of the visible waterlines on the hull. As previously noted from the photographs supplied by Mr. Moore the boat was submerged significantly more than indicated by the water lines. What remained on the hull showed changing multiple water lines in the area of the boot stripe which is normal.

   Where it changed from the normal static waterline to an abnormal line was noted to be quick and approximately (max) 2.5" above the normal static line.

   From there it rapidly increased another 8 to 9". We now know from Mr. Moore's pictures that this 8 to 9" increase was actually twice as deep and significant. This may have been the result of shifting accumulated water at some point during the event (bow to stern area) or the boat being rapidly forced under.

   We examined the boat for any indications that could have caused (1) the sinking and (2) rapid change in trim. The following was found:

   a. Rub rail was examined and internal water marks clearly confirmed that there was ingress

   b. Port side trim tab fitting was observed with "old" leakage pattern

   c. Swim platform fittings all had new leak patterns consistent with the transom sitting low in the water

   d. Aft bilge pump discharge which was normally 17" above the normal static waterline was submerged and this would have been a source

   e. Genset discharge was which was normally 17" above the normal static waterline was submerged and this would have been a source

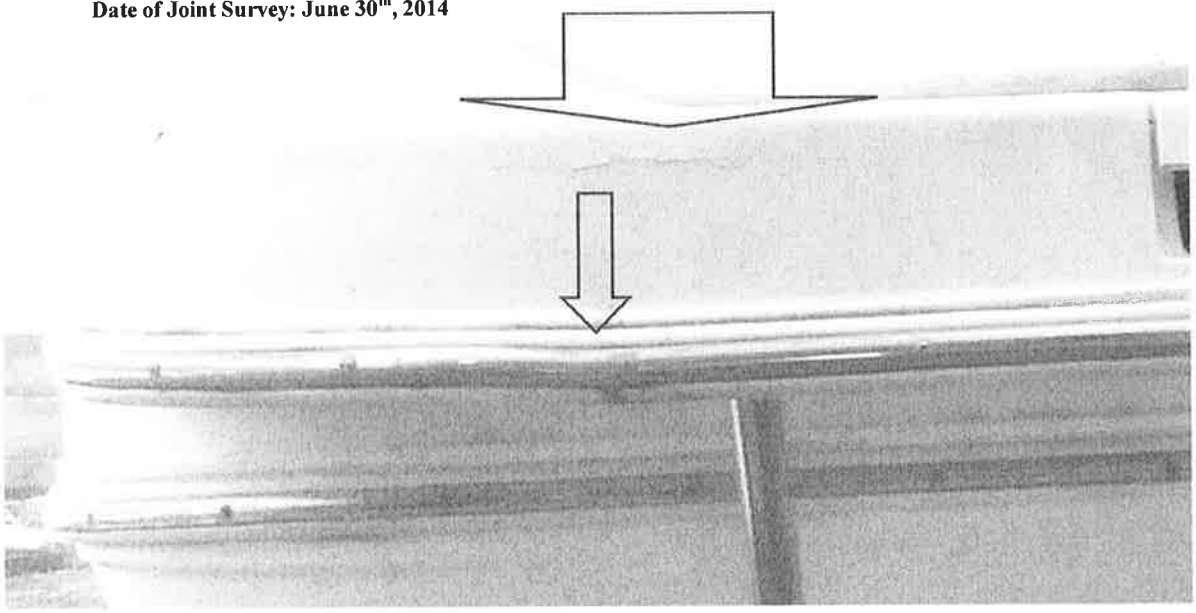
   f. The weather deck scupper drain was also submerged and this could have been another source

   BD had not made any observations of these water lines and the change from about 2.5" to an additional 8 to 9" is clearly a rapid change in vessel trim that should have alerted him. We know that BD never discussed the loss with Inlet Watch Marina or Troy Moore. The pictures that were provided to us were never given to BD during his initial inspections since BD never made contact with the Marina, its personnel or Troy Moore.

5. As previously mentioned the as found pictures provided by Troy Moore show a strong port list which contrary to BD's hypothesis that the boat sank by ingress on the stbd side. This was not discussed the day of the joint inspection since these photos were not produced at the time.

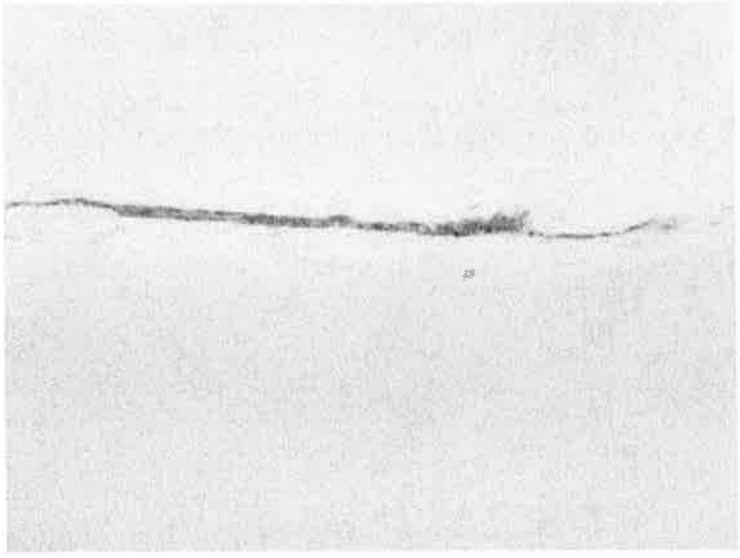
6. Next we inspected the exterior of the hull to determine if there were any signs that the boat was forced under. Outwardly along the gunwale & rubrail areas of the hull no strong indications were noted other than the previously sighted rubrail marks and damage to the (2) out of (4) thru hull fittings on the port bow.

   On the aft port side edge of the swim platform we observed a visible "deflection" on the rubrail which appeared to be an area where it was potentially hung up as being caught under a dock, structure or possibly being underneath another boat that was improperly secured in Mr. Triggiano's berth resulting in this damage



On the exterior surface there were repeated dock impacts which were older and not related but when we went underneath the swim platform to inspect we found a "fresh" large fiberglass failure consistent with this swim platform being caught underneath some type of structure/vessel.

This was shown to BD who after inspecting agreed that it was "fresh" and consistent with this swim platform being caught underneath a structure/vessel.



7. The raw water pump was produced. A box was brought forth by Mr. Joe Rose of Bellhart and we note that it was not sealed and when opened and inventoried we found numerous unrelated items in the box which we left "as is". An inventory of the related parts indicated that what was missing was as follows:

1. O-ring
2. Plastic fractured piece from the pump housing/volute
3. Shaft seal
4. Washers

Items that were in the box unrelated consisted of a dime; part of a rubber impeller, plastic pieces of unknown origin, etc. all of this was left as is. Of note the O-ring that is used to seal the pump housing to the SS wear plate was missing. Using a digital micrometer readings of the pump and its components were taken with BD independently taking measurements using his own micrometer. Any readings taken that were challenged were retaken. The SS wear plate was visibly distorted in the center penetration and measured to sit "proud" by approximately 0.187" at the (3) position (measurements below). The pump housing itself was measured at exactly 2.0" (less the O-ring which was missing) which renders an interference fit of about 0.146" since the impeller is 1.959".

We noted that the shaft housing (cast aluminum) where the bolts that secure the pump were cracked at the threads in two locations. Noted that the shaft seal was also failed (and missing). All of this was never noted by BD as relevant information & admitted to the undersigned.

As we examined the SS wear plate we explained to BD that this was likely the product of heat and thrust and quite possibly the result of an uneven bolting pattern since the threaded holes in two locations were cracked and could have resulted in a gap resulting in the SS wear plate distortion versus the conclusion that it was corrosion. BD did not agree although he admittedly did not notice the failed bolt holes in the cast aluminum housing.

We commented to BD that our client had replaced the raw water pump impeller and was within the prescribed maintenance period. BD acknowledged this fact but asserted that it was his opinion that the owner should have seen this problem. Note: we revert to the fact that this boat did not leak when float tested and required high pressure to produce a leak.

We examined the water pump housing specifically the interior wear/contact pattern in the plastic housing. We noted that the rubber impeller, which was hard against the housing, created a sealed edge all around and that this would not have allowed water to leak out since the impeller was in clear contact (hard contact). BD was shown this and he realized this but countered that the whole housing was cracked. We drew BD's attention to the failed area and one could clearly see the "old" cracks versus the new cracks in the plastic housing. We surmised based on that pattern that our 1st conclusion was correct and concluded secondly that the new cracks developed after the raw water pump was pressurized with the city water hose by BD.

Based on our examination we decisively concluded that the raw water pump was not the cause of the sinking. We shared this conclusion with BD who did not comment. Note: we revert to the fact that this boat did not leak when float tested and required high pressure to produce a leak.

Lastly BD confirmed that he never checked the ingress rate before doing his high pressure test which in our opinion damaged the pump when it was pressurized.

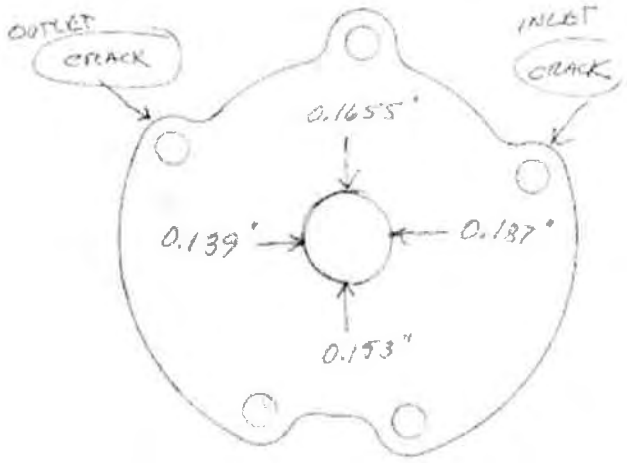
We asked BD how long did the boat remain in the water for the float test and he was unsure. We later learned in speaking with Joe Rose that the boat was floated before 10am and remained in the water all day. Mr. Rose stated that the boat only made water after the raw water pump was pressurized otherwise the boat had not been making water. This was also confirmed by Mr. Dwayne Dehart.

Photographs of the raw water pump supplied by BD don't clearly indicate if these are pre or post – pressurization.

We know that BD did not perform a simple ingress rate test and at this point it was not possible to perform an ingress rate test since the raw water pump had been destroyed.

We know that BD was unaware as to how long the boat remained in the water.

We know that BD stated on more than one occasion that it was his opinion that the ingress rate (leak) was dependant of the position of the internal rubber impeller. This remark caused curiosity since this would have indicated that ingress rate was in fact observed by BD.



8. Next we inspected the engine room. Looked for drip patterns in the area of the stbd engine raw water pump. None were found iwo which is inconsistent with a constant leaking appurtenance. This was shown to BD who acknowledged that there was no drip pattern in the area of the alleged leaking raw water pump.

9. Inspected the batteries and the wiring to/from the batteries. BD did not interpret the damage patterns correctly. There are (3) grp 27 batteries. (2) are starter batteries and the third is a house battery. All (3) are wired to a "Parallel" switch which is used to boost the power when the starter batteries are low by paralleling them thru a toggle switch on the helm station. Inspection of the (3) batteries and wiring rendered the following:

    - Stbd starter was 100% hot when it went down – DOM 3/10
    - Port starter was dead or very near dead when it went down. Since our inspection where the boat was found with a hard port list we would have investigated the starter solenoid on the port engine which could have contributed to the partially drained condition that was found. Visible water lines at the joint inspection suggested an even list sinking which we now know was not the case – DOM 6/13
    - House battery was 100% dead when it went down – DOM 4/13

    The parallel wires burned off hot on the port & stbd starter batteries indicting that this wire was energized (likely between the starter batteries) but remained intact on the house battery further confirming that this battery was completely dead when the boat went under.

Based on the patterns we would suspect that the bilge pumps were hot wired to the house battery only. A perusal of the owner's manual confirms that the starter batteries are isolated and that only the house battery supplies power to the DC components. BD was shown the patterns and agreed with our findings

10. Aft bilge pump and float switch was inspected. We confirmed that it was wired up and that the connections were "good". Wires coming from the pump and the float switch were properly connected and still intact – other wires that BD had made comment too were unrelated and probably from some other appurtenance that was no longer in use. BD agreed that the wiring was intact

SUMMARY:
Based on our inspection we can conclusively state the following:

1. The boat sank from a rapid ingress of water likely the result of a forced change in trim. This was not a gradual accumulation over an extended period of time. From last use on the 15th of December to the 27th of December there were only 11 to 12 days

2. Boat sank with a hard port list indicating that the stbd side raw water pump was not the source as indicated by BD

3. Float test conducted on 1/9/14 had negative results until the city water hose is used to apply significant pressure to the raw water inlet system

4. BD conducts a float test and states that the ingress rate was never observed and then states that the position of the raw water pump impeller likely influenced the ingress rate. We asked BD if it was leaking before the pressure test and he stated "yes" but could not state that observed rate.

5. BD's conclusion that this was the result of the raw water pump is in our opinion flawed. Our observations of the wear patterns don't support his theory plus by nature the pump would not have functioned if the suction volute had in fact been cracked as alleged. BD's comments that the ingress rate was dependant on the position of the impeller are telling that his observations and conclusions are flawed. We surmise that the complete failure of this item was done when the pump was over pressurized with city water causing spoliation of the pump. BD should have preserved the evidence, developed a protocol and requested a joint inspection for further consideration especially when he failed to properly investigate this matter.

6. BD failed to properly inspect the boat and failed to properly investigate the circumstances and environment that the boat was maintained

7. The marina maintains personnel (7) days from 0800hrs to 1700hrs but admitted to the undersigned that transient boats do come in from the ICW and are generally dealt with on the next day especially when they arrive after hours. The fact that the Triggiano boat was discovered by a neighbor versus the Inlet watch marina personnel points to the lack of vigilance that is claimed to exist by Mr. Moore. We opine that the possibility does exist that the damage to Mr. Triggiano's boat may have been the result of an improperly secured boat that came into contact with the properly secured Triggiano boat that came & left unnoticed but resulted in the partial sinking. The physical evidence is present and was never noticed or investigated by BD.

We are of the opinion that the Triggiano boat sank from being forced under as evidenced by the "fresh" damage to the swim platform, rubrail marks on the port bow area damaging (2) out of the (4) thru hull fittings.

Additional observations that were made:

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1. Inspect the berth – clearly because of the significant tidal changes and the marina being located on the ICW which is subject to transient berthing

2. Bumpers affixed to slip 7 are white and the transfer in the area where the (2) thru hull fittings are damaged is black. Clearly this came from a boat/barge/etc that came in contact with the Triggiano boat likely a transient

CHAIN OF CUSTODY:
The raw water pump was produced by Mr. Joe Rose and as previously stated was in an unsecured cardboard box with unrelated items of unknown origin. We took possession of the failed raw water pump and the exemplar that was used for comparison from BelHart Marine.

Parts missing were noted and previously discussed in this report. BD did not want to sign the chain of custody letter but was present when the "box" was tendered, contents inventoried, examined and secured. This pump as documented in BD's report to the insurance company was tested, examined, removed, disassembled and apparently left unsecured by BD at Belhart Marine.

PHOTOGRAPHS:

Dock:

New exterior wood enclosure

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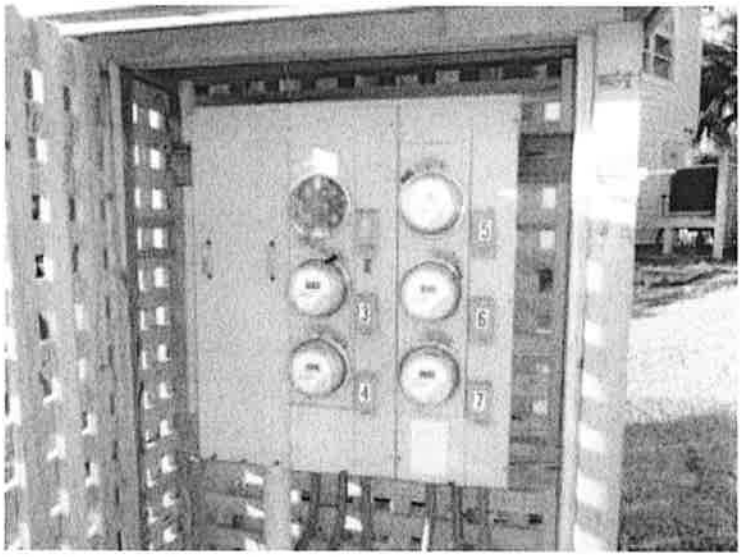
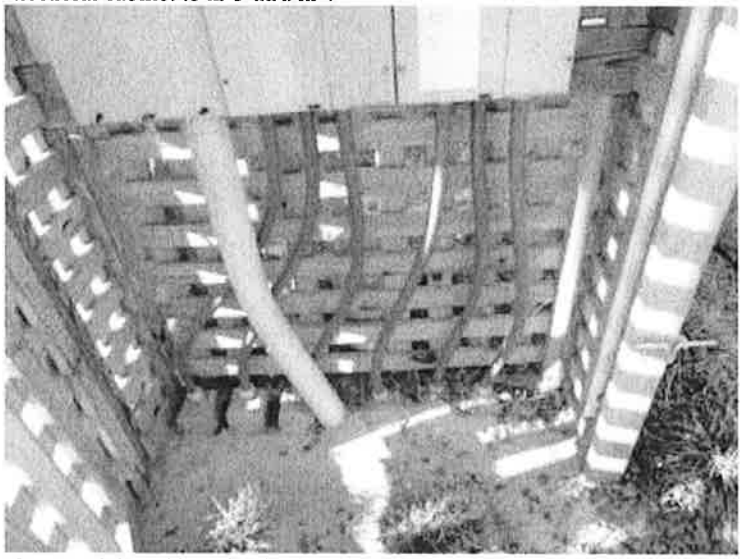


Electrical cabinet to nr 3 thru nr 7



New conduit and junction boxes to the electrical cabinet

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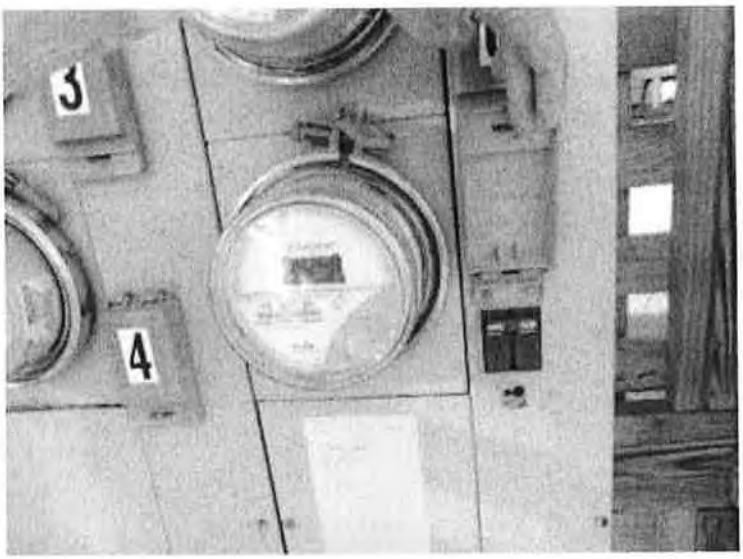
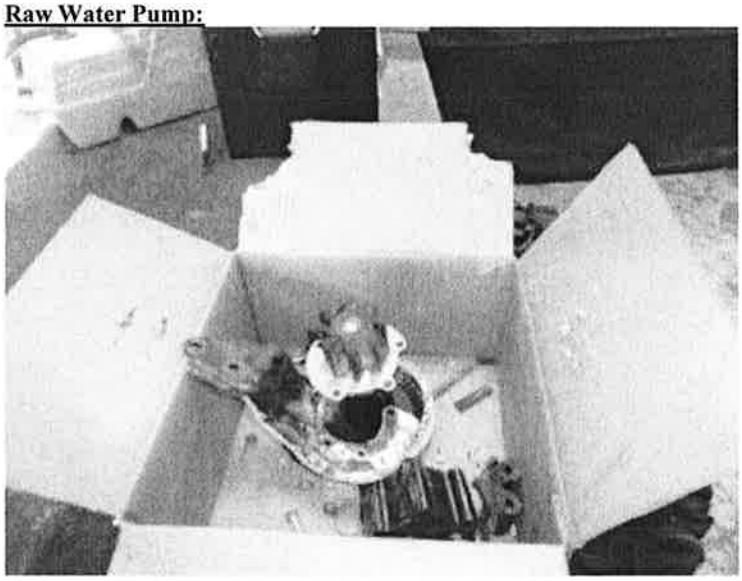


Nr 7 electric meter with breaker


View of nr 7 berth with a rising tide. Note the bulkhead with exposed reinforcement which extends outward approximately 12" from the face. Potential area where swim platform can be caught if boat is not properly secured

Exemplar of older conduit feeding berth nr 8 and up that was not renewed

Raw Water Pump:



Raw water as produced. Box was not secured and we noted that the O-ring was missing

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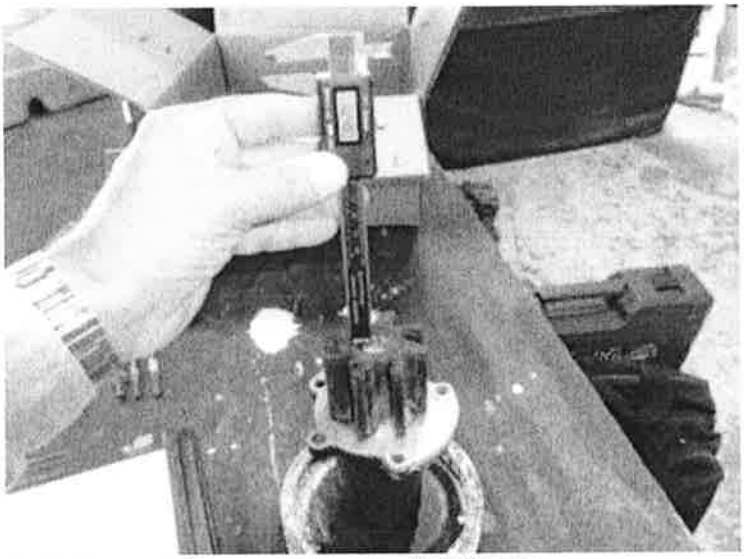
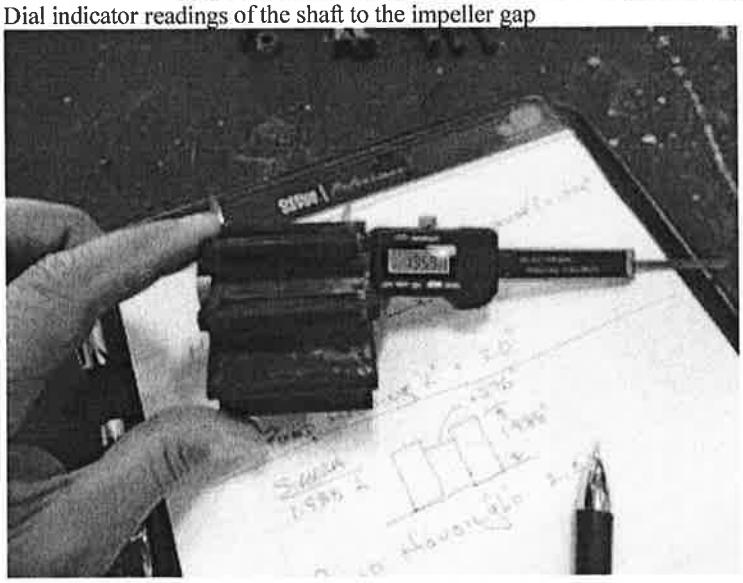


Dial indicator readings of the shaft to the impeller gap



Dial indicator readings of the impeller

ALPHA MARINE SURVEYORS

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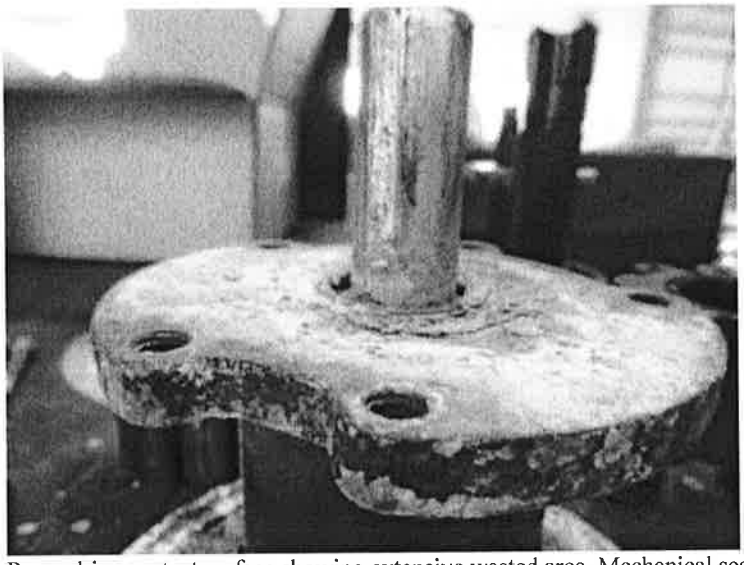
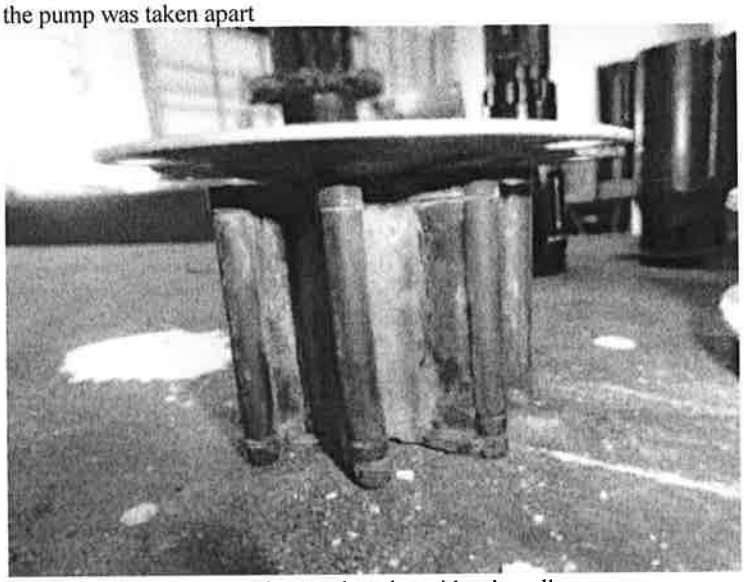


Pump drive contact surface showing extensive wasted area. Mechanical seal was not present and presumably lost when the pump was taken apart



Mock up of the SS wear plate against the rubber impeller

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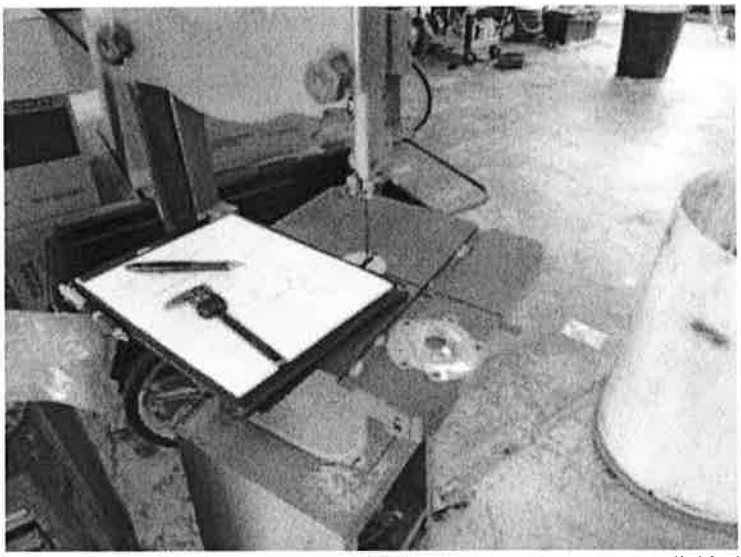
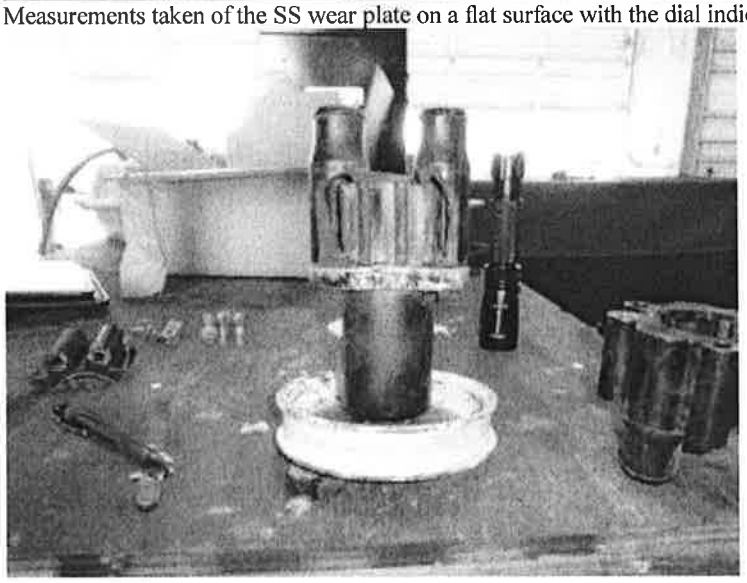


Measurements taken of the SS wear plate on a flat surface with the dial indicator



Pump mocked up

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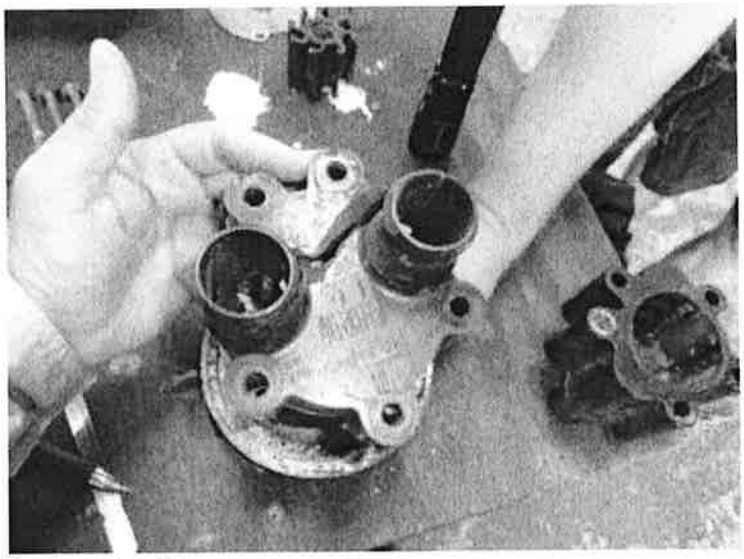

Pump mocked up

Heavy contact pattern clearly showing that the original failed area was well within the hub of the raw water pump impeller and not exposed to the inlet/discharge port of the pump volute. The missing plastic was also not present and presumably blown out when the pump was over pressurized

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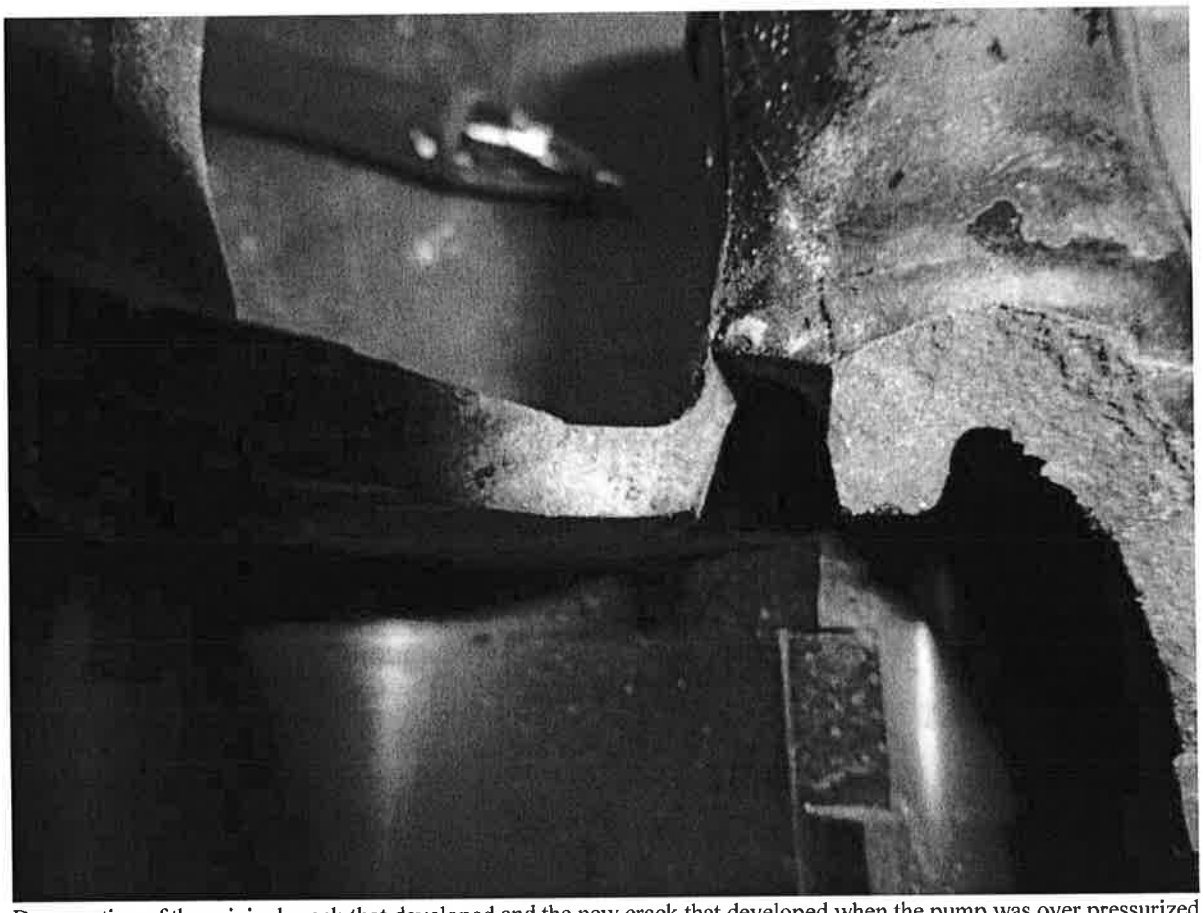

Demarcation of the original crack that developed and the new crack that developed when the pump was over pressurized with the water hose. By the position of the raw water pump impeller this original crack would have been sealed by virtue of contact and we are of the opinion that this pump would have minimal to no leak under normal operating conditions

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One of cracks where the bolts secure the plastic housing to the pump drive

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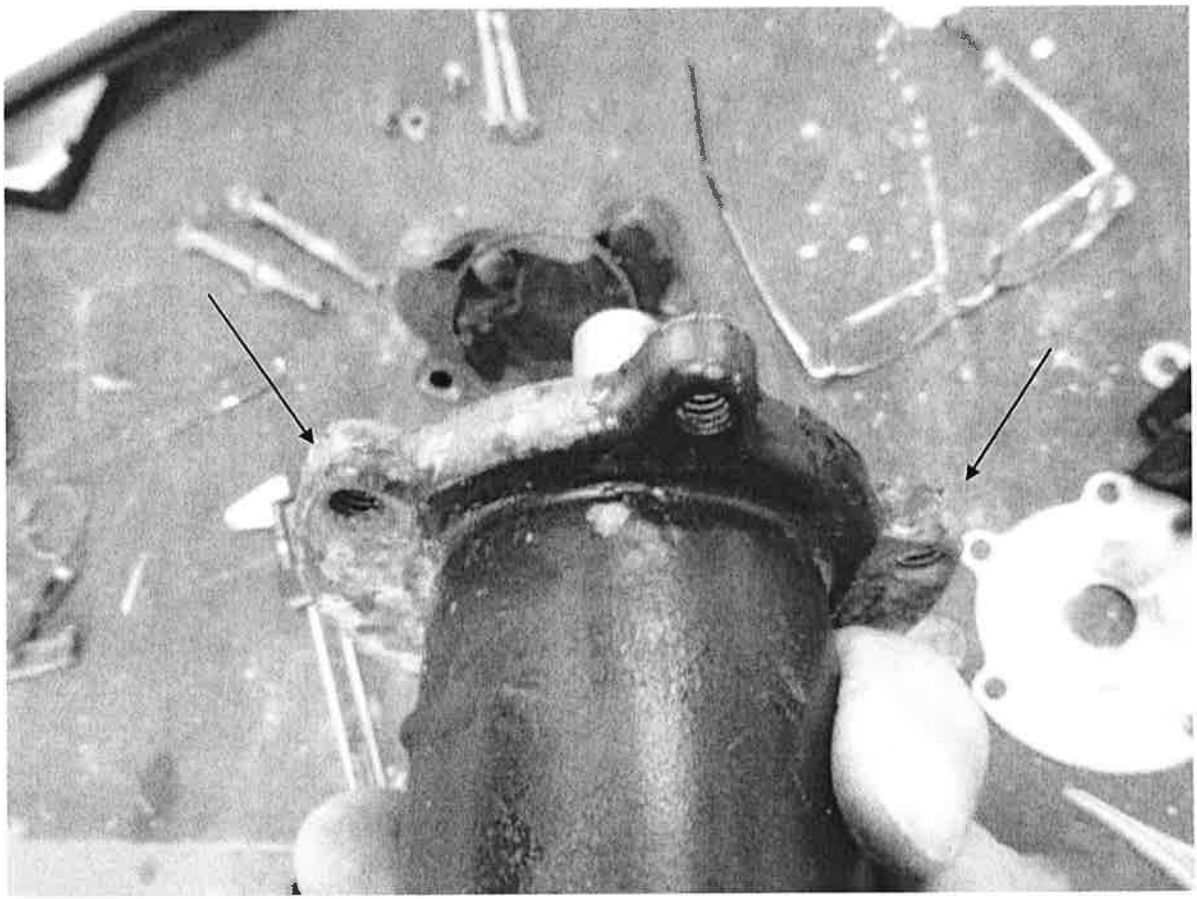

Cracks were found as indicated by the arrows

Inspection of Boat:

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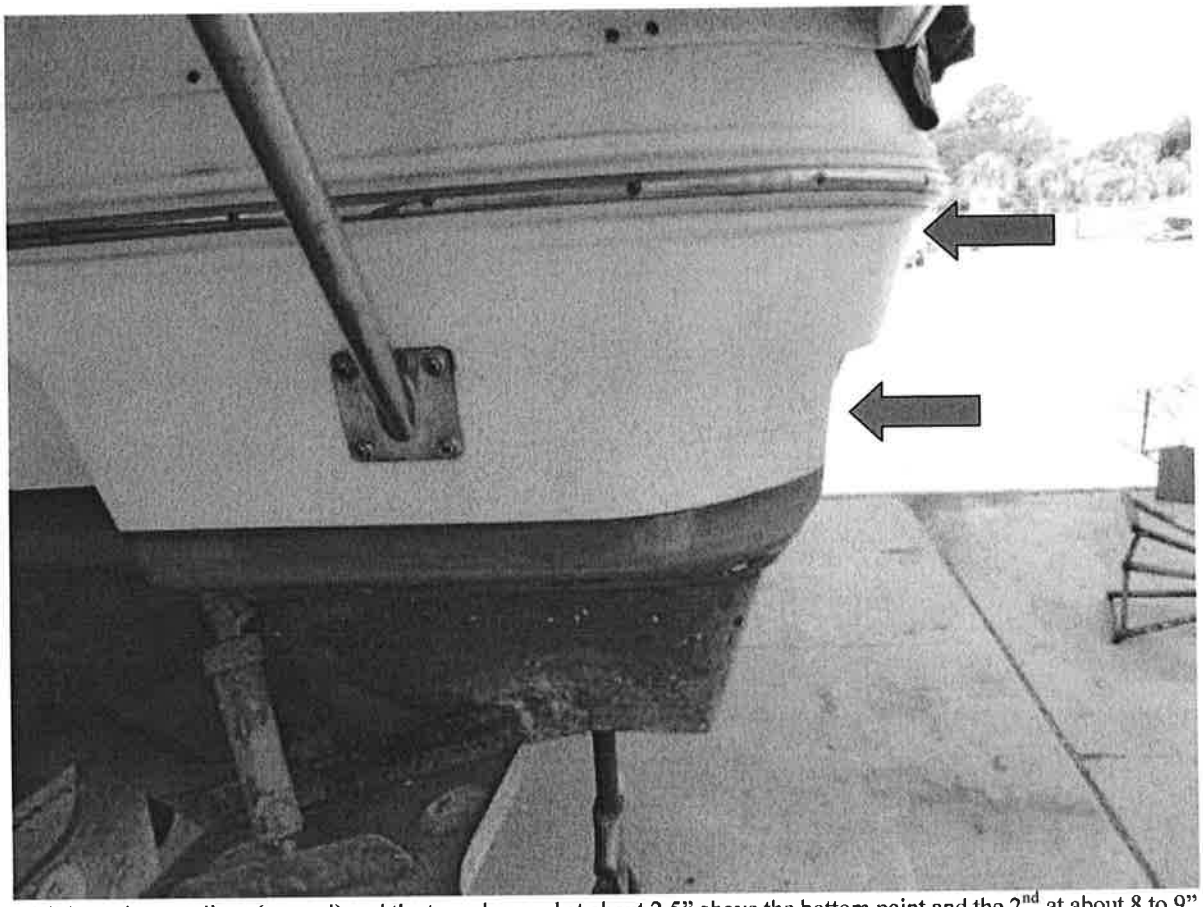

Visible static waterlines (normal) and the two observed at about 2.5" above the bottom paint and the 2nd at about 8 to 9" increase at the bottom edge of the rub rail

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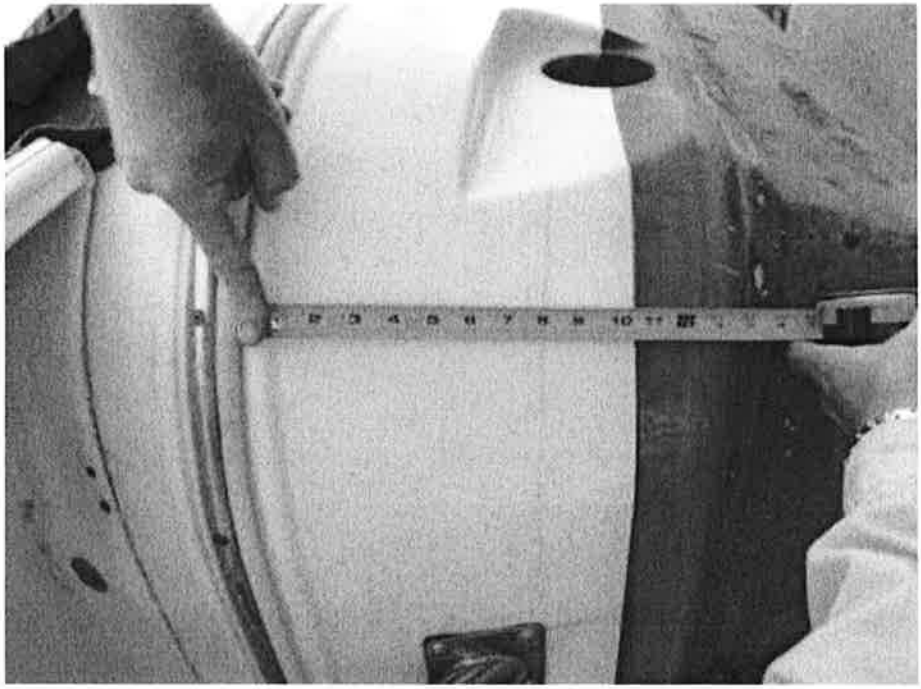

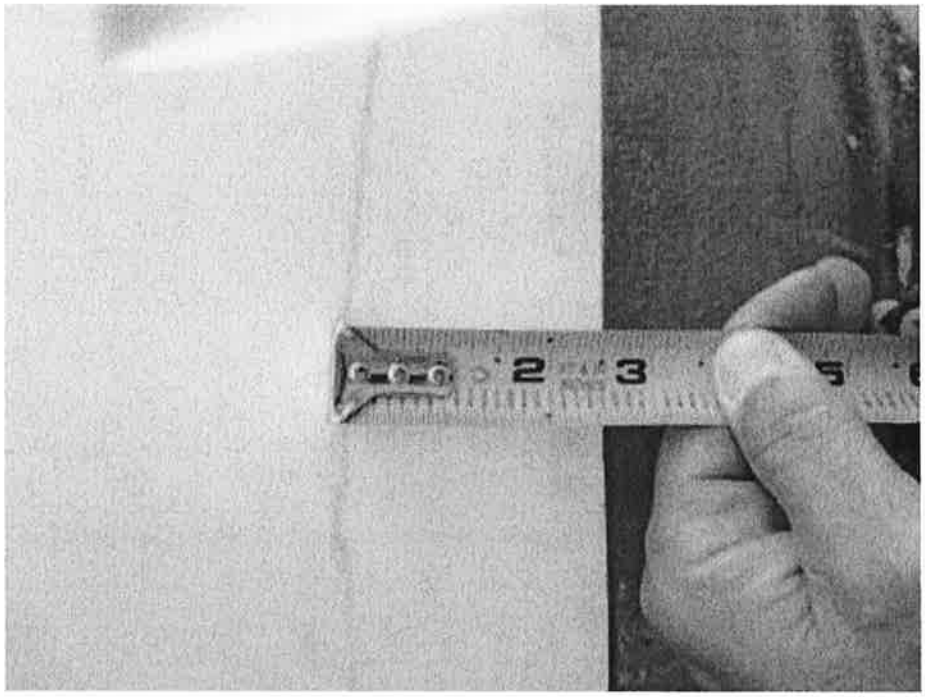

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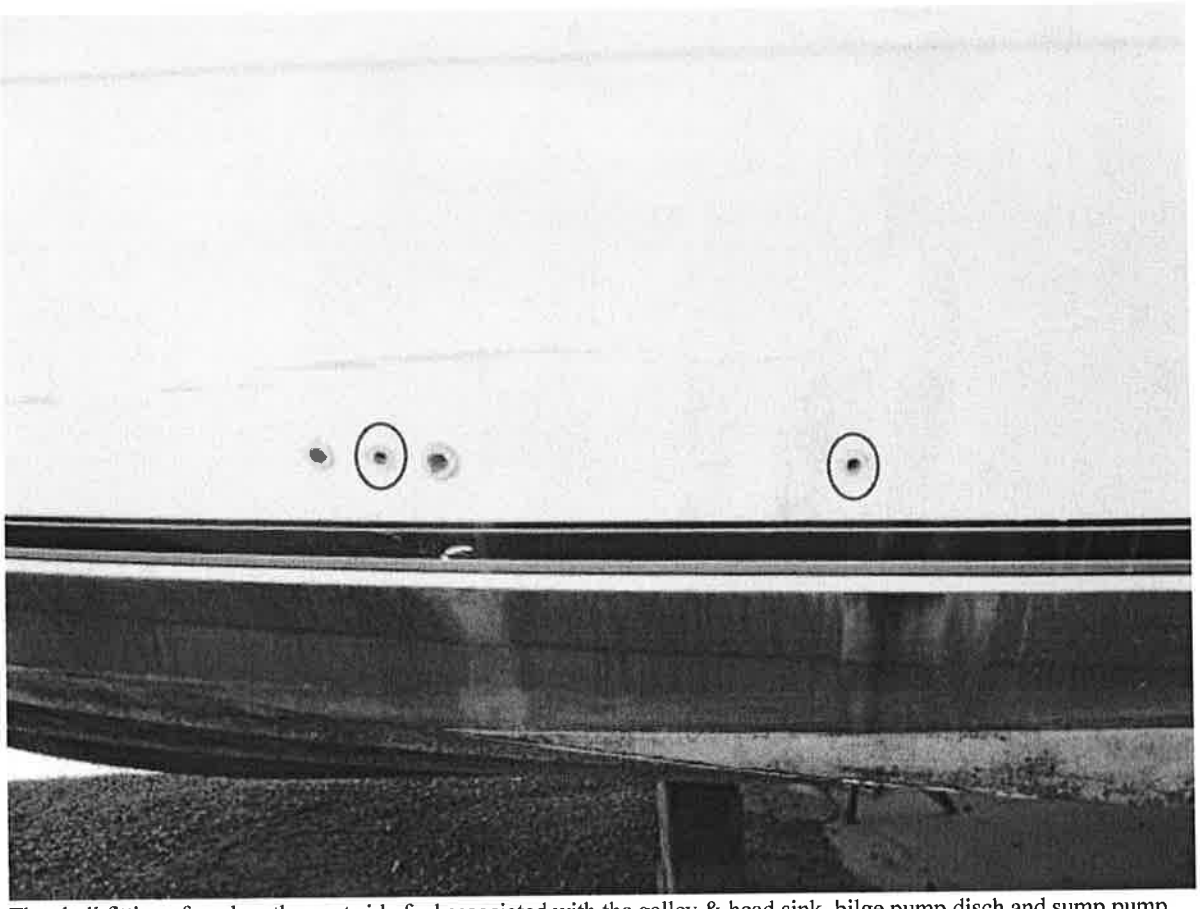

Thru hull fittings found on the port side fwd associated with the galley & head sink, bilge pump disch and sump pump disch. (2) of the thru hulls are freshly damaged creating a hole in the hull. Note the fresh black transfer on the hull

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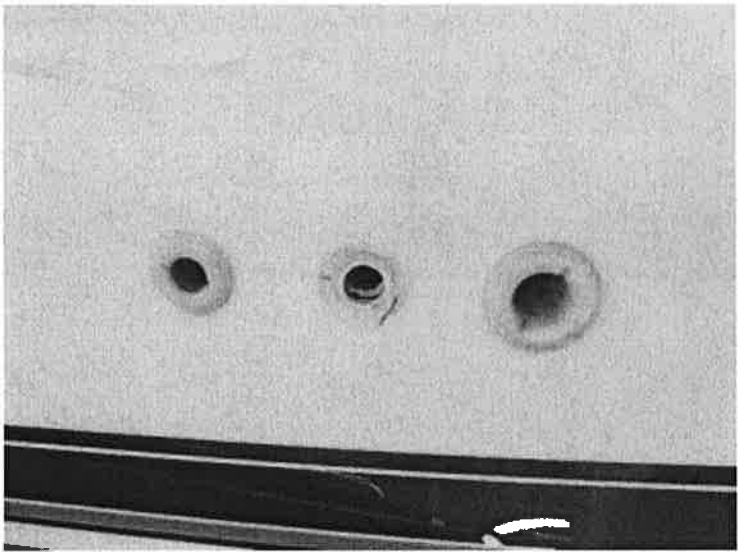

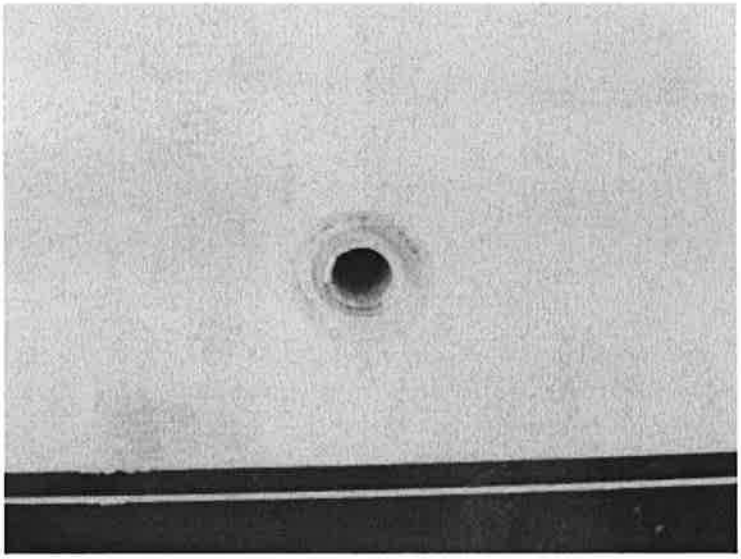

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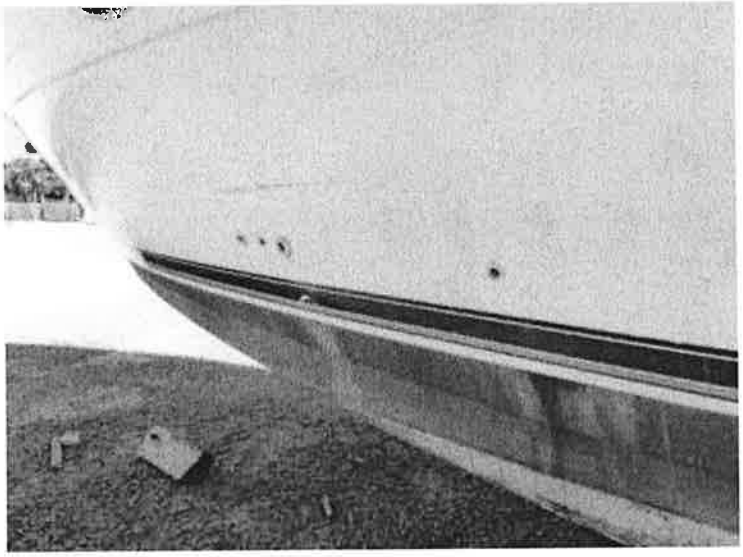

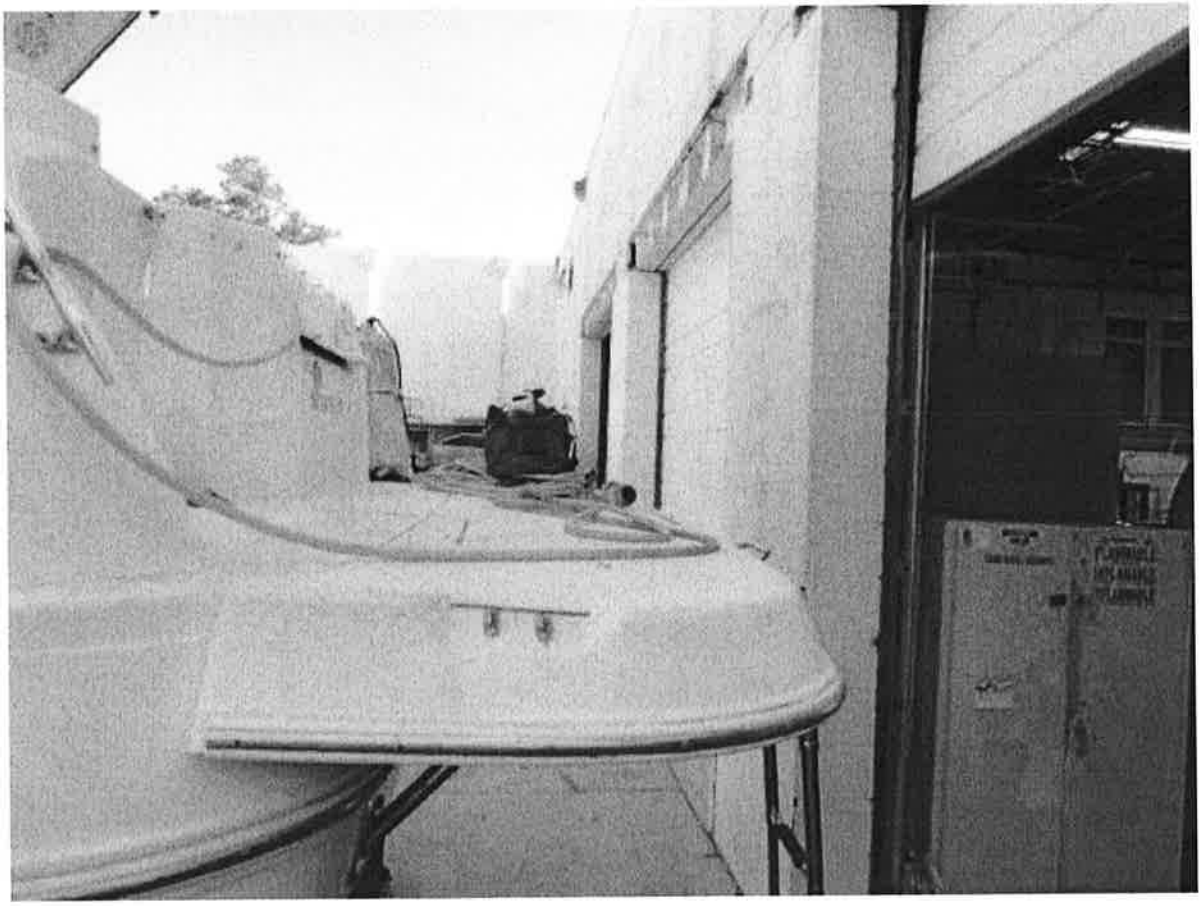

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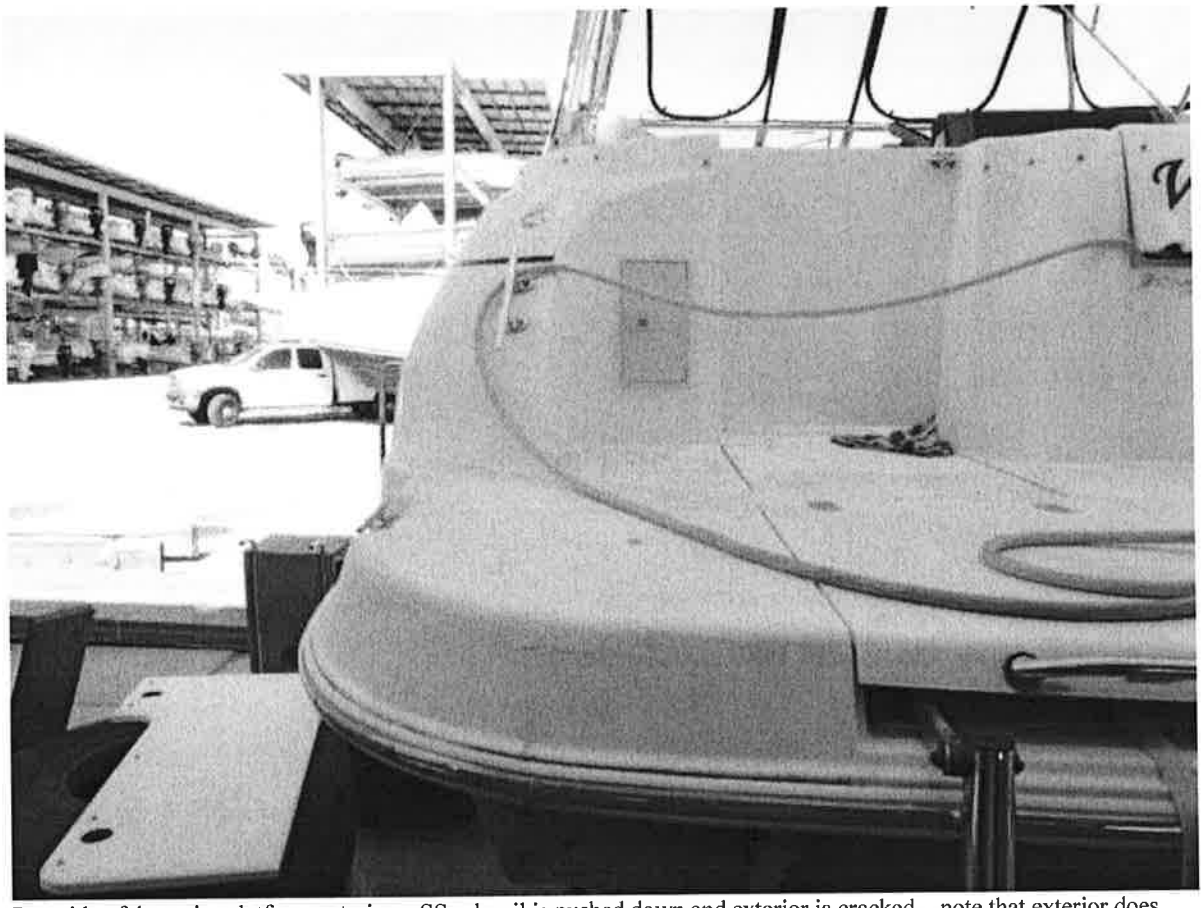

Port side of the swim platform exterior – SS rub rail is pushed down and exterior is cracked – note that exterior does display new & old cracks that can be easily overlooked

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Fresh crack found underneath the swim platform associated with the exterior crack on the port side

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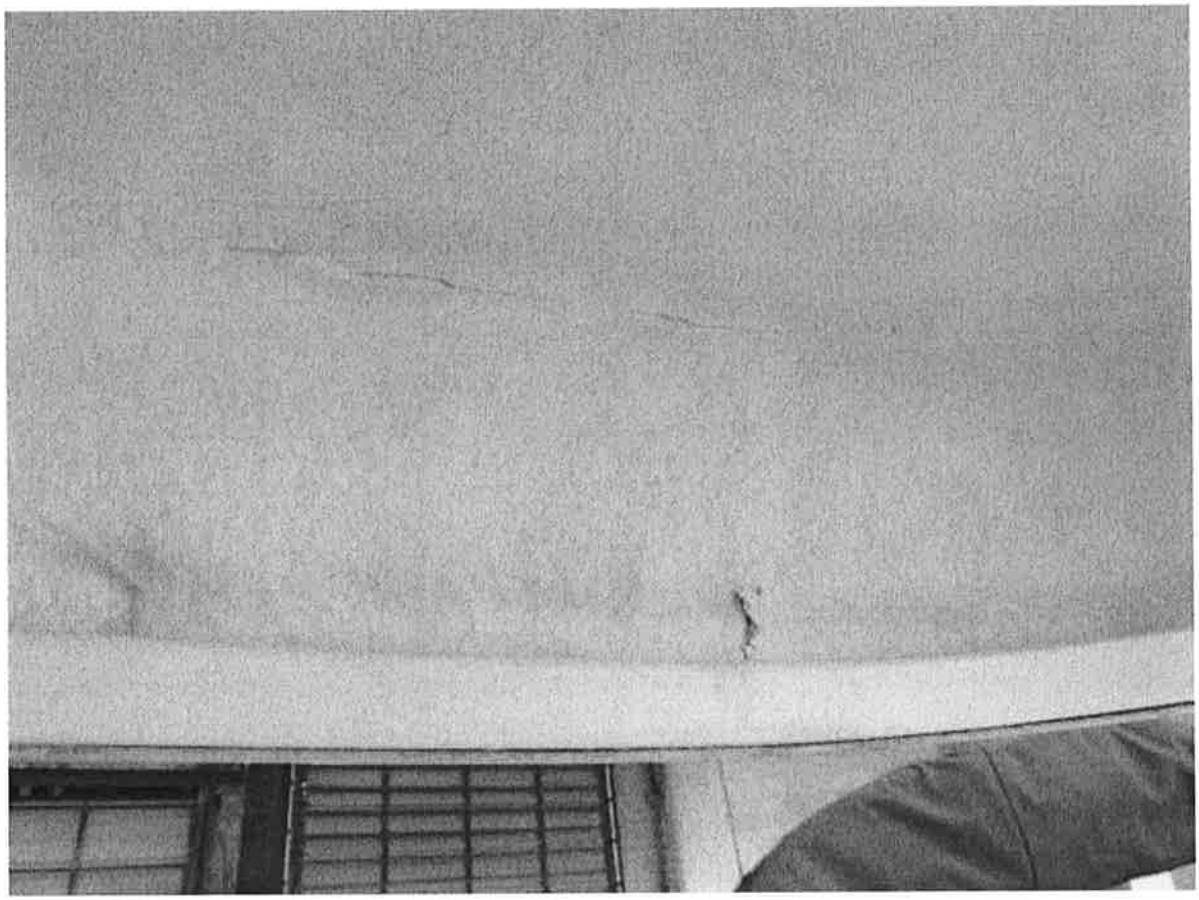

fresh crack in the port side underneath

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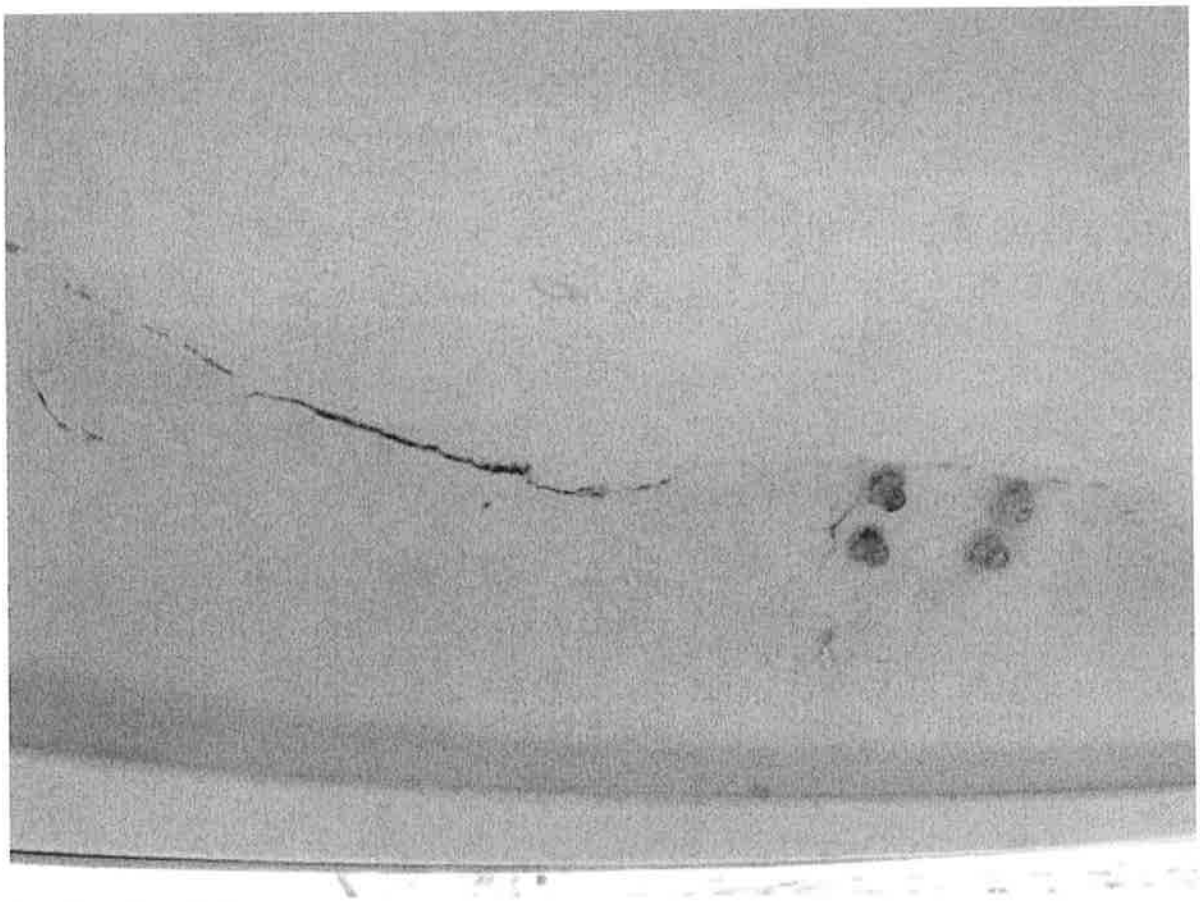

Port side underneath fresh crack

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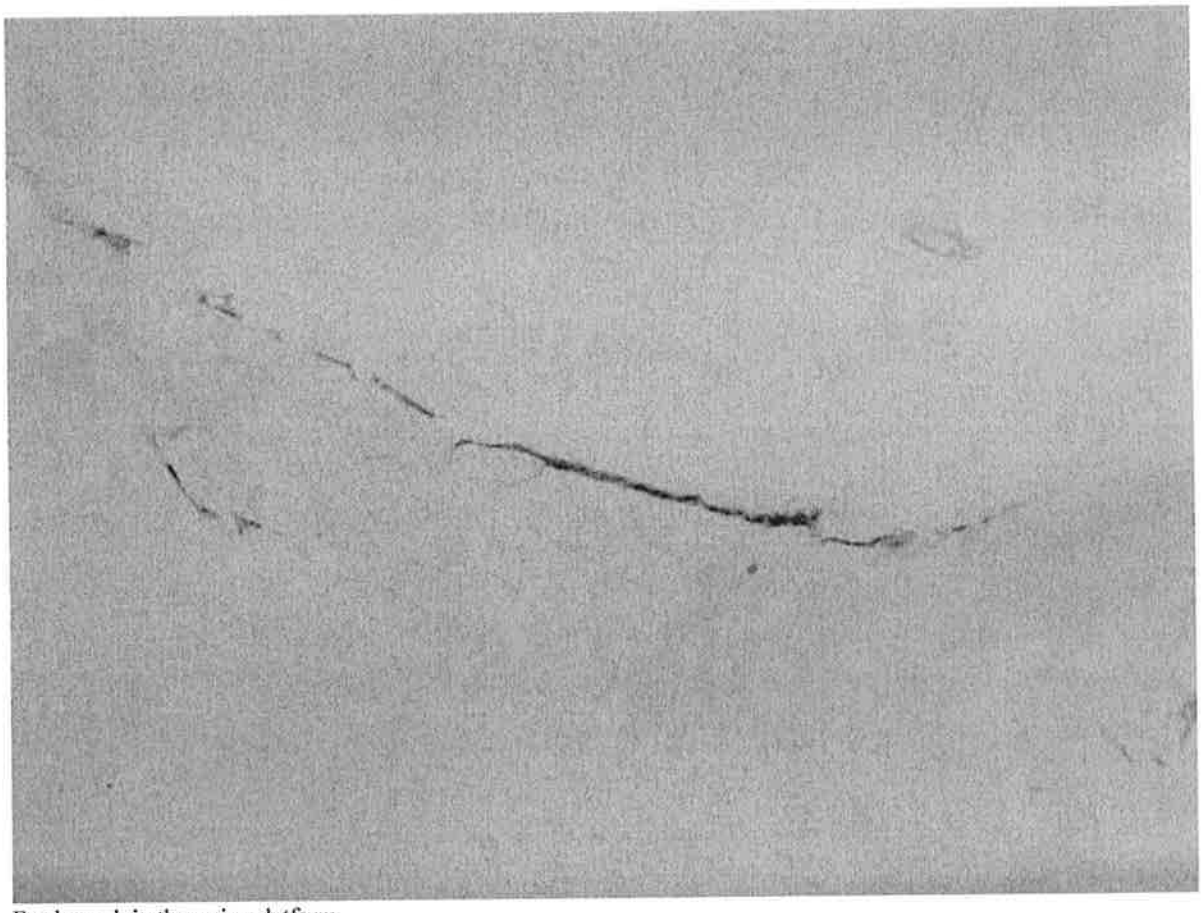

Fresh crack in the swim platform

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No damage to the stbd side

Engine Room Inspection:

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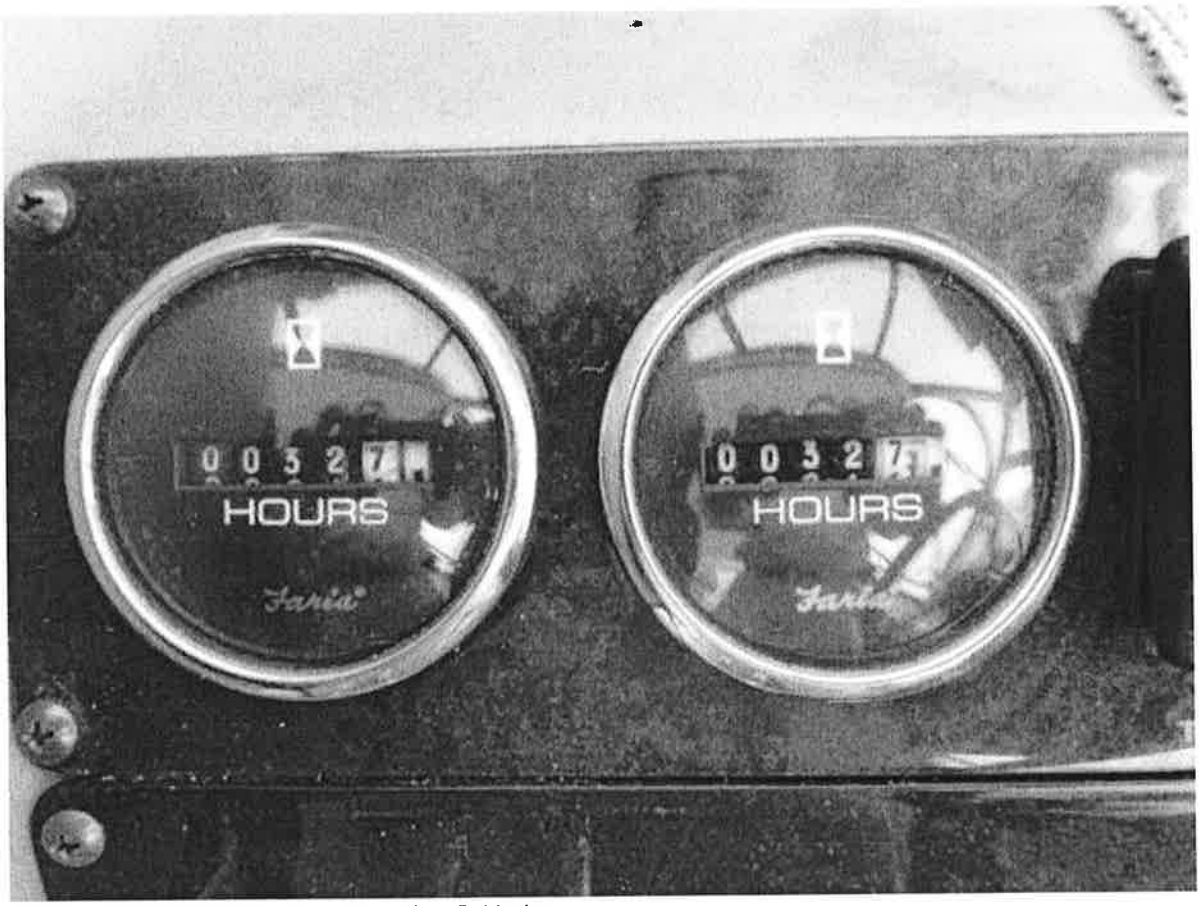

Hours on the P&S engines since installation @ 32.7hrs

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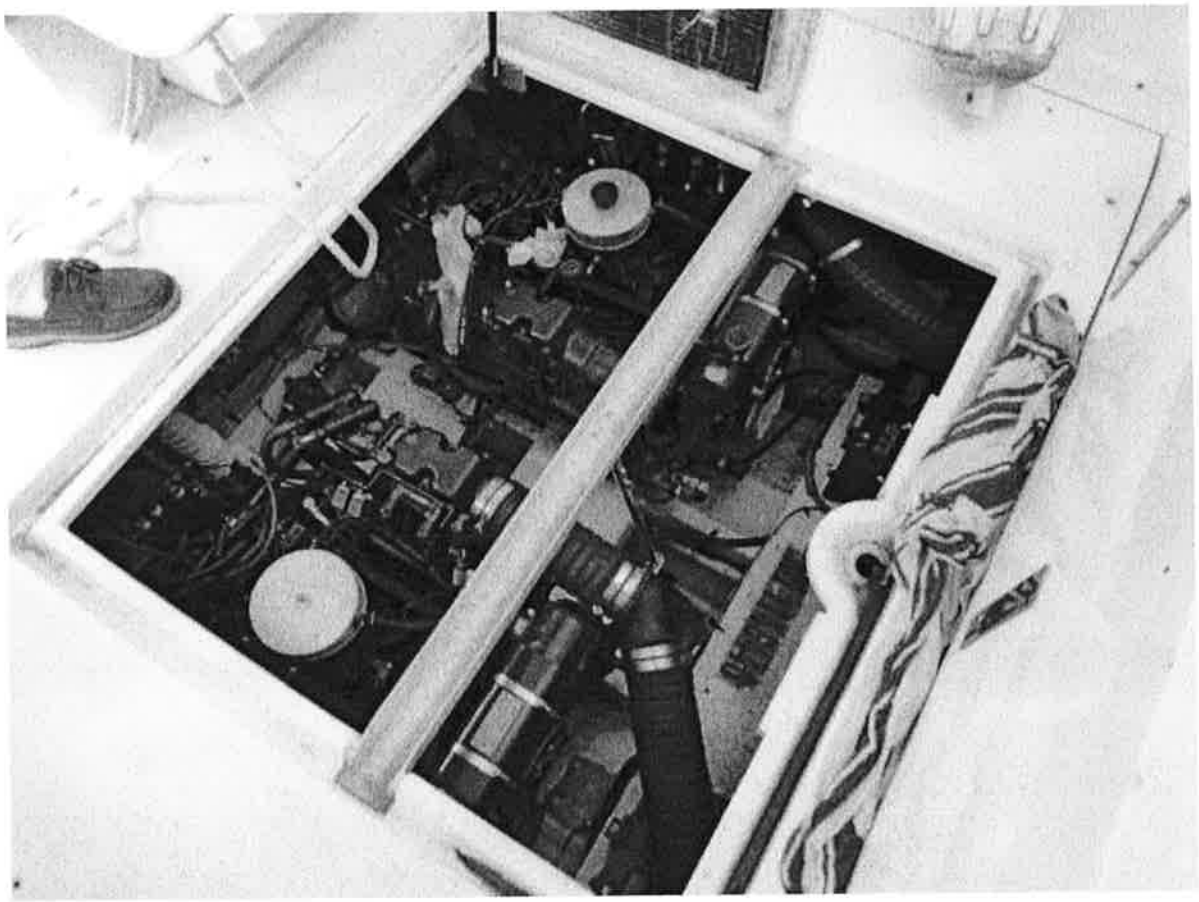

Port & stbd engines

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Johnson pump and float switch found properly wired

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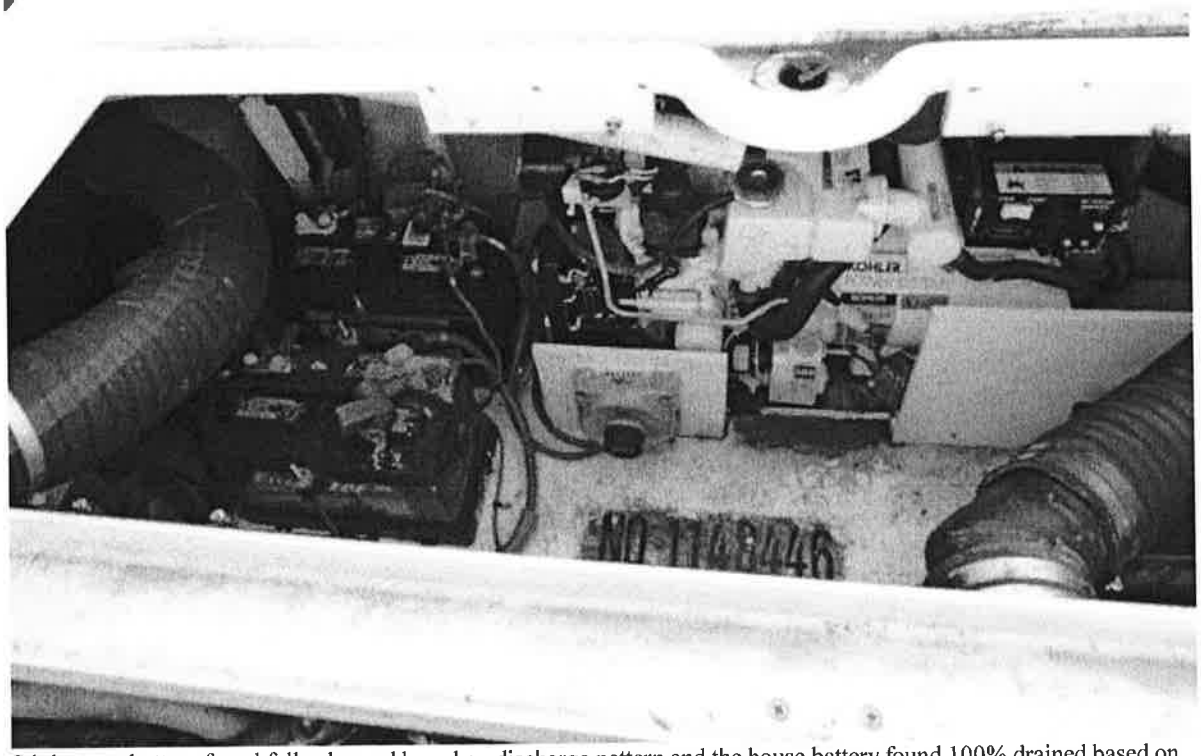

Stbd starter battery found fully charged based on discharge pattern and the house battery found 100% drained based on the discharge pattern

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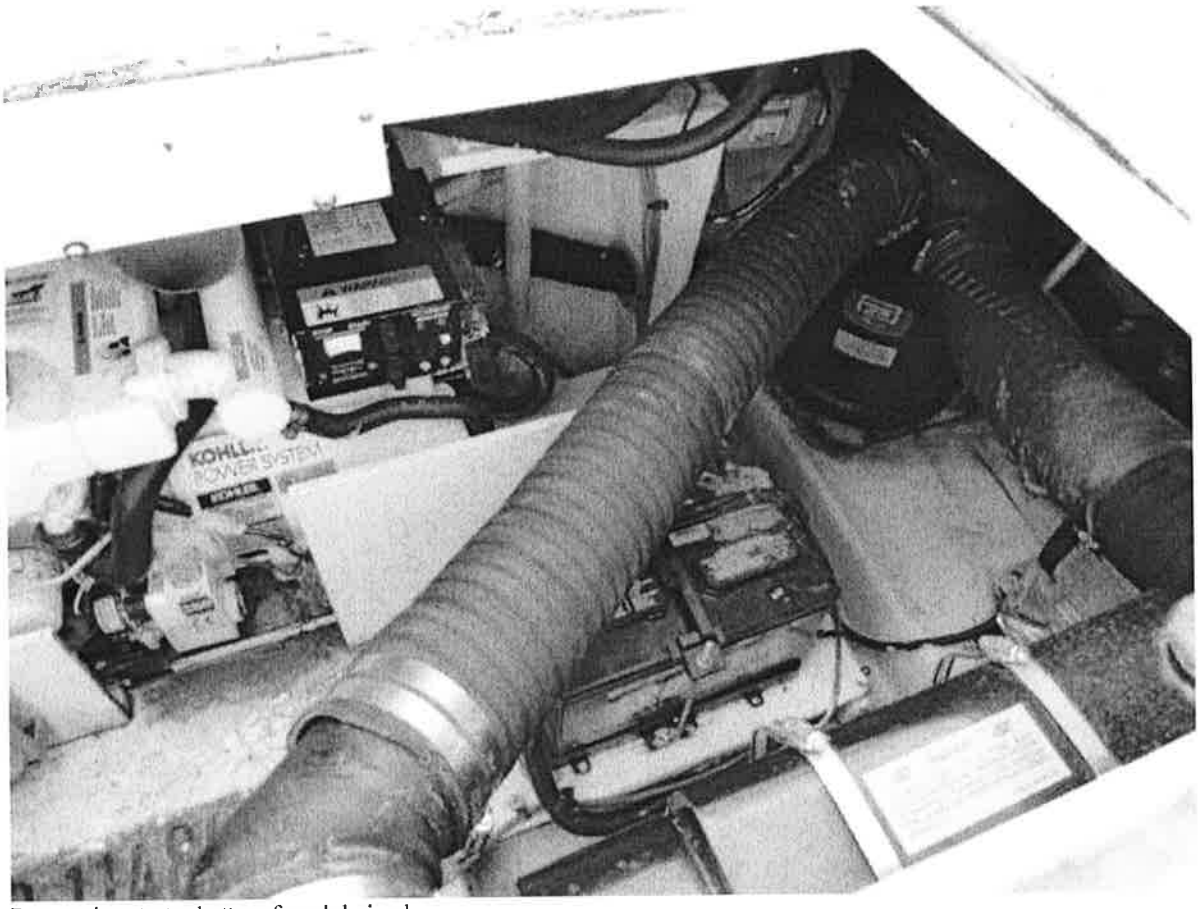

Port engine starter battery found drained

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No water pattern associated with the alleged leak of the raw water pump observed in the bilge

Interior Inspection:

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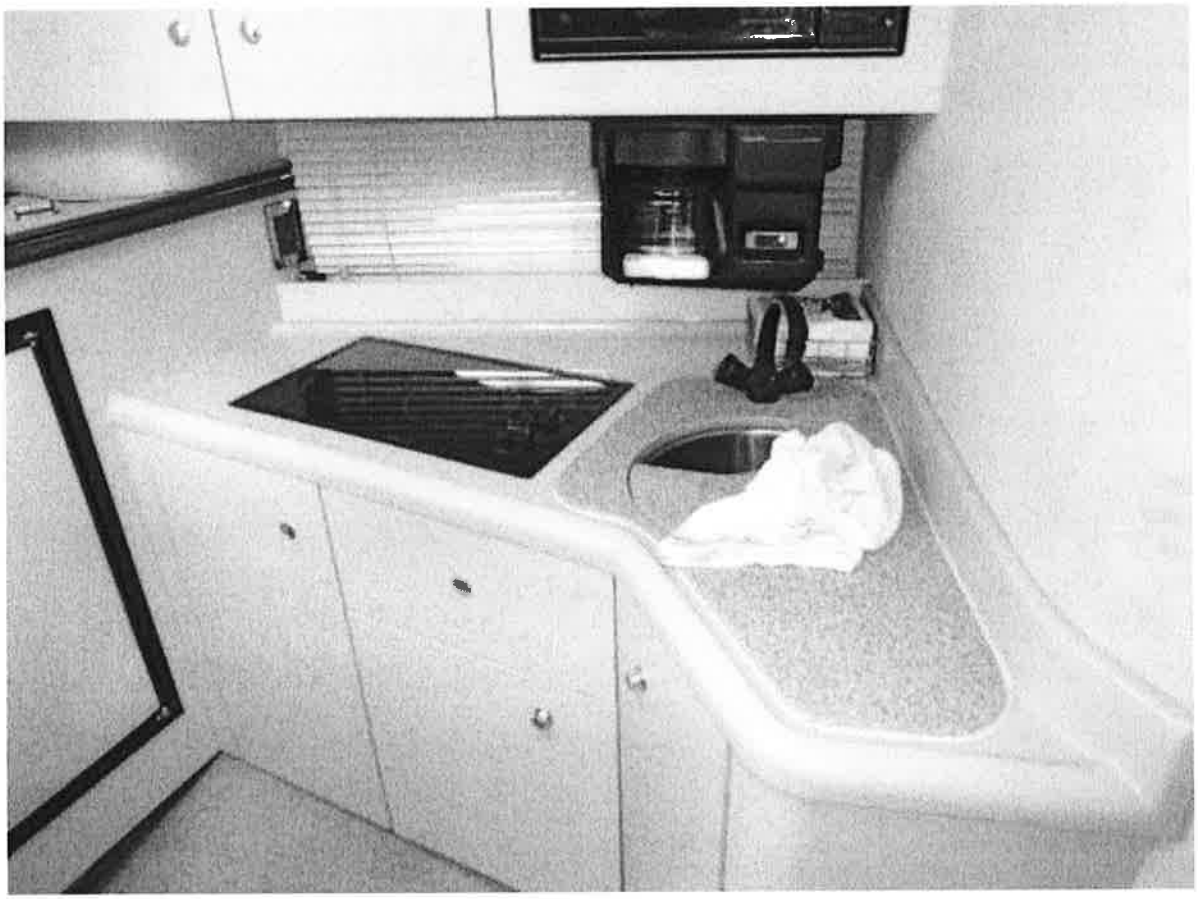

Galley with sink

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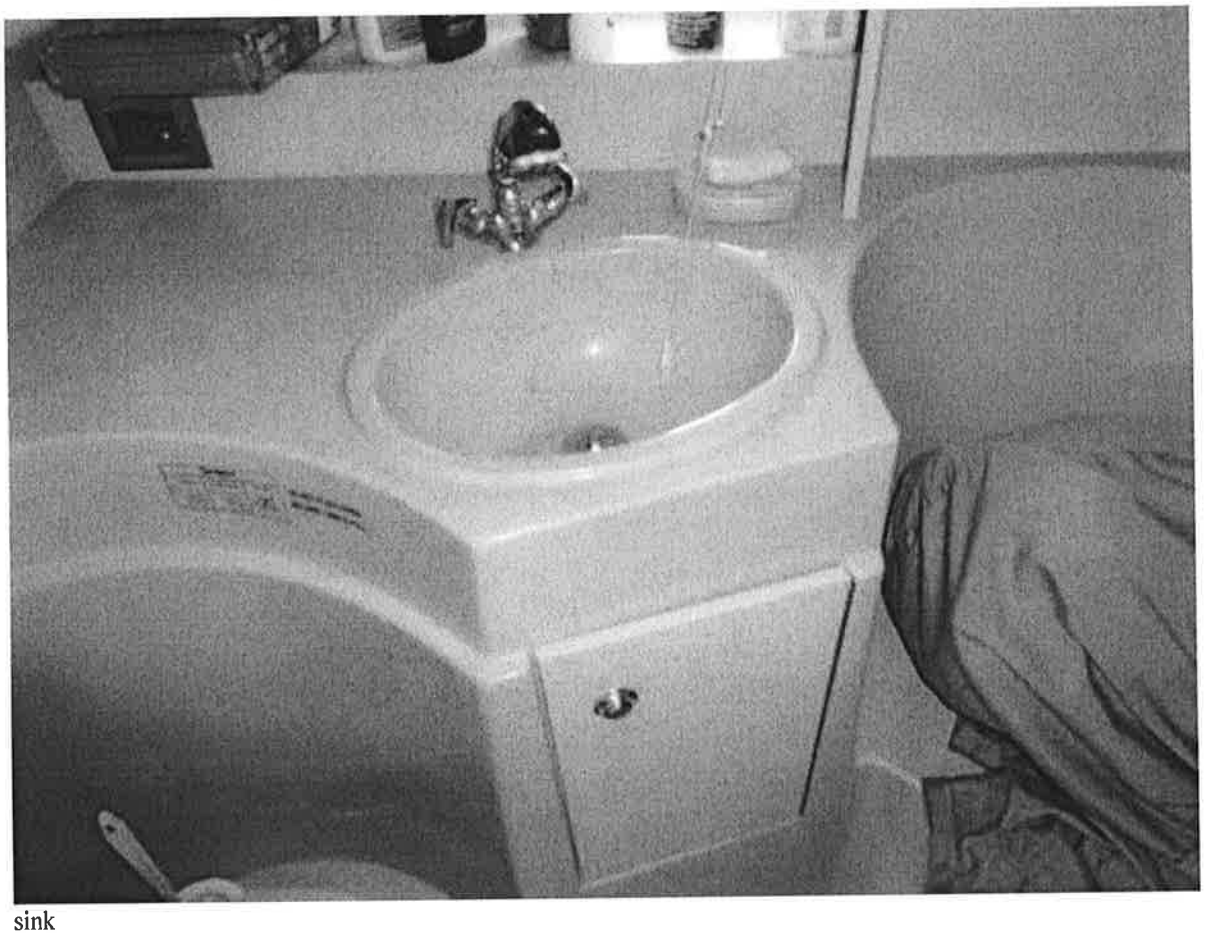

sink

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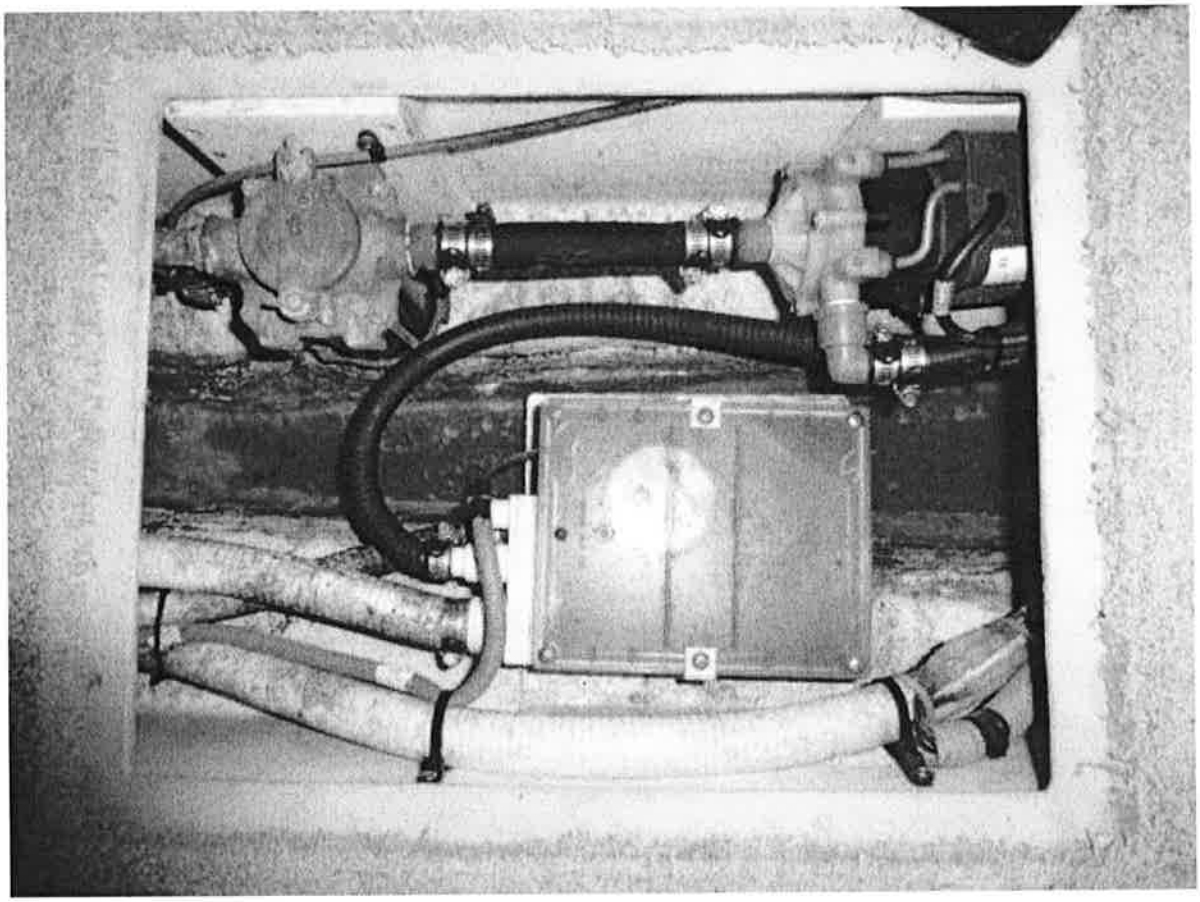
Date of Joint Survey: June 30th, 2014



Sump pump and AC pump

ALPHA MARINE SURVEYORS

PRELIMINARY REPORT # 1
Our File No.: 0514/038RRS
US Court Case No.: 14-CV-61057-WPD
Insured/ Owner: Michael Triggiano
Claim Unit No.: 8003139959-1-1
Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
Date of Joint Survey: June 30th, 2014

Fwd bilge pump properly wired

This report is offered solely as a marine survey and associated work product and for no other purpose. Any opinions, estimates, projections, calculations, or other materials are provided exclusively in the context of a marine survey and any further adjustment, accounting, tax, or other professional services related hereto must be secured from an appropriate professional.

The report is based only on the facts presently available to the surveyor in attendance and is submitted without prejudice to the right of whom it may concern. The right to amend and/or supplement this report should additional information be made available is reserved.

Digital photos contained in the body of this report were taken by the attending surveyor(s). We certify that the content of these pictures has not been changed and/or altered.

Respectfully Submitted

ALPHA MARINE SURVEYORS

PRELIMINARY REPORT # 1
Our File No.: 0514/038RRS
US Court Case No.: 14-CV-61057-WPD
Insured/ Owner: Michael Triggiano
Claim Unit No.: 8003139959-1-1
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Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
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ALPHA MARINE SURVEYORS

FOR THE CORPORATION
Rolando R. Santos, Marine Surveyor
Senior Marine Surveyor - Miami Office
SCMSHQ – MCMS
SAMS – AMS – E, Y&SC, H&M, C

Wendy Anderson

From: Drew Hains <dhains@murrayna.com>
Sent: Thursday, April 24, 2014 10:15 AM
To: John Rimes
Cc: Trishia Finkey; Wendy Anderson
Subject: Request for opinion regarding subcontracting engineering calculations, Shipbuilding
Attachments: M& A Pres Vac PD qt 4-4-14.doc

John:

Our firm, Murray and Associates, C/A # 9789, has been engaged to design a 185,000 BBL non caustic chemical tank barge which will be constructed in Erie, PA and will be a US flagged vessel. The engineering is being completed by our office in Fort Lauderdale, FL under the responsible charge of the professional engineers in our office. A number of the documents related to this vessel will be signed and sealed by the professional engineers in our office in accordance with USCG NVIC 10-92-CH2 (See http://www.uscg.mil/hq/cgcvc/cvc2/outer_continental_shelf/policy/nvic/NVIC_10-92_CH1_P.E._Req.pdf).

We have been asked by the shipyard to subcontract some engineering calculations from an Florida based equipment supplier, W & O, as indicated in the attached. It does not appear that W&O has a certificate of authorization or that this work will be done under the responsible charge of a professional engineer (from any state). I am concerned that it would be violative of Florida's engineering laws and rules for our firm to engage another FL based company for these engineering calculations, and I am now seeking your opinion. More specifically:

61G15-19.001 (6) (k) A professional engineer shall not knowingly associate with or permit the use of his name or firm name in a business venture by any person or firm which he knows or has reason to believe is engaging in business or professional practices of a fraudulent or dishonest nature;

61G15-19.001 (6) (m) If a professional engineer has knowledge or reason to believe that any person or firm is guilty of violating any of the provisions of Chapter 471, F.S., or any of these rules of professional conduct, failure to immediately present this information to FEMC;

The USCG may not require these calculations to be signed and sealed, however typically they are included in a loading manual for the vessel which is approved on behalf of the USCG.

I am aware that the board has taking different stances regarding the practice of naval architecture and marine engineering over the years. For example, the board attemped to take action against Murray and Associates and me personally for unlicensed activity prior to my licensure . Also for example, Paul Martin, the former Executive Director, once wrote:

> The Board determined at its meeting in December, 2004 in Tallahassee that the activities encompassed in marine engineering/naval architecture are engineering as defined in state statutes and subject to licensure requirements.

But I am also aware that the board took a different stance in an April of 2008 by motion of Mr. Rebane, where it was moved to uphold the laws and rules dealing with protective titles and to refrain from attempting to regulate naval architecture and marine engineering in Florida. Nonetheless, myself and many of my staff remain licensed by the FL board, and do not wish to knowingly violate board rules.

Your prompt advise is requested on this matter.

Kind Regards,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

To: Antonij Zecevic

From: Fred Loomis

CC:

Date: 7/27/2015

Re: Pres Vac pressure drop calculations

Hello Antonij

W&O is pleased to offer vapor line pressure drop calculations for the Seacor barge.

Pres-Vac ApS (Engineering Department) will be the agency performing/being responsible for the work (PDC).

We will do a "worst case scenario" calculation and submit the calculation/report to you.

Customer is responsible of submitting the calculation/report to ABS for approval. We will not be in contact with ABS regarding this project.

Attached please find copy of existing calculation from another project for your information.

Completion is estimated at 5-6 weeks due to current work load and upcoming Holiday.

Cost $4,500.00

Best Regards

Fred Loomis

2677 Port Industrial Drive
Jacksonville, FL 32226
Tel: 904.354.3800
Fax: 904.354.5321

● pen.com

Wendy Anderson

From: Howard, Dale <Dale.Howard@myfloridalicense.com>
Sent: Friday, March 06, 2015 11:30 AM
To: Wendy Anderson
Subject: Public records request

Good Morning,

Marine Engineers:

Phone numbers, email addresses and business address for the following counties:

Citrus, Manatee, Hillsborough, Charlotte, Hernando, Lee, Pasco, Collier, Sarasota

Thanks,

Dale E. Howard Jr.
Staff Assistant to Public Records Coordinator
Office of Open Government Suite 92
850.717.1832
Dale.Howard@myfloridalicense.com

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:04 AM
To: Wendy Anderson
Subject: FW: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting

From: Michael Monahan [mailto:Monahan@AereonMarine.com]
Sent: Wednesday, June 10, 2015 11:31 PM
To: Board
Subject: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting

Florida Board of Professional Engineers,

I have learned today, that FBPE, at its 8 - 9 Apr 2015 meeting, amended Rule 61G15-18.011 (7), to read as follows:

"Upon motion Mr. Fiorillo, seconded by Mr. Hahn, the proposed rule amendment was approved with the change as follows: (7) The term "marine engineer" as used in Section 471.031(b), F.S. shall mean a person who uses engineering principles and methodologies in the design of piers, docks, sea walls, or other marine structures governed by the Florida Building Code. Marine engineering shall not encompass the design of marine vessels, except for floating residential units as defined in Section 202 of the Florida Building Code. The motion passed."

The Board should immediately rescind this action. "Marine Engineering" is an ancient profession going back to the mid-nineteenth century. Marine Engineers have a nationally recognized engineering society (The Society of Naval Architects and Marine Engineers) which was founded in the nineteenth century. Marine Engineers have their own NCEES PE exam. And, most importantly, their own area of practice. Florida is an important state for the practice of Marine Engineering, especially in South Florida, Jacksonville, and Tampa. Attempting to redefine the term "Marine Engineer" into something that only Civil Engineers do, will cause confusion and harm to the public.

There are vessel plans and specifications falling only within the expertise of Marine Engineers which are required by law or regulation to be stamped by a PE.

Thank you for your attention to this urgent matter.

Very truly yours,

Michael T. Monahan, PE
MARINE ENGINEER (presuming that I am still allowed to use this title)

1819 SE 17th St, U1002
Fort Lauderdale, FL 33316-3059
USA

Tel: +1-954-727-5440 / +1-866-795-3402
Fax: +1-954-252-2543
Cel: +1-954-328-0406

e-mail: Monahan@AereonMarine.com

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 8:59 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Friday, June 05, 2015 8:17 AM
To: ZRAYBON@; Rebecca Sammons
Subject: Fw: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Looks like he wants a couple of things. I'm assuming that you all have an "interested persons" list of people who would like to receive meeting notices. It looks like he would like to be added to that list.

Second, he wants a workshop on 61G15-18.001(7). I'm hoping to have the language published by early July, so we'll want to plan on having a rule workshop on the August meeting agenda.

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

----- Forwarded by Lawrence Harris/OAG on 06/05/2015 08:12 AM -----

From: Franklin Homer <Franklin.Homer@gmlaw.com>
To: Lawrence Harris <Lawrence.Harris@myfloridalegal.com>
Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>
Date: 06/04/2015 05:15 PM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Harris: I had corresponded with Ms. Raybon a few weeks ago and have a couple of follow-up matters. First, through this e-mail I request that the FBPE provide advance notice to me of its proceedings pursuant to Fla. Stat 120.54(3)(a)3. If this request should be mailed or e-mailed to another designated individual to ensure that I receive proper notice, please let me know.

Second, regarding the proposed rule change for the definition of "marine engineering," I understand that the Board has approved the advancement of the rulemaking process for a change in the definition. Please confirm that the process has still not yet been noticed in the Florida Administrative Weekly as I have not seen it. Additionally, is there a way that I could also be specifically put on notice as we would like to request that a

workshop be held if the agency plan does not plan to hold one on its own.

Thank you for your assistance. Should you have any questions, I can be reached directly at 954.267.8028.

Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

From: Zana Raybon [mailto:ZRaybon@fbpe.org]
Sent: Wednesday, May 13, 2015 11:47 AM
To: Franklin Homer
Cc: Lawrence Harris; Rebecca Sammons
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Homer:

Thank you for contacting the Florida Board of Professional Engineers.

Regarding the changes to Ch. 471, please be advised that HB 217, which incorporates SB 338 and pertains to the establishment of a separate license for structural engineers in the state of Florida, has been enrolled and is awaiting the Governor's signature. To date, the bill has not been presented to the Governor for his signature. If and when it is signed, the Board will need to do rulemaking regarding the change in statute. We do not notice meetings or hearings pertaining to statute changes since the Board is prohibited from involvement in the legislative process.

Regarding the proposed rule change for the definition of "marine engineering," please be advised that the Board has approved the advancement of the rulemaking process for a change in the definition. The process has not yet been noticed in the Florida Administrative Weekly; however, if you would like more information on this issue, feel free to contact our Board counsel, Lawrence Harris, and he can assist you. He is copied on this email.

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Rebecca Sammons
Sent: Wednesday, May 13, 2015 7:35 AM
To: Zana Raybon

Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
Subject: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good Evening: I'm assisting a client interested in items related to the attached proposed legislation which is working its way through the Senate and House. My understanding is that the Board may simultaneously be revising Fla. Stat. 471 and that during the April 2015 FBPE Board meeting, the participants worked on clarifying the definition of "marine engineer". I'm trying to understand whether your revisions are anticipated to be included in the revisions that the House/Senate are working on. Also, where in the process of revising Section 471 are you? That is, what kind of notice/hearing has taken place as provided in Fla. Stat. 120.54 in case anyone from the public would like to participate?

Thank you,
Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

The information contained in this transmission may be attorney/client privileged and confidential. It is intended only for the use of the individual or entity named above. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have
received this communication in error, please notify us immediately by reply e-mail.

Unless specifically indicated otherwise, any discussion of tax issues contained in this e-mail, including any attachments, is not, and is not intended to be, "written advice" as defined in Section 10.37 of Treasury Department Circular 230.

A portion of our practice involves the collection of debt and any information you provide will be used for that purpose if we are attempting to collect a debt from you.

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:14 AM
To: Wendy Anderson
Subject: FW: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting
Attachments: winmail.dat

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Thursday, June 11, 2015 9:14 AM
To: Monahan@AereonMarine.com
Subject: Fw: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting

Good morning, Mr. Monahan. The Board staff received your correspondence, below, and as legal counsel to the Board, I have been asked to respond on behalf of the staff.

The language approved at the April meeting has not yet been "adopted" by the Board. Rather, the Board's vote is to begin the rulemaking process, as set forth in Florida Statutes. This process requires the Board to publish public notices of its intended action, and allows public input and participation throughout the process. While the first of the required notices has not yet been published, staff will ensure this communication is noted and added to the rulemaking record, so that the Board has the opportunity to consider your comment and concerns.

Regards,

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

From: Michael Monahan [mailto:Monahan@AereonMarine.com]
Sent: Wednesday, June 10, 2015 11:31 PM
To: Board
Subject: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting

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Thank you for your attention to this urgent matter.

Very truly yours,
Michael T. Monahan, PE
Marine Engineer (presuming that I am still allowed to use this title)
1819 SE 17th St, U1002
Fort Lauderdale, FL 33316-3059
USA
Tel: +1-954-727-5440 / +1-866-795-3402
Fax: +1-954-252-2543
Cel: +1-954-328-0406
e-mail: Monahan@AereonMarine.com<mailto:Monahan@AereonMarine.com>

(See attached file: winmail.dat)

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:23 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Zana Raybon
Sent: Friday, June 05, 2015 9:37 AM
To: Rebecca Sammons
Cc: Lawrence Harris (Lawrence.Harris@myfloridalegal.com)
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Rebecca:

I don't know if we have ever created a list of interested persons but for this can we start one?

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Friday, June 05, 2015 8:17 AM
To: ZRAYBON@; Rebecca Sammons
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Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>
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Thank you for your assistance. Should you have any questions, I can be reached directly at 954.267.8028.

Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

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Cc: Lawrence Harris; Rebecca Sammons
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Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

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Sent: Wednesday, May 13, 2015 7:35 AM
To: Zana Raybon
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

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Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
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Thank you,
Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
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2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

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received this communication in error, please notify us immediately by reply e-mail.

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Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:23 AM
To: Wendy Anderson
Subject: FW: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Tuesday, June 23, 2015 11:18 AM
To: Franklin Homer
Cc: Rebecca Sammons; Zana Raybon
Subject: RE: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

You are very welcome.

Written requests for a rule development workshop must be made no later than fourteen days after publication of the Notice of Rule Development. If no requests for a workshop are received within that time period, the Notice of Proposed Rule can be published. Publication of that notice starts a 21 day period for receipt of written comments from the JAPC staff attorney or the public, or requests for a rule hearing. Best,

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Franklin Homer ---06/23/2015 10:44:20 AM---Thank you. Do you know when you are planning to publish the Notice of Proposed Rule? I understand th

From: Franklin Homer <Franklin.Homer@gmlaw.com>
To: 'Lawrence Harris' <Lawrence.Harris@myfloridalegal.com>
Cc: 'Zana Raybon' <ZRaybon@fbpe.org>, Rebecca Sammons <RSammons@fbpe.org>
Date: 06/23/2015 10:44 AM
Subject: RE: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

Thank you. Do you know when you are planning to publish the Notice of Proposed Rule? I understand that you are providing an opportunity for request for a workshop to be submitted but it is unclear how long the window will remain open.

Thanks again,
Franklin

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Monday, June 22, 2015 3:06 PM
To: Franklin Homer
Cc: ZRAYBON@; Rebecca Sammons
Subject: FBPE Rule 61G15-18.011

Good afternoon, Mr. Homer. As requested, I wanted to let you know that the Notice of Rule Development was published this past Friday, June 19, 2015. Below is a link to the notice, as published in the Florida Administrative Register. Please let me know if you need any further information, and have a great afternoon!

https://www.flrules.org/Gateway/View_notice.asp?id=16127916

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:23 AM
To: Wendy Anderson
Subject: FW: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, June 23, 2015 11:19 AM
To: 'Lawrence Harris'
Cc: Rebecca Sammons; Zana Raybon
Subject: RE: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

Great. Thanks again.

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Tuesday, June 23, 2015 11:18 AM
To: Franklin Homer
Cc: Rebecca Sammons; 'Zana Raybon'
Subject: RE: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

You are very welcome.

Written requests for a rule development workshop must be made no later than fourteen days after publication of the Notice of Rule Development. If no requests for a workshop are received within that time period, the Notice of Proposed Rule can be published. Publication of that notice starts a 21 day period for receipt of written comments from the JAPC staff attorney or the public, or requests for a rule hearing. Best,

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Franklin Homer ---06/23/2015 10:44:20 AM---Thank you. Do you know when you are planning to publish the Notice of Proposed Rule? I understand th

From: Franklin Homer <Franklin.Homer@gmlaw.com>
To: 'Lawrence Harris' <Lawrence.Harris@myfloridalegal.com>
Cc: 'Zana Raybon' <ZRaybon@fbpe.org>, Rebecca Sammons <RSammons@fbpe.org>
Date: 06/23/2015 10:44 AM
Subject: RE: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

Thank you. Do you know when you are planning to publish the Notice of Proposed Rule? I understand that you are providing an opportunity for request for a workshop to be submitted but it is unclear how long the window will remain open.

Thanks again,
Franklin
From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Monday, June 22, 2015 3:06 PM
To: Franklin Homer
Cc: ZRAYBON@; Rebecca Sammons
Subject: FBPE Rule 61G15-18.011

Good afternoon, Mr. Homer. As requested, I wanted to let you know that the Notice of Rule Development was published this past Friday, June 19, 2015. Below is a link to the notice, as published in the Florida Administrative Register. Please let me know if you need any further information, and have a great afternoon!

https://www.flrules.org/Gateway/View_notice.asp?id=16127916

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
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PL-01, The Capitol
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Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:23 AM
To: Wendy Anderson
Subject: FW: Request for Development Workshop pertaining to FBPE Rule 61G15-18.011
Attachments: Request for Development Workshop Letter for Murray & Assoc .pdf

---

From: Zana Raybon
Sent: Saturday, July 04, 2015 5:12 PM
To: Lawrence Harris (Lawrence.Harris@myfloridalegal.com)
Cc: Rebecca Sammons
Subject: FW: Request for Development Workshop pertaining to FBPE Rule 61G15-18.011

Larry,

For your review.

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Beth-Ann Krimsky [mailto:beth-ann.krimsky@gmlaw.com]
Sent: Thursday, July 02, 2015 4:09 PM
To: Zana Raybon
Cc: 'Lawrence.Harris@myfloridalegal.com'; Franklin Homer; Robby Birnbaum
Subject: Request for Development Workshop pertaining to FBPE Rule 61G15-18.011

Dear Ms. Raybon, Please see the attached letter and request. Thank you for your attention to, and consideration of, this matter.

Sincerely,
Beth-Ann Krimsky

GreenspoonMarder LAW

Beth-Ann E. Krimsky
Shareholder
200 E. Broward Boulevard
Suite 1800
Fort Lauderdale, FL 33301
Direct Phone: 954-527-2427
General Phone: 954-491-1120, ext. 2627
Fax: 954-333-4027
beth-ann.krimsky@gmlaw.com

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:23 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Tuesday, July 21, 2015 11:34 AM
To: Rebecca Sammons
Subject: Fw: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
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----- Forwarded by Lawrence Harris/OAG on 07/21/2015 11:33 AM -----

From: Lawrence Harris/OAG
To: Franklin Homer <Franklin.Homer@gmlaw.com>
Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>, "'ZRaybon@fbpe.org'" <ZRaybon@fbpe.org>
Date: 07/20/2015 11:08 AM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good morning, Mr. Homer. The Notice of the Rule Development Workshop has not yet been prepared and published; once it is published, I'll be sure to forward a copy to you.

One clarification. I know the Board is interested in producing the very best rule language possible, and I would expect that it will take the time necessary to so develop that language. I, however, am without authority to commit the Board to any course of action on the rule development process. Hence, while I expect that the Board is likely to either continue the workshop or hold additional workshops, if necessary, that will be the Board's decision, and I cannot commit it to do so.

Regards,

Larry

Lawrence D. Harris
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PL-01, The Capitol

Tallahassee, Florida 32399-1050
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Franklin Homer ---07/20/2015 10:41:14 AM---Larry: Thank you for speaking with me this morning. This e-mail shall confirm that the definition of

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To: 'Lawrence Harris' <Lawrence.Harris@myfloridalegal.com>
Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>, "'ZRaybon@fbpe.org'" <ZRaybon@fbpe.org>, Tammie Britt <Tammie.Britt@myfloridalegal.com>
Date: 07/20/2015 10:41 AM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Larry: Thank you for speaking with me this morning. This e-mail shall confirm that the definition of "marine engineer" as set forth in the July 8, 2015 Florida Administrative Register has been withdrawn and that a workshop will be held pertaining to working out a definition on August 12 from 9:00 a.m. until 11:30 a.m. at the Shores Hotel & Resort in Daytona Beach. You advised that the Board would like to get this right and, if necessary, would continue the workshop for additional time.

It is my understanding that we will be able to attend and present at the workshop. At this time there are no further deadlines and we need not request a hearing given the withdrawal of the definition. We reserve all rights.

When you have a moment, can you please forward me the notice of the workshop for our records?

Thank you, again.

Franklin

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Friday, June 05, 2015 8:58 AM
To: Franklin Homer
Cc: Beth-Ann Krimsky; ZRAYBON@; Tammie Britt
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good morning, Mr. Homer. Your understanding of the status of the Board's proposed rule amendment to 61G15-18.001 is correct. That is, the Board approved a definition for marine engineers at its April, 2015, Board meeting, but we have not yet published the Notice of Rule Development. I expect that the Notice of Rule Development will be published in the FAR in approximately 2 weeks.

I will be happy to provide you with the exact date of publication once we get to that point, and a copy of the Notice as submitted the FAR. I will also take note of your interest in this rule, and your request to be provided advance notice of further proceedings on this Rule. Regards,

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
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Tallahassee, Florida 32399-1050

Office: (850) 414-3771
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Franklin Homer ---06/04/2015 05:15:44 PM---Mr. Harris: I had corresponded with Ms. Raybon a few weeks ago and have a couple of follow-up matter

From: Franklin Homer <Franklin.Homer@gmlaw.com>
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Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>
Date: 06/04/2015 05:15 PM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Harris: I had corresponded with Ms. Raybon a few weeks ago and have a couple of follow-up matters. First, through this e-mail I request that the FBPE provide advance notice to me of its proceedings pursuant to Fla. Stat 120.54(3)(a)3. If this request should be mailed or e-mailed to another designated individual to ensure that I receive proper notice, please let me know.

Second, regarding the proposed rule change for the definition of "marine engineering," I understand that the Board has approved the advancement of the rulemaking process for a change in the definition. Please confirm that the process has still not yet been noticed in the Florida Administrative Weekly as I have not seen it. Additionally, is there a way that I could also be specifically put on notice as we would like to request that a workshop be held if the agency plan does not plan to hold one on its own.

Thank you for your assistance. Should you have any questions, I can be reached directly at 954.267.8028.

Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

From: Zana Raybon [mailto:ZRaybon@fbpe.org]
Sent: Wednesday, May 13, 2015 11:47 AM
To: Franklin Homer
Cc: Lawrence Harris; Rebecca Sammons
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Homer:

Thank you for contacting the Florida Board of Professional Engineers.

Regarding the changes to Ch. 471, please be advised that HB 217, which incorporates SB 338 and pertains to the establishment of a separate license for structural engineers in the state of Florida, has been enrolled and is awaiting the Governor's signature. To date, the bill has not been presented to the Governor for his signature. If and when it is signed, the Board will need to do rulemaking regarding the change in statute. We do not notice meetings or hearings pertaining to statute changes since the Board is prohibited from involvement in the legislative process.

Regarding the proposed rule change for the definition of "marine engineering," please be advised that the Board has approved the advancement of the rulemaking process for a change in the definition. The process has not yet been noticed in the Florida Administrative Weekly; however, if you would like more information on this issue, feel free to contact our Board counsel, Lawrence Harris, and he can assist you. He is copied on this email.

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Rebecca Sammons
Sent: Wednesday, May 13, 2015 7:35 AM
To: Zana Raybon
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
Subject: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good Evening: I'm assisting a client interested in items related to the attached proposed legislation which is working its way through the Senate and House. My understanding is that the Board may simultaneously be revising Fla. Stat. 471 and that during the April 2015 FBPE Board meeting, the participants worked on clarifying the definition of "marine engineer". I'm trying to understand whether your revisions are anticipated to be included in the revisions that the House/Senate are working on. Also, where in the process of revising Section 471 are you? That is, what kind of notice/hearing has taken place as provided in Fla. Stat. 120.54 in case anyone from the public would like to participate?

Thank you,
Franklin

GreenspoonMarder LAW

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Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

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To: Zana Raybon
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
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Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:25 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]
Attachments: Summary of status of Senate Bill (SB 338) relating to engineers.PDF; Summary of status of House Bill (HB 217) relating to engineers.PDF

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
Subject: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good Evening: I'm assisting a client interested in items related to the attached proposed legislation which is working its way through the Senate and House. My understanding is that the Board may simultaneously be revising Fla. Stat. 471 and that during the April 2015 FBPE Board meeting, the participants worked on clarifying the definition of "marine engineer". I'm trying to understand whether your revisions are anticipated to be included in the revisions that the House/Senate are working on. Also, where in the process of revising Section 471 are you? That is, what kind of notice/hearing has taken place as provided in Fla. Stat. 120.54 in case anyone from the public would like to participate?

Thank you,
Franklin

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Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:25 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Wednesday, May 13, 2015 1:00 PM
To: Rebecca Sammons
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Thank you for getting back to me so quickly! I know you are very busy getting ready to travel.

Do you think you could send me the minutes from the April meeting? I was able to find the agenda and the meeting book online. Might help me develop a "to do" list. This can wait until next week, if that's more convenient for you.

Also, when you get back, can you check and see if the "Is a SERC required checklist" on this rule was sent over? That's something we need to submit to OFARR to get a rule project started. Thank you in advance, and have a very safe trip. Best,

Larry

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Rebecca Sammons ---05/13/2015 12:39:43 PM---Larry: It's Rule 61G15-18.011 and they approved it at the April 2015 meeting. Here is the language.

From: Rebecca Sammons <RSammons@fbpe.org>
To: Lawrence Harris <Lawrence.Harris@myfloridalegal.com>
Cc: Zana Raybon <ZRaybon@fbpe.org>
Date: 05/13/2015 12:39 PM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Larry:
It's Rule 61G15-18.011 and they approved it at the April 2015 meeting. Here is the language. I need to review my notes to make sure that they didn't make any changes. I will check while I am out of town and get back

with you. thanks
Rebecca

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Wednesday, May 13, 2015 12:26 PM
To: Rebecca Sammons
Cc: Zana Raybon
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Thank you for including me on this. Do you happen to know what rule number this is, and when the Board approved the language? Any information you can provide that will help me track down this matter would be great. Sorry for any extra work that causes, but I'll do everything I can to get this project moving forward with all due haste. Thanks,

Larry

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Zana Raybon ---05/13/2015 11:47:15 AM---Mr. Homer: Thank you for contacting the Florida Board of Professional Engineers.

From: Zana Raybon <ZRaybon@fbpe.org>
To: "Franklin.Homer@gmlaw.com" <Franklin.Homer@gmlaw.com>
Cc: Lawrence Harris <Lawrence.Harris@myfloridalegal.com>, Rebecca Sammons <RSammons@fbpe.org>
Date: 05/13/2015 11:47 AM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Homer:

Thank you for contacting the Florida Board of Professional Engineers.

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Regarding the proposed rule change for the definition of "marine engineering," please be advised that the Board has approved the advancement of the rulemaking process for a change in the definition. The process has not yet been noticed in the Florida Administrative Weekly; however, if you would like more information

on this issue, feel free to contact our Board counsel, Lawrence Harris, and he can assist you. He is copied on this email.

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Rebecca Sammons
Sent: Wednesday, May 13, 2015 7:35 AM
To: Zana Raybon
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
Subject: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good Evening: I'm assisting a client interested in items related to the attached proposed legislation which is working its way through the Senate and House. My understanding is that the Board may simultaneously be revising Fla. Stat. 471 and that during the April 2015 FBPE Board meeting, the participants worked on clarifying the definition of "marine engineer". I'm trying to understand whether your revisions are anticipated to be included in the revisions that the House/Senate are working on. Also, where in the process of revising Section 471 are you? That is, what kind of notice/hearing has taken place as provided in Fla. Stat. 120.54 in case anyone from the public would like to participate?

Thank you,
Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

A portion of our practice involves the collection of debt and any information you provide will be used for that purpose if we are attempting to collect a debt from you.[attachment "61G15-18.011-Marine Engineering.docx" deleted by Lawrence Harris/OAG]

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:26 AM
To: Wendy Anderson
Subject: FW: FBPE Rule 61G15-18.011

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Monday, June 22, 2015 3:06 PM
To: Franklin Homer
Cc: ZRAYBON@; Rebecca Sammons
Subject: FBPE Rule 61G15-18.011

Good afternoon, Mr. Homer. As requested, I wanted to let you know that the Notice of Rule Development was published this past Friday, June 19, 2015. Below is a link to the notice, as published in the Florida Administrative Register. Please let me know if you need any further information, and have a great afternoon!

https://www.flrules.org/Gateway/View_notice.asp?id=16127916

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Assistant Attorney General
Administrative Law Bureau
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PL-01, The Capitol
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Office: (850) 414-3771
Fax: (850) 922-6425

Wendy Anderson

From: Rebecca Sammons
Sent: Wednesday, July 22, 2015 9:26 AM
To: Wendy Anderson
Subject: FW: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, June 23, 2015 10:44 AM
To: 'Lawrence Harris'
Cc: Zana Raybon; Rebecca Sammons
Subject: RE: FBPE Rule 61G15-18.011 (34428.0002) [IWOV-ACTIVE.FID9231738]

Thank you. Do you know when you are planning to publish the Notice of Proposed Rule? I understand that you are providing an opportunity for request for a workshop to be submitted but it is unclear how long the window will remain open.

Thanks again,
Franklin

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Monday, June 22, 2015 3:06 PM
To: Franklin Homer
Cc: ZRAYBON@; Rebecca Sammons
Subject: FBPE Rule 61G15-18.011

Good afternoon, Mr. Homer. As requested, I wanted to let you know that the Notice of Rule Development was published this past Friday, June 19, 2015. Below is a link to the notice, as published in the Florida Administrative Register. Please let me know if you need any further information, and have a great afternoon!

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Department Circular 230.

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Wendy Anderson

From: Zana Raybon
Sent: Wednesday, July 22, 2015 10:40 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Monday, July 20, 2015 11:13 AM
To: 'Lawrence Harris' <Lawrence.Harris@myfloridalegal.com>
Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>; Zana Raybon <ZRaybon@fbpe.org>
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Understood. Thank you.

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Monday, July 20, 2015 11:09 AM
To: Franklin Homer
Cc: Beth-Ann Krimsky; 'ZRaybon@fbpe.org'
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good morning, Mr. Homer. The Notice of the Rule Development Workshop has not yet been prepared and published; once it is published, I'll be sure to forward a copy to you.

One clarification. I know the Board is interested in producing the very best rule language possible, and I would expect that it will take the time necessary to so develop that language. I, however, am without authority to commit the Board to any course of action on the rule development process. Hence, while I expect that the Board is likely to either continue the workshop or hold additional workshops, if necessary, that will be the Board's decision, and I cannot commit it to do so.

Regards,

Larry

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Franklin Homer ---07/20/2015 10:41:14 AM---Larry: Thank you for speaking with me this morning. This e-mail shall confirm that

the definition of

From: Franklin Homer <Franklin.Homer@gmlaw.com>
To: 'Lawrence Harris' <Lawrence.Harris@myfloridalegal.com>
Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>, "'ZRaybon@fbpe.org'" <ZRaybon@fbpe.org>, Tammie Britt <Tammie.Britt@myfloridalegal.com>
Date: 07/20/2015 10:41 AM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Larry: Thank you for speaking with me this morning. This e-mail shall confirm that the definition of "marine engineer" as set forth in the July 8, 2015 Florida Administrative Register has been withdrawn and that a workshop will be held pertaining to working out a definition on August 12 from 9:00 a.m. until 11:30 a.m. at the Shores Hotel & Resort in Daytona Beach. You advised that the Board would like to get this right and, if necessary, would continue the workshop for additional time.

It is my understanding that we will be able to attend and present at the workshop. At this time there are no further deadlines and we need not request a hearing given the withdrawal of the definition. We reserve all rights.

When you have a moment, can you please forward me the notice of the workshop for our records?

Thank you, again.

Franklin

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Friday, June 05, 2015 8:58 AM
To: Franklin Homer
Cc: Beth-Ann Krimsky; ZRAYBON@; Tammie Britt
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good morning, Mr. Homer. Your understanding of the status of the Board's proposed rule amendment to 61G15-18.001 is correct. That is, the Board approved a definition for marine engineers at its April, 2015, Board meeting, but we have not yet published the Notice of Rule Development. I expect that the Notice of Rule Development will be published in the FAR in approximately 2 weeks.

I will be happy to provide you with the exact date of publication once we get to that point, and a copy of the Notice as submitted the FAR. I will also take note of your interest in this rule, and your request to be provided advance notice of further proceedings on this Rule. Regards,

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

Franklin Homer ---06/04/2015 05:15:44 PM---Mr. Harris: I had corresponded with Ms. Raybon a few weeks ago and have a couple

of follow-up matter

From: Franklin Homer <Franklin.Homer@gmlaw.com>
To: Lawrence Harris <Lawrence.Harris@myfloridalegal.com>
Cc: Beth-Ann Krimsky <beth-ann.krimsky@gmlaw.com>
Date: 06/04/2015 05:15 PM
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Harris: I had corresponded with Ms. Raybon a few weeks ago and have a couple of follow-up matters. First, through this e-mail I request that the FBPE provide advance notice to me of its proceedings pursuant to Fla. Stat 120.54(3)(a)3. If this request should be mailed or e-mailed to another designated individual to ensure that I receive proper notice, please let me know.

Second, regarding the proposed rule change for the definition of "marine engineering," I understand that the Board has approved the advancement of the rulemaking process for a change in the definition. Please confirm that the process has still not yet been noticed in the Florida Administrative Weekly as I have not seen it. Additionally, is there a way that I could also be specifically put on notice as we would like to request that a workshop be held if the agency plan does not plan to hold one on its own.

Thank you for your assistance. Should you have any questions, I can be reached directly at 954.267.8028.

Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
http://www.gmlaw.com

From: Zana Raybon [mailto:ZRaybon@fbpe.org]
Sent: Wednesday, May 13, 2015 11:47 AM
To: Franklin Homer
Cc: Lawrence Harris; Rebecca Sammons
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Mr. Homer:

Thank you for contacting the Florida Board of Professional Engineers.

Regarding the changes to Ch. 471, please be advised that HB 217, which incorporates SB 338 and pertains to the establishment of a separate license for structural engineers in the state of Florida, has been enrolled and is awaiting the Governor's signature. To date, the bill has not been presented to the Governor for his signature. If and when it is signed, the Board will need to do rulemaking regarding the change in statute. We do not notice meetings or hearings pertaining to statute changes since the Board is prohibited from involvement in the legislative process.

Regarding the proposed rule change for the definition of "marine engineering," please be advised that the Board has approved the advancement of the rulemaking process for a change in the definition. The process has not yet been noticed in the Florida Administrative Weekly; however, if you would like more information on this issue, feel free to contact our Board counsel, Lawrence Harris, and he can assist you. He is copied on this email.

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Rebecca Sammons
Sent: Wednesday, May 13, 2015 7:35 AM
To: Zana Raybon
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Tuesday, May 12, 2015 9:05 PM
To: Board
Subject: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Good Evening: I'm assisting a client interested in items related to the attached proposed legislation which is working its way through the Senate and House. My understanding is that the Board may simultaneously be revising Fla. Stat. 471 and that during the April 2015 FBPE Board meeting, the participants worked on clarifying the definition of "marine engineer". I'm trying to understand whether your revisions are anticipated to be included in the revisions that the House/Senate are working on. Also, where in the process of revising Section 471 are you? That is, what kind of notice/hearing has taken place as provided in Fla. Stat. 120.54 in case anyone from the public would like to participate?

Thank you,
Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com

http://www.gmlaw.com

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received this communication in error, please notify us immediately by reply e-mail.

Unless specifically indicated otherwise, any discussion of tax issues contained in this e-mail, including any attachments, is not, and is not intended to be, "written advice" as defined in Section 10.37 of Treasury Department Circular 230.

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Wendy Anderson

From: Zana Raybon
Sent: Wednesday, July 22, 2015 10:40 AM
To: Wendy Anderson
Subject: FW: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting
Attachments: winmail.dat

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Lawrence Harris [mailto:Lawrence.Harris@myfloridalegal.com]
Sent: Thursday, June 11, 2015 9:14 AM
To: Monahan@AereonMarine.com
Subject: Fw: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting

Good morning, Mr. Monahan. The Board staff received your correspondence, below, and as legal counsel to the Board, I have been asked to respond on behalf of the staff.

The language approved at the April meeting has not yet been "adopted" by the Board. Rather, the Board's vote is to begin the rulemaking process, as set forth in Florida Statutes. This process requires the Board to publish public notices of its intended action, and allows public input and participation throughout the process. While the first of the required notices has not yet been published, staff will ensure this communication is noted and added to the rulemaking record, so that the Board has the opportunity to consider your comment and concerns.

Regards,

Lawrence D. Harris
Assistant Attorney General
Administrative Law Bureau
Office of the Attorney General
PL-01, The Capitol
Tallahassee, Florida 32399-1050
Office: (850) 414-3771
Fax: (850) 922-6425

From: Michael Monahan [mailto:Monahan@AereonMarine.com]
Sent: Wednesday, June 10, 2015 11:31 PM
To: Board
Subject: "Marine Engineer" definition - Rule 61G15-18.011 (7) - improperly adopted at 8 - 9 Apr 2015 FBPE Meeting

Florida Board of Professional Engineers,

I have learned today, that FBPE, at its 8 - 9 Apr 2015 meeting, amended Rule 61G15-18.011 (7), to read as follows:

"Upon motion Mr. Fiorillo, seconded by Mr. Hahn, the proposed rule amendment was approved with the change as follows: (7) The term "marine engineer" as used in Section 471.031(b), F.S. shall mean a person who uses engineering principles and methodologies in the design of piers, docks, sea walls, or other marine structures governed by the Florida Building Code. Marine engineering shall not encompass the design of marine vessels, except for floating residential units as defined in Section 202 of the Florida Building Code. The motion passed."

The Board should immediately rescind this action. "Marine Engineering" is an ancient profession going back to the mid-nineteenth century. Marine Engineers have a nationally recognized engineering society (The Society of Naval Architects and Marine Engineers) which was founded in the nineteenth century. Marine Engineers have their own NCEES PE exam. And, most importantly, their own area of practice. Florida is an important state for the practice of Marine Engineering, especially in South Florida, Jacksonville, and Tampa. Attempting to redefine the term "Marine Engineer" into something that only Civil Engineers do, will cause confusion and harm to the public.

There are vessel plans and specifications falling only within the expertise of Marine Engineers which are required by law or regulation to be stamped by a PE.

Thank you for your attention to this urgent matter.

Very truly yours,
Michael T. Monahan, PE
Marine Engineer (presuming that I am still allowed to use this title)
1819 SE 17th St, U1002
Fort Lauderdale, FL 33316-3059
USA
Tel: +1-954-727-5440 / +1-866-795-3402
Fax: +1-954-252-2543
Cel: +1-954-328-0406
e-mail: Monahan@AereonMarine.com<mailto:Monahan@AereonMarine.com>

(See attached file: winmail.dat)

Wendy Anderson

From: Zana Raybon
Sent: Wednesday, July 22, 2015 10:43 AM
To: Wendy Anderson
Subject: FW: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Zana Raybon
Executive Director
Phone : 850.521.0500 ext. 122

From: Franklin Homer [mailto:Franklin.Homer@gmlaw.com]
Sent: Wednesday, May 13, 2015 2:06 PM
To: Zana Raybon <ZRaybon@fbpe.org>
Cc: Lawrence Harris <Lawrence.Harris@myfloridalegal.com>; Rebecca Sammons <RSammons@fbpe.org>
Subject: RE: Revisions to Fla. Stat. 471 and April FBPE Board meeting [IWOV-ACTIVE.FID9231738]

Thank you for your quick and informative response. I am in meetings the rest of the day but will likely circle back to Mr. Harris by the end of the week.

Sincerely,
Franklin

From: Zana Raybon [mailto:ZRaybon@fbpe.org]
Sent: Wednesday, May 13, 2015 11:47 AM
To: Franklin Homer
Cc: Lawrence Harris; Rebecca Sammons
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Phone : 850.521.0500 ext. 122

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Thank you,
Franklin

GreenspoonMarder LAW

Franklin Homer, Esquire
Greenspoon Marder, P.A.
2255 Glades Road, Suite 400-E
Boca Raton, FL 33431
Direct Dial Telephone: 954.267.8028
Direct Facsimile: 954.267.8029
Email: franklin.homer@gmlaw.com
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The Florida Engineering Society

Addresses The Engineer/Architect Practice Issues

Submittted to the State Board of Professional Engineers
April 23, 1997

The Florida Engineering Society
125 South Gadsden Street - Tallahassee, Florida 32301
904/224-7121 -- FAX 904/222-4349 -- email: fes@FLENG.ORG

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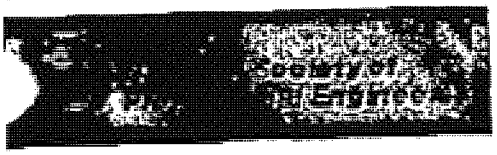

Issue Brief

July 1, 1996, Publication #4037

BUILDING DESIGN

Support professional engineers' authority to design buildings, including those intended for human habitation or occupancy. Support the public's right to select an engineer as the prime professional on a building project.

BACKGROUND

State and territorial legislatures clearly recognize the critical role that engineers play in the design of buildings and structures. Consequently, most engineering licensing statutes include provisions that specifically identify the "design of buildings and structures" as a normal and permissible area of practice for licensed professional engineers (PEs). It's also important to note that most state laws place no limitations on the type of buildings engineers are permitted to design.

Legislatures have also enacted licensing statutes that permit the architectural profession to engage in building design services. Because state laws also permit licensed PEs to perform these same design services, overlap of the two professions' practices has been unavoidable. In some states, conflicts have resulted in litigation. Out of this litigation has emerged a series of key decisions regarding the authority of licensed PEs to engage in building design. Among their findings, most state courts have determined that with regard to the design of buildings: the definitions of the practices of architecture and professional engineering are substantially the same or overlap to such an extent that there is no distinction between them; the professions of architecture and professional engineering are equally qualified to design buildings; licensed PEs can design and supervise the construction of buildings; the definition of engineering does not restrict engineering building design to buildings of an industrial nature, rather than to buildings for habitation or occupancy by humans; building design services include acting as the prime design professional; and, the design of buildings and serving as prime professional are within the practice of engineering and are not the "incidental practice of architecture."

The building process is commonly overseen by an individual or organization designated the "prime professional." Sometimes, the prime professional is a member of an organization with in-house expertise to design each system of the building. In other cases, the prime professional retains services of others to design particular systems. It's also conceivable, depending on the nature of the building involved, that a single design professional is competent enough to perform most or all aspects of the building design. State legislatures, state and federal agencies, and the courts have recognized the authority of both licensed professional engineers and licensed architects to serve as prime professional in building design. This is entirely consistent with legislative and court determinations that have also recognized the authority of both professions to design buildings. If one can legally design a building, then certainly one can also manage the overall design and construction process.

NSPE POSITION

NSPE supports the establishment and preservation of provisions in professional engineering licensing

laws that authorize engineers to provide building design services. The professional engineer plays a central role in building design. Many professional engineers have obtained the necessary education and experience that qualifies them to design either the overall building or one of its component systems. Accordingly, legislatures in almost every state have determined that a fundamental aspect of the practice of engineering includes the design of buildings and structures.

State licensing statutes are predicated and justified solely as a means to protect the public health, safety, and welfare, not to enhance the standing of one design profession over another. Restrictions imposed on licensed professional engineers from serving as the prime professional have no basis in protecting the public but only serve to restrain competition.

Owners should have complete freedom to select and designate a prime professional for any specific project on the basis of their own requirements and the qualifications of the professional. The individual retained as prime should perform only those services that he or she is qualified for and should use the services of other qualified professionals as required to provide a proper and complete professional service to the client consistent with applicable law.

NSPE ACTION

NSPE provides assistance to its state societies in resolving disagreements with the architectural profession on building design issues at the state level.

STATUS

The professional engineering licensing laws of forty-three states explicitly recognize the design of buildings as within the scope of practice of engineering. The other seven state PE laws also permit engineers to design buildings by authorizing engineers to design "structures," a term that encompasses buildings. No state professional engineering licensing law or architectural licensing law prohibits engineers from providing prime professional services.

The PEs' authority to provide building design services is challenged from time to time at the state level. In 1996, efforts to rollback engineers' authority have surfaced in Delaware, Florida, and New Hampshire.

NSPE REFERENCES

Professional Policy 97-A - Architect-Engineer Relationships

Professional Policy 152 - Licensure and Qualifications for Practice - 7/95

Building Design: The Engineer's Role (Pub. 1727) - 1/94

Engineering Licensing Laws & The Design of Buildings (Pub. 1728) - 1/94

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NATIONAL ENGINEER - ARCHITECT RELATIONS: AN OVERVIEW

The architectural and engineering professions have disagreed on their respective roles in the building design area, including which profession should serve as the coordinating or prime professional, ever since the advent of licensing statutes for the professions in the early 1900s. Early on it was recognized that these laws identified overlapping scopes of practice for the two groups. Since at least as early as the 1950s, these overlap issues have been litigated before state courts. (See NSPE's discussion paper, *Engineering Licensing Law and the Design of Buildings* [NSPE Pub. 1728] for a detailed discussion of the major cases.)

The most recent round of conflict between the two groups began in the 1970s and has continued into the early 1990s. During this time, professional engineers in numerous states have reported incidents that, when viewed as a whole, appear to reflect a concerted effort on the part of the architects to restrict qualified engineers from designing buildings or serving as the coordinating or prime professional. Among the conflicts reported are the following:

Arkansas. In 1993, a licensed engineer's building design plan was rejected by a local building inspection official because it did not bear an architectural seal. The code official indicated that the state architectural licensing board had instructed him that no building design of any type, including manufacturing or industrial buildings costing over $75,000, could receive a permit unless it was sealed by an architect.

Florida. Architects and engineers have been engaged in a long-running dispute over the authority of professional engineers to provide building design services. Numerous actions against engineer and architect licensees for illegal practice prompted the architectural and engineering licensing boards to sign a joint agreement in 1971. However, the architectural profession continued, however, to seek to restrict engineers from building design practice. In 1982, the architectural society disseminated a misleading memorandum to local code enforcement officials that implied that engineering seals were not acceptable on design plans for buildings which were principally for human use or for commercial purposes. The two boards returned to the negotiating table in the mid-1980s. Negotiations collapsed when the architectural licensing board published draft language on incidental practice that they had agreed not to publish. The boards recommenced discussions and signed another agreement in 1993.

Kansas. At the initiation of its architect members, in 1992, the state Board of Technical Professions (which jointly regulates engineers, architects, and other design professions) considered action against a licensed architectural engineer for submitting drawings to a public authority without the seal of an architect.

Maine. Legislation adopted in 1991 at the behest of the architectural profession resulted in municipalities rejecting building design plans that had been sealed by professional engineers. Professional engineers in the state were compelled to obtained corrective legislation the following year in order to rectify the situation. (See case study on page 5).

Maryland. The architectural licensing board issued a memorandum to county permit and inspection officials in 1991 interpreting statutory amendments to the architectural licensing statute in a manner that prohibited engineers from designing or renovating commercial buildings. This action was followed the next year by legislation that would have prohibited public authori-

ties from accepting plans sealed by licensed engineers practicing architecture incidental to their practice of engineering. The state's professional engineers opposed the legislation and it was modified to relieve some of their concerns.

Massachusetts. In 1992, the state architectural society proposed amendments to the state building code that would have required the design and preparation of building design plans to be completed solely by an architect. The building code currently permits either an engineer or architect to prepare such plans. The state's professional engineers protested the change and forced the architects to withdraw the proposal.

Montana. Architects introduced legislation in 1993 that would have allowed them to design industrial facilities, warehouses, garages, and other buildings. Currently, the architectural profession is restricted solely to the design of structures primarily for human occupancy or use. The state's professional engineers opposed the legislation and it was defeated.

New Jersey. Architects attempted to capitalize on a 1984 state court ruling that identified weaknesses in the state engineering statute by aggressively seeking to restrict engineers' authority to provide building design services and to serve as the prime professional. Engineers responded by working to have legislation enacted that provided them specific authority in the building design field. (See case study on page 11).

North Carolina. The architectural licensing board attempted to limit the practice of engineering and enlarge the scope of architectural practice into the field of engineering by redefining "structural systems" in proposed rules in 1991. The proposed changes implied to the uninformed reader that professional engineers were not permitted to perform structural systems work. The state's professional engineers were successful in having the proposed rules amended to reflect that licensed engineers also had such authority.

Ohio. In 1993, the architectural licensing board defeated proposed rules of the engineering licensing board that would have clarified the use of the term "building" in the engineering licensing statute and would have provided clients with the right to select an appropriate design professional as the "prime design professional" on any building project. The engineering board initiated the rule change when the architectural board continued to bring charges against licensed engineers for the "illegal practice of architecture," despite having signed a joint agreement with the engineering board.

Pennsylvania. In 1988, the architectural licensing board sought to prevent engineering firms from hiring licensed architects and then performing building design services.

South Carolina. In 1992, architects attempted to amend the architectural licensing statute to eliminate the exemption for engineers practicing architecture incidental to the practice of engineering. The legislation would have also changed the wording of a key section of the architectural statute to imply that an architectural seal was always required.

South Dakota. A licensed engineer reported constant harassment by architects since 1987 claiming that he is engaged in the illegal practice of architecture. The engineer reported that in one case, the complaint was filed by 22 architects that had signed a petition at an AIA chapter meeting.

Texas. Architects challenged engineers' authority to provide building design services, following passage of an architectural practice statute in 1989. Among their efforts, architects threatened to sue school boards that selected engineers to design facilities, sought an attorney general's opinion that recognized the architectural profession's position and drafted a misleading handbook to code enforcement officials. But the architectural profession was successfully challenged at each instance by the facts of the state's

engineering and architectural licensing statutes and by the vigilance of the state PE society. (See case study on page 17).

NSPE - AIA *LETTER OF AGREEMENT* AND *JOINT PRACTICE ACCORD*

In response to the conflicts that had emerged in the states in the 1980s and in an effort to prevent similar conflicts in the future, the national engineering and architectural professional societies embarked on a series of discussions and correspondence exchanges to forge a national consensus.

In April-May 1989, the presidents of NSPE and AIA signed an *Architect/Engineer Relationships Letter of Agreement* that stated:

> The National Society of Professional Engineers (NSPE) and the American Institute of Architects (AIA) agree that the primary purpose of state laws governing the practice of engineering and of architecture are to protect the public health and safety and to enhance the economic and social welfare of the public.
>
> Such laws should not be used to artificially inhibit the practice of either profession in areas in which they are both technically and professionally qualified by virtue of educational preparation, experience, and professional registration.
>
> In the design of buildings and other facilities, the capabilities of engineers and architects sometimes overlap. It is not in the interests of the general public or of potential clients for there to be real or apparent conflicts between the national associations of engineering and architecture over areas of practice, especially as reflected in provisions for state registration laws.
>
> In recognition of the above points, the American Institute of Architects (AIA) and the National Society of Professional Engineers (NSPE) agree to initiate a process of discussion and study to develop a joint statement of policy regarding engineer/architect relationships. It is anticipated that such a policy will be communicated to the state organizations of the AIA and the NSPE and to the State Boards of Registration for both engineers and architects for their consideration in determining appropriate relationships at the state level.
>
> The AIA and the NSPE intend to complete the process of discussion and study no later than July 1, 1990

In June 1989, the NSPE and AIA presidents agreed to form a Joint NSPE/AIA Coordination Committee to improve cooperation between the professions at an organizational level and also within the individual working environment. The joint committee met on December 11, 1989, and discussed a broad range of topics. There was general agreement that while problems and disagreements did exist, most collaborative architectural/engineering projects throughout the country were working satisfactorily. It was acknowledged that there were problems in some states, notably (at that time) in New Jersey and Pennsylvania. The committee adopted the optimistic view that these disputes could be satisfactorily resolved in the near future and would be watched with great interest.

The committee developed several statements of general principles to guide the development of improved working relations between engineers and architects and the initiation of joint efforts between NSPE and AIA. Implicit in these statements was the need for improved communications between the two professions at all levels.

Eight statements were set forth by the committee in a draft *Architect-Engineer Joint Practice Accord* which stated the following:

AN ACCORD, entered by and between the American Institute of Architects (hereinafter, "AIA") and the National Society of Professional Engineers (hereinafter, "NSPE") as follows:

WHEREAS a joint AIA/NSPE Committee was established as a result of dialogue and agreements reached in June, 1989 between the Presidents of AIA and NSPE and;

WHEREAS the Committee proposed concepts and mutual efforts to bring about improved working relationships both at the organizational level and within the individual working environment:

NOW, THEREFORE, IT IS HEREBY AGREED THAT the two organizations:

(1) Establish joint architectural-engineering groups at the state and local levels to address problems that involve working relationships between engineers and architects;

(2) Develop educational conferences, joint seminars and panel discussion groups of both architects and engineers to make presentations at the national, state and chapter meetings of both AIA and NSPE. Such programs should be directed toward developing a better understanding among architects and engineers with regard to such issues as interprofessional business practices and the financial and contractual matters involved in joint practice on building projects;

(3) Endorse the right of an owner, or using agency to have total freedom to select a prime design professional for any specific project based on the requirements of the owner and the qualifications of the professional selected in response to the request for proposals;

(4) Recognize that all design professionals must practice within their area(s) of competence, have full control of their design efforts on every project and not allow their decisions and design to be compromised by non-professionals;

(5) Cooperate when mutually beneficial on national, state and local legislative and regulatory matters of interest and concern to both groups;

(6) Endorse the use of the term "incidental" in many state statutes, which recognizes that either an architect or an engineer, where competent, should be allowed to perform those incidental services that are necessary to complete a design;

(7) Recognize that the interpretation and enforcement of professional licensing laws are the responsibility of state licensing boards and that while affected national organizations should provide guidance and direction, the licensing process falls within the states' jurisdiction and the resolution of overlapping practice issues is a state responsibility;

(8) Acknowledge that graduates of an architectural engineering program approved by the Accreditation Board for Engineering Technologies (ABET) may continue on a career path leading to registration as a registered professional architectural engineer and that existing statutes governing architectural registration do not accept an architectural engineering degree, per se, as meeting the full educational requirements for licensure as an architect. Students entering into an architectural engineering curriculum should be advised that they are not on a direct path leading to registration as an architect.

Following lengthy discussion at its February 1990 meeting, the NSPE Board of Directors approved the *Joint Practice Accord*, viewing it as an important step toward improving relations between the two professions and in keeping with NSPE's previous commitment to AIA as outlined in the *Letter of Agreement*. The AIA board of directors rejected the accord, however, and to this day refuses to sign it.

ICOR REPORT ON DESIGN PROFESSIONALS

The national professional societies are not the only groups that have been seeking to bridge differences between the engineering and architectural professions. The umbrella organizations for the engineering and architectural licensing boards, the National Council of Examiners for Engineering and Surveying (NCEES) and the National Council of Architectural Registration Boards (NCARB), have also sought a consensus. Their efforts have been conducted primarily under the auspices of the Interprofessional Council on Registration (ICOR), which also includes the Council of Landscape Architecture Registration Boards (CLARB) in addition to NCEES and NCARB.

In 1991, ICOR formed a task force to draft a report that would outline the scopes of practice and services embraced by each of the four professional design disciplines participating in the Council (architects, engineers, landscape architects, surveyors). It was anticipated that each of the ICOR members would then adopt the task force's recommendations as part of the statutes regulating each professional design discipline and also use them as a guide for code enforcement officials (CEOs).

In January 1992, ICOR member organizations were presented a first draft of the Task Force Report, which had been assembled primarily by NCARB staff. NCEES found the draft to be generally acceptable, except for the appendix where the definitions of engineering and surveying were significantly less detailed and comprehensive than the definitions of architecture and landscape architecture. NCEES agreed to embellish the engineering and surveying appendixes, while NCARB agreed to redraft the body of the report to make it more consistent with the model laws of each of the ICOR member organizations. In May 1992, NCARB presented ICOR the second draft. NCEES reviewed it and found it unacceptable. NCEES was particularly concerned with sections of the report that implied that the design of buildings for human occupancy should be limited to architects as opposed to qualified engineers. NCEES responded by proposing further changes to this second draft, but NCARB rejected those changes. The project was stalemated throughout 1993 as ICOR members debated whether or not the project was even feasible. In 1994, ICOR members decided to abandon any further attempt to develop a report. (Note: Any copies of the report in circulation are draft only and have not been approved by ICOR.)

MODEL HANDBOOK FOR BUILDING OFFICIALS

During this same period, NCARB was also taking independent actions that further exacerbated tensions between the architectural and engineering professions.

In 1992, NCARB released a *Model Handbook for Building Officials on Architecture and Engineering Registration Laws*. The document, published without any input from NCEES or NSPE, purported to define the appropriate role of licensed architects and professional engineers on the building design team. As defined in the publication, the role of the engineer was clearly subservient to that of the architect. Building code officials were advised on the broad range of knowledge possessed by architects in contrast to the narrow scope of knowledge possessed by engineers. Upon learning of the NCARB publi-

cation, representatives of NCEES, NSPE, NCARB, AIA, and the American Consulting Engineers Council (ACEC) met to discuss engineers' opposition. Following those discussions, and a concerted effort by NSPE to have its state societies alert state CEOs to NSPE's repudiation of the document, NCARB was compelled to withdraw the *Model Handbook.*

In its communications with state building code enforcement officials, NSPE noted that:

> State engineering registration laws recognize that areas of overlap exist between engineering and architecture particular in the design of buildings. Efforts to draw a definitive line of demarcation between the two professions in the area of building design have failed in various jurisdictions and have led to deep division between the two professions. When competent and qualified professional engineers perform building design services they are not engaged in "incidental practice of architecture", (a term which has historically defied any concrete definition or meaning), but instead are properly engaged in the "practice of engineering" as defined in the state statute. Court decisions over the years in other jurisdictions have reinforced this basic legal proposition. Artificial and arbitrary distinctions seeking to (1) demarcate when an architect's seal is or is not required or (2) restrain competent and qualified professional engineers from serving as the prime design professional in the design of buildings truly ignore both the professional responsibilities and historic patterns of the two professions up to the present. In this regard we would simply note that the mere fact that the state architect law "permits" an architect to coordinate the services of other consultants does not "require" that an architect perform such services as some have suggested.
>
> It is essential that state law be applied in a reasonable and intelligent manner for the protection of the public health and safety as intended by the legislature. We urge you to continue to accept the seal of all competent and qualified design professionals (e.g., architects and engineers) on building design drawings submitted for approval consistent with state law.

NCARB MODEL LAW AMENDMENT

The furor over the *Model Handbook* did not deter NCARB from pursuing another course of action equally troubling to the engineering profession, however. In early 1993, NSPE learned that NCARB had proposed to amend its *Model Legislative Guidelines* for the definition of the "practice of architecture" to specifically include within the definition the "coordination of any elements of technical submissions prepared by others including, as appropriate and without limitation, consulting engineers and landscape architects."

Many within the engineering community considered this action an overt attempt by NCARB to secure statutory recognition of the architect's role as the prime professional. Some within the architectural community attempted to assure engineering groups that their concern was not warranted, noting that with few exceptions, state architectural licensing statutes currently contain exemptions for engineers through an "incidental practice" clause and that NCARB's proposed amendment would not change or restrict these exemptions. Many within the engineering community responded by noting that this opinion mischaracterized the issue as involving the "incidental practice of architecture" (implying that the "coordination of services provided by consultants" should be seen solely as the "practice of architecture", and therefore that when such services are provided by professional engineers, those services should be viewed as the "incidental practice of architecture"). NSPE and NCEES would not accept this

proposition because most states implicitly recognize the authority of professional engineers to "coordinate services provided by consultants." Moreover, engineers argued, they should not need to rely upon a vague and uncertain "incidental practice of architecture" exemption in the architectural licensing statute as the basis of the professional engineer's legal authority to coordinate services provided by consultants.

Despite discussions and the exchange of several letters from NSPE and NCEES requesting that NCARB withdraw its amendment, its board moved ahead anyhow and amended its legislative guidelines in June 1993.

Immediately following the NCARB action, NSPE's Registration & Qualifications for Practice Committee recommended that the NSPE Board of Directors seek to have NCEES formally amend its *Model Law* to include parallel language. At its July 1993 meeting, the NSPE Board concurred and passed the recommendation to NCEES for consideration. At its August 1993 meeting, the NCEES board of directors formally approved the modification to its *Model Law.*

1994 TUCSON MEETING

NSPE, AIA, and other organizations met April 21, 1994, to discuss a broad range of issues. One area that NSPE had expected to resolve was that the building owner or client has the right to select either an engineer or an architect as the coordinating or prime professional for any building design project. Unfortunately, architectural representatives refused to accept NSPE's position and continued to insist that only they should serve as the coordinating or prime professional on building projects designed for human occupancy. NSPE President Dudley Hixson, P.E-L.S., characterized the meeting as "disappointing", because of its failure to resolve the "deep divisions" that existed on the prime professional issue.

NSPE President Hixson; AIA President L. William Chapin II, FAIA; and ACEC President Paul F. Sprehe, did, however, sign the following "Statement of Interprofessional Cooperation":

> We, the principal national leaders of the design professions, recognize our common interests in protecting the public health and safety by providing professional design services to the public. We represent different professions responsible for the built environment and specifically seek ways to work together to reduce conflicts within the broader design community.
>
> We oppose interprofessional jurisdictional disputes between architects and engineers as being counterproductive to the interests of the public and the design professions. We do not seek to impose specific solutions on state and local situations but stand ready to help mediate in instances where we can be helpful.
>
> This has been and is the basis of our cooperation in improving the design community and the services we jointly provide.

If the agreement were interpreted by both professions as meaning that both would oppose limitation on an owner's right to select either an architect or an engineer as the prime professional, then the agreement would have a positive effect. Shortly after its signing, it was clear that no such interpretation existed. NSPE President Hixson, in response to an incomplete and somewhat misleading article about the statement that appeared in the *Engineering News-Record*, commented that "serious substantive differences between the two professions as to who may properly serve as prime professional in the design of buildings and on other projects remained entirely unresolved." AIA, on the other hand, hailed the statement as a "breakthrough for moving the design professions' focus away from interprofessional practice disputes..."

CONCLUSION

These episodes serve as indicators that on a national level, as well as in states across the country, the architectural profession has acted contrary to its stated desires to reach a mutual understanding with the engineering profession and that their actions have unnecessarily exacerbated tensions between the two groups. They also demonstrate NSPE's resolve to counter architectural encroachments when they surface as well its desire to reach a workable solution to engineer-architect conflict.

PROFILE OF THE ENGINEERING AND ARCHITECTURAL PROFESSIONS

ENGINEERING

Approximate Number of Engineers - **1,716,000**[1]

Approximate Number of Licensed Engineers - **652,410**[2]

Approximate *Number of U.S. Engineering Firms* - **15,000**[3]

Number *of Engineering Degrees Granted in 1993*[4]

- **65,001** Bachelor's Degrees, Total

  64,608 Bachelor's Degrees from Accredited Institutions - 99% of Total Bachelor's Degrees Granted

  393 Bachelor's Degrees from Unaccredited Institutions - 1% of Total Bachelor's Degrees Granted

- **37,302** Graduate Degrees

Number of Accredited U.S. Engineering Education Institutions (Institution has at least one accredited engineering program) - **302**[5]

Professional Society -

National Society of Professional Engineers (NSPE)
1420 King Street
Alexandria, VA 22314-2794
PH: 703/684-2800/FAX: 703/836-4875
Founded: 1934
Members: 70,000

Licensing Board Umbrella Organization -

National Council of Examiners for Engineering and Surveying (NCEES)
P.O. Box 1686
Clemson, SC 29633-1686
PH: 803/654-6824/FAX: 803/654-6033

ARCHITECTURE

Approximate Number of Architects - **123,000**[9]

Approximate *Number of Licensed Architects* - **85,000**[10]

Approximate Number of U.S. Architectural Firms - **15,000**[11]

Number *of Architectural Degrees Granted in 1992*[12]

- **5,703** Bachelor's Degrees, Total

  3,026 Bachelor's Degrees from Accredited Institutions - 53% of Total Bachelor's Degrees Granted

  2,677 Bachelor's Degrees from Non-Accredited Institutions - 47% of Total Bachelor's Degrees Granted

- **1,427** Accredited Master's of Architecture Degrees Granted

Number of Accredited U.S. Architectural Education Institutions - **100**[13]

Professional Society -

American Institute of Architects (AIA)
1735 New York Avenue, N.W.
Washington, DC 20006
PH: 202/626-7300/FAX: 202/626-7365
Founded: 1857
Members: 55,000

Licensing Board Umbrella Organization -

National Council of Architectural Registration Boards (NCARB)
1735 New York Avenue, N.W.
Washington, DC 20006
PH: 202/783-6500/FAX: 202/783-0290

THE BUILDING DESIGN MARKET: AN OVERVIEW

INTRODUCTION

Observers in states that have experienced long-running engineer-architect disputes have characterized the pattern of conflict as periodic rather than constant. Incidents where the architectural profession moves aggressively to restrict activities of the engineering profession in the building design area appear to coincide with downturns in the building construction market. There is a logic to this pattern, in that the architectural profession is engaged solely in building design, and as such is more adversely impacted by declines in the building construction market than is the engineering profession, which on the whole provides a broader array of services.

Economic downturns alone do not account entirely for the architects' behavior, however. At least two additional factors also come into play. First, the engineering profession has already assumed and continues to seek a greater share of the building design market. Second, building owners and other consumers of building design services recognize that the engineer can also meet, and in some cases, better meet, their building design needs than can architects.

THE ENGINEER AS PRIME PROFESSIONAL

Much of the evidence that exists as to the increasing role of the engineer as the coordinating or prime professional on building projects is anecdotal. Engineering design firms have noted the trend away from their firm serving merely as a subconsultant to an architectural firm toward their serving as the prime professional. In some cases, they have brought architects on staff so that they can provide a greater range of services in-house, and dispense with the need to retain an architect as a subconsultant.

Research conducted by the American Consulting Engineers Council (ACEC) verifies this trend. A 1992 survey of interprofessional firms[1] indicates that in 1980, 90 percent of the responding firms contracted their services to architects, whereas only 10 percent contracted directly with owners. In 1992, the numbers had shifted dramatically, with only 60 percent contracting their services to architects, while 40 percent contracted directly with owners. A 1992 ACEC survey of its Small Firm Coalition members reports similar findings. Only nine percent of the responding firms reported that their work was contracted with an architectural firm in 1992, compared to 34 percent in 1982. Eighty-one percent contracted directly with the owner in 1992, compared to 66 percent in 1982.

Data from ACEC's 1993-94 Business Health Survey indicates that this trend could continue. Twenty-five percent of the 1,300 firm respondents indicate that becoming the prime professional was one of their top three long-term opportunities for expansion. Only environmental and private development services were rated higher. The survey also indicates that building design services are a substantial block of engineering firms' practice. Twenty-three percent of respondents identified commercial/office buildings as one of the three largest markets for which they did the most work in 1993. Public buildings, educational buildings, housing, and building renovation all fell within the 15-20 percent range.

This data indicates that the engineer has assumed a substantial role in the building design market and is increasingly being selected as the prime or coordinating professional. If trends continue in this direction, efforts on the part of architects to restrict engineers' authority in the building design area are likely to continue and/or expand.

WHAT CLIENTS NEED

Another factor contributing to the architectural profession's concern may be the result of weakness within the architectural profession itself. The architectural profession may be inadequately prepared to respond to the growing demands of building owners and clients for complex and "multi-use" structures that are environmentally friendly, affordable, and both functional and aesthetic. The architect may not be the best suited for providing the broad scope of services that building owners/clients expect. Or perhaps, clients have not been completely satisfied with the architectural services they have received in the past.

A 1993 study of business (medium-size manufacturing, trade, financial and other businesses) and institutional (health care, educational, non-profit) clients conducted for the American Institute of Architects sheds some light on these issues. Among the conclusions of the study, *What Clients Need: A Study of Business and Institutional Clients' Expectations of Architects*[2], are the following:

- Institutional and business clients place a greater priority on building functions, or practical issues, rather than on aesthetics, or design issues. Of the building design items asked about, 95 percent of respondents rated fire and life safety systems, 90 percent indoor air quality, 89 percent energy efficiency, and 88 percent lighting as major priorities. Only 66 percent rated the design statement or aesthetics of the facility and 64 percent the way the facility fits in with its physical surroundings as major priorities. That is to say, about 30 percent considered these to be minor priorities.

- Eighty-four percent of respondents said that responsiveness to client needs and 83 percent said ability to manage the overall project (including regulations, zoning requirements, etc.) are very important when choosing an architect. Seventy-seven percent of respondents also like to see good track records of adherence to schedules and budgets. A less important factor was the architect's design quality or aesthetic sense, with only 68 percent of respondents saying it was a very important factor.

- Respondents believe architects need to improve their financial management skills. Forty-three percent of respondents said the phrase "save you money" does not describe architects "too much" or "at all" and 32 percent said the same about the phrase "budget sensitive".

- Respondents who hired architectural firms report high levels of satisfaction with the firm having made the design statement the client wanted (58 percent) and being responsive to the client's needs (56 percent). In two areas, however, architects performed less well. Only 50 percent were very satisfied that the architect met expectations in terms of managing the design/construction process and only 48 percent were very satisfied that the project stayed within budget and schedule.

- Of 12 specific areas of service, respondents rated architects as very valuable for designing a new building (74 percent), helping get zoning, building and other permits (61 percent), and space planning (60 percent). Areas of service where architects are perceived to be less valuable and where in fact respondents have been less likely to turn to architects include managing construction projects (only 44 percent rated architects as very valuable), building site selection (26 percent), facilities management (22 percent), and giving advice on how to obtain financing (18 percent).

- When asked which of a series of 20 adjectives apply to architects, 70 percent of respondents said the term "elitist" describes architects completely or somewhat, and 59 percent said the term "arrogant" also applies completely or somewhat.

- Architects have a positive image overall, but engineers have an even more positive image. 91 percent of respondents said they had a high or fairly good opinion of architects compared with 94 percent for engineers.

This data sheds light on several important issues from the engineering profession's perspective. Foremost, it challenges the architectural profession's assertion that they are the better qualified to serve as a coordinating or prime professional on a building design project. In fact, only half of the respondents who used an architectural firm were very satisfied with the firm's project management skills. The survey also points out client dissatisfaction with architects' ability to manage and control budgets and schedules, also a key function of a coordinating or prime professional. Services that clients identified as most critical when selecting an architect, such as responsiveness to needs, and managing zoning and building permit processes, are tasks which are in no way unique to the architectural profession and can equally be provided by engineers. And finally, aesthetic aspects of a building, the core of the architectural profession's contribution to a building project, are not nearly as important to clients as are factors such as life and fire safety, indoor air quality, energy efficiency, and lighting, factors for which engineers are more capable or at least equally capable to architects of providing.

These and other conclusions that can be readily drawn from the AIA survey strengthen the engineering profession's position that engineers are equally qualified as are architects to provide building design services and serve as the coordinating or prime professional.

REFERENCES

[1] *American Consulting Engineer*. "Engineers in Prime Time on Modern Design Team," November 1992.

[2] *What Clients Need: A Study of Business and Institutional Clients' Expectations of Architects*. American Institute of Architects. Washington, DC. 1993. Copies may be purchased for $70 ($35 for AIA members) by contacting AIA at 1-800-365-2724. Ask for order # J373.

FLORIDA BOARD OF PROFESSIONAL ENGINEERS
Education, Experience and Examination
Requirements for Licensure

EDUCATION

1. Board Rule 61G15-20 implements F.S. 471.013 which provides for Board acceptance of accreditation of schools and courses of study by a nationally accepted accreditation organization.

2. The Accreditation Board for Engineering & Technology (ABET) is the only duly recognized (by the U.S. Department of Education) agency for the purpose of accrediting engineering curricula in the United States.

3. The ABET standards (referred to as criteria) and policies and procedures are enclosed herewith. See Appendix A.

4. The criteria are in two major parts, both of which must be met by any given engineering program to receive accreditation. These are the general criteria which must be met by every program, and the program criteria which must be met by each disciplinary oriented program.

5. It should be noted that the general criteria require study in mathematics, basic science and engineering sciences at a level not typically found in architecture programs.

   It is this very point that is deemed crucial in the educational preparation for design. Architects are prepared to have general knowledge about matters pertaining to building design, but lack the depth of preparation to adequately address the detailed analysis and synthesis required to create a finished design.

6. The program criteria are discipline specific and go far beyond the rudimentary educational preparation given architects in many areas; e.g. structures, electrical systems, HVAC systems, materials selection, site evaluation, etc.

7. Among others, program criteria are presented for:
   Architectural Engineering
   Civil Engineering
   Construction Engineering
   Electrical Engineering
   Mechanical Engineering
   Environmental Engineering

8. Board Rule 61G15-20 is very specific about the requirement for educational preparation based on engineering curricula/degrees as accredited by ABET; or the establishment of "substantial equivalency" including

articulation requirements to meet ABET criteria/standards.

9. Catalog materials (e.g. University of Florida) are included illustrating courses/content for the above named areas (except Architectural Engineering). These take on added significance when one considers life safety issues...there is only one accredited Fire Protection Engineering program in the United States (University of Maryland)...and obviously these aspects of design tend to be referred to engineers. See Appendix B.

10. Catalog materials (e.g. University of Miami) are included outlining requirements for an accredited Architectural Engineering program. It is very clear that the depth and breadth in the basic sciences, mathematics and technical specialties, exceed that in a typical Architecture program. See Appendix C.

EXPERIENCE

1. Engineer applicants for the professional practice examinations must have completed an ABET approved degree program or equivalent and four years of acceptable experience (including one year of engineering design experience). This experience is normally gained while the applicant holds an engineering intern (EI) certificate.

2. The applicant's experience record requires evidence of employment from employers or supervisors who themselves are employed in the engineering profession or are professional engineers. An important part of the evaluation of experience is the determination of qualifications to be placed in "responsible charge."

3. Board Rule 61G15-18.011 defines responsible charge as "that degree of control an engineer is required to maintain over engineering decisions made personally or by others over which the engineer exercises supervisory direction and control authority."

EXAMINATION

1. The professional practice examinations in engineering are discipline specific and cover a much broader spectrum of activities than has been generally understood.

2. Board Rule 61G15-21 includes abbreviated examination syllabi (as developed by the National Council of Examiners for Engineering and Surveying (NCEES). In particular, those closely related to architecture include the following:
   Civil/Sanitary Engineering
   Electrical Engineering
   Mechanical Engineering

Structural Engineering
Control Systems Engineering
Fire Protection Engineering

3. The general practice of architecture overlaps all these areas, not just Civil/Sanitary Engineering.

4. There exist at least 13 accredited Architectural Engineering programs in the U.S. (including one at the University of Miami). Efforts are continuing to prepare an appropriate NCEES examination for graduates of these programs. See Appendix D.

APPENDIX B
Catalog Materials (Engineering)

CHM 4413 Biophysical Chemistry S.
Credits: 4; Prereq: CHM 4411 and MAC 3.
Biochemical applications of thermodynam
ort phenomena, enzyme kinetics, foun
ntum mechanics, spectroscopy, statistic
amics, and biochemical structure deterr

CHM 4453 Physical Chemistry of Polymer
Credits: 2; Prereq: CHM 4411 or equivalen.
Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical and rheological properties of plastics and rubbers.

CHM 4905 Individual Problems. F, S, SS.
Credits: 1 to 3; Prereq: Permission of the faculty member supervising the work. May be repeated for additional credit.
Double registration permitted. An assigned reading program or the development of an assigned experimental problem.

CHM 4910 Senior Research. F, S, SS.
Credits: 1 to 3. Senior standing and consent of instructor. May be repeated for additional credit.
Laboratory or literature investigations of chemical problems of current interest.

CHM 4940 Supervised Teaching. F, S, SS.
Credits: 1 to 2; Prereq: Senior standing and consent of instructor. May be repeated for credit.
Teaching, usually at the general chemistry level. Required is a superior record at UF in the course in which the student will assist, senior standing as a chemistry major with a good record, and evidence that the student's own progress will not be delayed.

Civil Engineering
llege of Engineering

INSTRUCTIONA L STAFF 1995-96

Thompson, P.Y., Chair; Barnes, G.; Bloomquist, D.G.; Chris-tensen, B.A.; Cook, R.; Courage, K.G.; Davidson, J.L.; Dewitt, B.A.; Ellifritt, D.S.; Ellis, R.D.; Fagundo, F.E.; Gibson, D.W.; Glagola, C.; Hatfield, K.; Hays, C.O.; Herbsman, Z.; Hoit, M.I.; Long, G.; Lybas, J.M.; McVay, M.C.; Motz, L.H.; Najafi, F.T.; Roque, R.; Ruth, B.E.; Shrestha, R.L.; Smith, S.E.; Tia, M.; Townsend, F.T.

ADJUNCT AND AFFILIATE STAFF

Dean, R.G.; Deere, D.U.; Eades, J.L.; Maxman, R.; Mehta, A.; Schmertmann, J.H., Sheppard, D.

Construction Engineering

CCE 4204 Construction Methods and Management. F,S,SS.
Credits: 3; Prereq: Junior or senior standing or consent of instructor; Coreq: CGN 4101.
Theory and practice of construction operations, equipment utilization and construction methods. Analysis of costs. Optimizing crew and equipment. Heavy equipment costs.

CCE 4801 Formwork Design and Construction. S.
Credits: 3; Prereq: CCE 4204; Coreq: CES 4702.
Strength and design of concrete formwork; use of design tables and types of material used. Emphasis on quality, safety and economy of formwork design.

CCE 4810 Construction Engineering Design. S.
Credits: 3; Prereq: CGN 4101, CCE 4204.
ulation of comprehensive construction project
ing all phases of planning, scheduling and con-
om start to finish which involves making major
sions. Oral presentation at end of course.

Credits: 3; Prereq: CEG 4011.
EG classification only.Subsurface exploration settlements analysis, shearing resistance, slope stability, earth pressure and an introduction to foundation design.

CEG 4111 Foundation Engineering Design. S.
Credits: 3; Prereq: CEG 4012.
Comprehensive design of geotechnical system, focusing on design of complete project and utilizing CAD programs. Designs, drawings and oral presentations through group effort.

Structural Engineering

CES 3102 Mechanics of Engineering Structures. F,S,SS.
Credits: 4; Coreq: EGM 3520.
Stress and deformation analysis of framed structures. Influence lines, criteria for critical loading, moment area, virtual work, slope deflection and consistent deformation.

CES 4034 Civil Engineering Estimating. F.
Credits: 3; Prereq: CCE 4204, CGN 4101 and senior standing. EG classification or consent of instructor.
Design of systems for estimating and cost control of man-machine productivity for civil engineering projects. Analysis of cost factors required for optimization of engineering-investment efficiency.

CES 4141 Stress Analysis. F,S.
Credits: 2; Prereq: CES 3102. EG classification or consent of instructor.
Analysis of framed structures by the stiffness method. Introduction to the finite element methods.

CES 4605 Analysis and Design in Steel. F,S.
Credits: 3; Prereq: CGN 3501, CES 3102. EG classification only.
Elastic and plastic theories of design, design of members subjected to tension, compression, flexure, torsion. Design of connections and rigid frames.

CES 4608 Advanced Steel Design. S.
Credits: 3; Prereq: CES 4141, CES 4605.
Simulation of comprehensive design experience, focusing on design of complete project. Designs, cost estimates, drawing and oral presentations through group effort.

CES 4702 Analysis and Design in Reinforced Concrete. F,S,SS.
Credits: 3; Prereq: CGN 3501, CES 3102. EG classification only.
Ultimate strength analysis and design of reinforced concrete members, working stress design for flexure, moment distribution, influence lines, design of rigid frames, introduction to prestressed concrete.

CES 4704 Advanced Reinforced Concrete Design. F.
Credits: 3; Prereq: CES 4702. EG classification only.
Comprehensive design of a complete concrete structural system. Group effort will include study of alternate solutions, structural analysis and design, detailed construction drawings, and oral presentation of solutions.

ral Civil Engineering

I 3421 Computer Methods in Civil Engineering.
Credits: 4.
ew of FORTRAN, use of computer, numerical
ods as applied to civil engineering problems
adsheets and civil engineering software.

N 3501 Civil Engineering Materials. F,S,SS.
Credits: 4; Prereq: EGM 3520, CES 3102.
A study of the principal materials used for engineering purposes with special attention to their mechanical properties and the importance of these properties to the engineer. Application of statistics in quality assurance and control.

CGN 3710 Experimentation and Instrumentation in Civil Engineering. F, S, SS.
Credits: 3; Prereq: PHY 3041.
Fundamentals and applications of measuring systems commonly used in civil engineering. Topics include recording techniques, strain, force, displacement, flow, temperature, humidity and pH measurements.

CGN 4101 Civil Engineering Cost Analysis. F,S,SS.
Credits: 2; Prereq: Junior or senior standing or consent of instructor.
Analysis of civil engineering proposals, utilizing time-value and related factors. Feasibility and optimum life comparisons. Utility rate derivation, utility/cost method.

CGN 4905 Special Problems in Civil Engineering. F,S,SS.
Credits: 1 to 4; Maximum of 9 credits. Prereq: Recommendation of department chair.
Selected problems or projects in the student's major field of engineering study.

CGN 4948 Practical Work in Civil Engineering. F,S,SS.
Credits: 1 to 3; Prereq: 4 EG classification.
One term industrial employment, including extra work according to a pre-approved outline. Practical engineering work under industrial supervision, as set for in the College of Engineering regulations.

CGN 4949 Co-op Work Experience. F,S,SS.
Credits: 1; Prereq: EG classification.
May be taken for credit with consent of department.

Water Resources Engineering

CWR 3201 Hydrodynamics. F,S,SS.
Credits: 4; Prereq: EGM 3511, 3400, or MAP 3302.
Classification of fluids. Hydrostatics. Similitude. Conservation of mass, energy and momentum. Potential flow, influence of viscosity and turbulence in the flow of water.

CWR 4111 Engineering Hydrology. F,S,SS.
Credits: 3; Prereq: CWR 4202. EG classification only.
Review of fundamentals of hydrology. Application of hydrology to hydraulic and transportation design including evaluation of runoff; design of control structures, detention and retention basis; flood plain mapping.

CWR 4202 Hydraulics. F,S,SS.
Credits: 3; Prereq: CWR 3201 or consent of instructor.
Fundamental equations for pipe and open conduit flow. Development of design oriented formulas for pipes and open channels. Introduction to hydrology.

CWR 4812 Water Resources Engineering Design. S.
Credits: 3; Prereq: CWR 4202; Coreq: CWR 4111.
Planning and design of the engineering facilities of various water resource systems; i.e., dams canals, pipelines and similar civil engineering works

†† Grading is on S-U basis only.

General Engineering

EGN 4032 Professional Issues in Engineering. F, S.
Credits: 3, Prereq: Senior standing or consent of instructor.
Engineering legal aspects, insurance, specifications, contract documentation and labor relations. A discussion of professionalism and ethics in the practice of engineering. Engineering safety including regulations, standards, job site safety planning, and laboratory and testing safety.

EGN 4834 Humanities and Engineering. S.
Credits: 3.
Studies in the relationships between humanities and engineering for engineering students. The course will consider issues, values and judgments in technology against the background of studies in the humanities. (H)

General Engineering History

HIS 3470 History of Technology 1. F.
Credits: 3.
The development of technology and engineering from antiquity to approximately 1750 with emphasis on the relationship of this development to the growth of western civilization.

HIS 3471 History of Technology 2. S.
Credits: 3.
The development of technology and engineering from approximately 1750 to WW-1 with emphasis on the relationship of this development to the changing patterns of life in western civilization.

Surveying and Mapping

SUR 3101 Basic Surveying and Mapping. F,S,SS.
Credits: 3; Prereq: MAC 1142.
Angle, distance and elevation measurement. Application to geographic information development, engineering, boundaries, topography, forestry and construction. Error theory. Horizontal and vertical curves.

SUR 3322 Introduction to Mapping
Credits: 2.
History of mapping, surveying of mapping instruments and methods, introduction to digital mapping, practical applications.

SUR 3331 Photogrammetry. S.
Credits: 2; Prereq: SUR 3101.
Photo interpretation and basic measurements. Geometry of vertical photographs. Mapping from photographs. Remote sensing.

SUR 3331L Photogrammetry Lab. S.
Credits: 1; Coreq: SUR 3331.
Practical projects in photogrammetry, photo measurements, mapping, GIS integration.

SUR 3403 Cadastral Principles. S.
Credits: 3; Prereq: SUR 3101.
Cadastral systems, land boundaries, corners, areas; writing land descriptions, identification of land parcels; legal principles of boundary location, the government land survey system.

SUR 3501 Geodetic and Control Surveying. S.
Credits: 3; Prereq: SUR 3101.
Geodetic instrumentation, azimuth determination by astronomy, geodetic leveling, geodetic coordinate systems, plane projections.

SUR 3501L Geodetic Surveying Lab. F.
Credits: 1; Coreq: SUR 3501.
Geodetic instrumentation, electronic data collector, geodetic astronomy, coordinate conversions.

SUR 3520 Measurement Science. S.
Credits: 4; Prereq: MAC 3312, STA 3032 or STA 3023.
Theory of measurement errors. Error propagation. Variance and covariance. Polynomial curve fitting. Regression analysis. Correlation. Least squares adjustments.

SUR 3640 Surveying Computations. F.
Credits: 2; Coreq: SUR 3101.
The principles of geometry applied to surveying computations. Computer methods.

SUR 4201 Route Geometrics. F,S,SS.
Credits: 2; Prereq: SUR 3101, Senior standing or consent of instructor.
Geometric design of transportation systems. Computer applications. Comprehensive design project. Spiral curves, superelevation theory, earthwork analysis.

SUR 4305 Marine Surveying and Mapping. F.
Credits: 2; Prereq: Senior standing.
Methods of positioning points near shore and in open ocean, depth measurements, tide measurements.

SUR 4350 Photogrammetric Geometronics. F.
Credits: 3; Prereq: SUR 3331, 3520.
Stereographic mapping. Analytic control extension. Mapping from satellite imagery. Terrestrial mapping.

SUR 4381 Remote Sensing
Credits: 3; Prereq: senior standing.
Remote sensing systems, ground truthing, image classification systems, mapping applications, applications in plant and animal science, urban planning, engineering, geology, integration into geographic information systems.

SUR 4430 Land Surveying Practice. S.
Credits: 3; Prereq: SUR 3403.
A study of land survey practice; the lot survey; the sectional survey; the water boundary survey; office and business practices; professional standing.

SUR 4462 Subdivision Design. S.
Credits: 3; Prereq: SUR 4201.
Design of a medium-sized subdivision, master plan development, physical development considerations, legal requirements, comprehensive project, mock presentation, platting.

SUR 4530 Geodesy. F.
Credits: 3; Prereq: SUR 3101.
Introduction to geometric and physical geodesy, ellipsoids, geodetic lines, computation of position, gravity, coordinate systems.

SUR 4531 Geodetic Positioning. S.
Credits: 3; Prereq: SUR 3520.
Satellite geodesy, orbit parameters, GPS observation, vector analysis, networking.

SUR 4620 Geographic Information Systems. F.
Credits: 3.
GIS concepts, surveying and mapping input in GIS development, comparison of GIS systems, applications in the natural and physical sciences, engineering, planning.

SUR 4905 Special Problems in Land Surveying. F,S,SS.
Credits: 1 to 3.
Special problems or projects in the student's major field of study.

SUR 4912 Senior Project. F,S,SS.
Credits: 2; Prereq: Senior standing.
Laboratory, equipment, or literature investigations of surveying and mapping probems and concepts of current interest resulting in a written work. (Takes two consecutive terms to complete course.)

SUR 4949 Co-op Work Experience. F,S,SS.
Credits: 1; Prereq: EG classification.

Transportation Engineering

TTE 4004 Transportation Engineering. F,S.
Credits: 3; Prereq: EGM 3400, SUR 3101.
Survey of transportation modes; planning, design, operation of transportation systems; costs and benefits of transportation systems.

TTE 4811 Physical Design of Transportation Elements. F S.
Credits: 3; Prereq: SUR 3101, CGN 3501. EG classification only.
Drainage, soils, embankments, fabrics, stabilization, flexible and rigid pavement design, resurfacing, new developments, material control, bridge inspection and repair maintenance.

Classics

College of Liberal Arts and Sciences

INSTRUCTIONAL STAFF 1995-96

Sussman, L., Chair; Dickison, S.; Eaverly, M.; Hartigan, K.; Miller, D.G.; Schmeling, G.L.; Wagman, R.; Young, D.

Undergraduate Coordinator: M.A. Eaverly
Graduate Coordinator: R. Wagman
Office: Dauer 3C (392-2075)

Classical and Ancient Studies

(All courses indicated CLA or CLT are taught in English)

CLA 1100 The Glory that was Greece. F.
Credits: 3; Prereq: None.
A broad cultural view of the classical Greek world. Greek sources read in translation. (H, I)

CLA 1120 The Grandeur that was Rome. S.
Credits: 3; Prereq: None.
Provides a multi-faceted introduction to the culture of Rome. Primary source material read in translation. (H, I)

CLA 3111 Athens: Its Topography and Monuments.
Credits: 3; Prereq: None.
An examination of the topography and monuments of ancient Athens emphasizing material remains and literary evidence. (H, I)

CLA 3114 Greece Today and Yesterday. S.
Credits: 3; Prereq: None.
An interdisciplinary course examining various aspects of ancient and modern Greek life and culture. (I)(H)

CLA 3151 Pompeii: An Archaeological Laboratory.
Credits: 3; Prereq: None.
Study of the material remains of a Roman town through an examination of the excavated finds: architecture, wall-paintings, and inscriptions. (I)(H)

CLA 3500 Sport and Recreation in the Ancient World.
Credits: 3; Prereq: None.
Examination and discussion of sport and recreation in the ancient Greek and Roman worlds with an emphasis on archaeological and ancient literary sources.

CLA 3501 Women in Classical Antiquity. S.
Credits: 3; Prereq: None.
The status of women in antiquity will be exami light of modern thinking on the subject of wor roles in society. (I)(H)

†† Grading is on S-U basis only.

EEX 3601L Lab: Management of Special Education Students. S, SS.
Credits: 2; Coreq: EEX 3601.
Practice in application of classroom management strategies in actual laboratory and classroom settings rving exceptional students.

EEX 3840 Practicum in Special Education.
Credits: 1 to 3; maximum of 6 credits.
Open only to majors in Special Education. Students are assigned to work with handicapped students in classrooms, agencies or institutions. Students are supervised and attend seminars relating to community and school services for handicapped persons.

EEX 4064 Educational Programming for Infants and Toddlers with Disabilities. S.
Credits: 3.
This course provides an overview of issues, trends and best practices in the education of the infant who is at-risk or disabled (birth to three).

EEX 4241 Teaching Academic Skills to Exceptional Students. F, SS.
Credits: 3.
Curriculum methods and materials for teaching basic skills to learning disabled children, youth, and adults.

EEX 4244L Direct Observation and Recording for Special Educators. F, S.
Credits: 2.
A laboratory of direct observation procedures. The production, management, and interpretation of data for instruction decisions.

EEX 4280 Career/Vocational Education for the Handicapped Student. F.
Credits: 2; Coreq: EEX 4280L.
This non-categorical course is designed to introduce special educators to the career and vocational futures of mildly and severely handicapped youth. Career/Vocational content and basic skills of special tudents will be developed.

EEX 4280L Lab: Career/Vocational Education for the Handicapped Student. F.
Credits: 1; Coreq: EEX 4280.
Observation of exceptional students in a variety of settings related to career and vocational education.

EEX 4754 Family Focused Involvement in Early Childhood Special Education. SSA.
Credits: 3.
Professional skills in working with families of young children with disabilities, including understanding of family systems theory, assessing family strengths and needs, developing individualized family support plans (IFSP) or individual educational plan (IEP), and enhancing communication and counseling skills. Issues related to understanding families from diverse cultures also will be presented.

EEX 4790 Multicultural Issues in Early Childhood Special Education. S.
Credits: 3.
Overview of issues related to cultural and linguistic diversity among young children with disabilities and their families.

EEX 4812 Practicum in Early Childhood Special Education. S.
Credits: 3.
Students will conduct assessments, will plan an intervention program, and will provide intervention to preschool children who are disabled.

EEX 4905 Individual Study. F, S, SS.
Credits: 1 to 6.
Open only to selected undergraduate students who wish to study an individual problem in depth which relates to their preparation as special education teachers. The project must be approved and supervised by a departmental faculty member.

Education: Mental Retardation

EMR 3011 The Mentally Retarded Student. F.
Credits: 3.
Educational, psychological, sociological and medical aspects of children and adolescents with varying degrees of retardation.

EMR 4330 Methods and Materials for the Trainable Mentally Handicapped. S.
Credits: 3.
Course investigates the development and implementation of programs/curricula for moderately retarded students in the public schools, institutions, and privately operated schools and workshops, ages preschool through adolescence.

Education: Physical & Multiple Handicapped

EPH 4033 The Severely Multi-Handicapped Child. F.
Credits: 1 to 3.
Educational procedures, programming strategies, and curriculum development required for developmentally young children and youth with physical impairment including visual, auditory, medical, and behavioral problems.

Electrical and Computer Engineering
College of Engineering

INSTRUCTIONAL STAFF 1995-96

Uman, M.A., Chair; Couch, L.W. II, Associate Chair; Fitzgerald, J.T., Assistant Chair; O'Malley, J.R., Undergraduate Coordinator; Anderson, C.S.; Anderson, J.M.M.; Arroyo, A.A.; Bosman, G.; Bullock, T.E.; Carroll, D.P.; Chenette, E.R. (Emeritus); Childers, D.G. (Emeritus); Domijan, A. Jr.; Doty, K.L.; Edmonson, W.W.; Eisenstadt, W.R.; Elgerd, O.I. (Emeritus); Fossum, J.G.; Fox, R.M.; Hammer, J.; Harris, J.G.; Houts, R.C.; Kalman, R.E. (Emeritus); Lam, H.; Latchman, H.A.; Latour, M.H. (Emeritus); Law, M.E.; Li, J.; Li, S.S.; Lindholm, F.A.; Lynch, M.A.; Miller, S.L.; Neugroschel, A.; Ngo, K.D.T.; Nishida, T.; O, K.K.; Peebles, P.Z. Jr.; Principe, J.C.; Rakov, V.A.; Ramaswamy, V.; Rambo, K.J.; Sah, C.T.; Schwartz, C.A.; Shaffer, C.V. (Emeritus); Smith, J.R. (Emeritus); Srivastava, R.; Staudhammer, J.; Su, S.Y.; Taylor, F.J.; Thomson, E.M.; Tou, J.T. (Emeritus); Wagner, W.A.; Watson, J.K. (Emeritus); Zmuda, H.; Zory, P.S.

Although not specifically stated, the prerequisites for all courses, except those required by other departments, may include classification as an electrical engineering student in good standing. Also, a student in the Department of Electrical and Computer Engineering can not take a course with an EEL prefix unless the student has earned a C or better in all prerequisite EEL prefix courses.

Engineering: Electrical

EEL 3003 Elements of Electrical Engineering. F, S, SS.
Credits: 3; Prereq: MAC 3313, PHY 3041.
An introduction to the theory and practice of electrical engineering for students not majoring in electrical engineering; circuits, machines, electronics and systems.

EEL 3111 Circuits 1. F, S, SS.
Credits: 3; Coreq: PHY 3041, MAC 3313.
Basic analysis of DC and AC electric circuits.

EEL 3112 Circuits 2. F, S, SS.
Credits: 3; Prereq: EEL 3111, MAP 3302 or Coreq: EGM 3311.
Continuation of EEL 3111.

EEL 3135 Signals and Systems. F, S, SS.
Credits: 3; Prereq: EEL 3112; Coreq: MAP 4403.
Convolution, applications of Fourier, Laplace, and z transforms.

EEL 3211 Basic Electric Energy Engineering. F, S, SS.
Credits: 3; Prereq: EEL 3111; Coreq: EEL 3112.
Analysis and modeling of power system components. Magnetic circuits, energy conservation, transformers, AC and DC rotating machines.

EEL 3303L Electrical Circuits Laboratory. F, S, SS.
Credits: 1; Coreq: EEL 3111 or EEL 3003.
Introductory electrical engineering laboratory in electrical instrumentation, devices and systems.

EEL 3304 Electronic Circuits 1. F, S, SS.
Credits: 3; Prereq: EEL 3111.
Fundamentals of analog electronic circuits and systems.

EEL 3396 Solid-State Electronic Devices. F, S, SS.
Credits: 3; Prereq: EEL 3111.
Introduction to the principles of semiconductor electron device operation.

EEL 3472 Electromagnetic Fields and Applications 1. F, S, SS.
Credits: 3; Prereq: EEL 3111.
Electric and magnetic fields and forces, Maxwell's equations in point and integral form, plane wave propagation, energy and power.

EEL 3473 Electromagnetic Fields and Applications 2. S.
Credits: 3; Prereq: EEL 3472.
Boundary value problems, transmission lines, guided waves, introduction to radiation principles.

EEL 3701C Digital Logic and Computer Systems. F, S, SS.
Credits: 4; Coreq: CSG 3422.
An overview of logic design, algorithms, computer organization and assembly language programming and computer engineering technology. Laboratory.

EEL 4201L Electrical Energy Conversion Laboratory. F, S, SS.
Credits: 1; Prereq: EEL 3211.
Electric energy conversion, devices and systems.

EEL 4213 Electric Energy Systems 1. F.
Credits: 3; Prereq: EEL 3211.
System models for generators, transformers, transmission lines and large-scale power networks. Matrix formulations, power flow analysis, symmetrical component theory, balanced and unbalanced fault analysis.

EEL 4230 Electronic Drives and Motor Control. S.
Credits: 3; Prereq: EEL 3211 and EEL 3135.
Analysis and design of AC and DC motor controls with semiconductor converter drives. Controlled rectifier and chopper drives for DC motors; cycloconverter and inverter drives for AC motors.

EEL 4272 Surge Overvoltages in Power Systems. S.
Credits: 3; Coreq: EEL 3112 and EEL 3211.
Switching transients; interaction between lightning and power systems; traveling waves; power apparatus insulation coordination; computer aids; instrumentation for specialized surge testing.

EEL 4304L Electronics Laboratory. F, S, SS.
Credits: 1; Prereq: EEL 3303L; Coreq: EEL 3304.
Electronic instrumentation, devices and systems.

†† Grading is on S-U basis only.

EEL 4306C Electronic Circuits 2. F, S, SS.
Credits: 3; Prereq: EEL 3304 ,EEL 3112 and EEL 4304L.
Design-oriented continuation of EEL 3304; feedback, op amp circuits and applications, digital electronics. Laboratory.

EEL 4310C Digital Integrated Circuits. S.
Credits: 3; Prereq: EEL 3304.
Analysis and design of digital circuits using MOS and bipolar devices. Laboratory.

EEL 4331C Solid-State Technology. F, S.
Credits: 3; Prereq: EEL 3396 or EEL 3304.
Principles of solid-state device fabrication. Laboratory.

EEL 4351 Electronic Device Fundamentals. S.
Credits: 3; Prereq: EEL 3396.
Physical principles of modern solid-state devices and their practical applications.

EEL 4436 Microwave Techniques. S.
Credits: 3; Prereq: EEL 3472.
Waveguides and resonant cavities. Methods of generating, transmitting and receiving microwaves.

EEL 4440 Optical Communication Systems. S.
Credits: 3; Prereq: EEL 3396 and PHY 4422.
Introduction to electromagnetic waves, dielectric waveguides and fibers, propagation characteristics of fibers, characterization methods, LEDs and laser diodes, photodetector optical receivers and communication systems.

EEL 4445 Optics for Engineers. F.
Credits: 3; Prereq: EEL 3472.
Nature of light, radiometry, laser basics, interferometry, holography, coherence, polarization, diffraction, fiber optics, Fourier optics.

EEL 4461 Antenna Systems. S.
Credits: 3; Prereq: EEL 3472.
Electromagnetic field theory and its application to antenna design.

EEL 4514 Communication Systems and Components. F, S, SS.
Credits: 3; Prereq: EEL 3112 and EEL 3135.
Theory of communication, and applications to radio, television, telephone, satellite, cellular telephone, spread spectrum, and computer communication systems.

EEL 4514L Communication Laboratory. F, S, SS.
Credits: 1; Prereq: EEL 4304L; Coreq: EEL 4514.
Communication circuits and radio frequency instruments, devices and measurements.

EEL 4516 Noise in Devices and Communication Systems. S.
Credits: 3; Coreq: EEL 4514.
Origin, characterization and measurement of random noise. Calculation of signal-to-noise ratios and probability of errors in communication systems.

EEL 4610 State Variables and Control. S.
Credits: 3; Prereq: EEL 3135.
Development of state-variable approach to linear continuous-time and discrete-time systems with emphasis on the design of feedback control system including stabilizing compensators, state estimators and controllers for tracking and disturbance rejection.

EEL 4657 Linear Control Systems. F, S, SS.
Credits: 3; Prereq: EEL 3135.
Theory and design of linear control systems.

EEL 4657L Linear Controls Laboratory. F, S, SS.
Credits: 1; Prereq: EEL 4657.
Practical applications of linear control theory.

EEL 4712C Digital Design. F, S.
Credits: 4; Prereq: EEL 3701C.
Advanced modular logic design, design languages, "finite" state machines and binary logic. Laboratory.

EEL 4713C Digital Computer Architecture. F, S.
Credits: 4; Prereq: EEL 3701C.
The use of electronic digital modules to design computers. Organization and operation of computers. Hardware/software tradeoffs. Design of computer interfacing. Laboratory.

EEL 4744C Microprocessor Applications. F, S, SS.
Credits: 4; Prereq: EEL 3701C.
Elements of microprocessor-based systems; hardware interfacing and software design for their application. Laboratory.

EEL 4905 Individual Problems in Electrical Engineering. F, S, SS.
Credits: 1 to 4: May be repeated with a change of content up to a maximum of 4 credits.
Selected problems or projects in the student's major field of engineering study.

EEL 4914C Electrical Engineering Design. F, S, SS.
Credits: 3; Prereq: Senior standing.
Selected design projects involving engineering applications in the various areas of electrical engineering. Must be taken prior to the semester of graduation. Laboratory.

EEL 4930 Special Topics in Electrical Engineering. F, S, SS.
Credits: 1 to 4: May be repeated with change of content up to a maximum of 4 credits.
Special courses covering selected topics in electrical engineering.

EEL 4931 Electrical Engineering Undergraduate Seminar. F.
Credits: 1; max: 1; Prereq: EG classification.
A series of seminars given by a group of faculty members in the department.

EEL 4939 Electric Utility Seminar. S.
Credits: 1.
A series of weekly seminars on the electric utility industry. Lectures from industry engineers include various technical topics related to power engineering.

EEL 4949 Co-op Work Experience. F, S, SS.
Credits: 1††; Prereq: EG classification.
Practical co-op engineering work under approved industrial supervision.

English
College of Liberal Arts and Sciences

INSTRUCTIONAL STAFF 1995-96

Clark, I., Chair; Bredahl, A.C., Associate Chair; Ault, D.; Bargad, W.; Beyette, T.K.; Brantley, R.E.; Bryant, M.; Carnell, C.S.; Carpenter, R.H.; Cech, J.; Craddock, P.; Crews, H.E.; Duckworth, A.M.; Emery, K.; Foreman, R.C.; Gordon, A.M.; Greger, D.; Haskins, J.; Hegeman, S.; Hill-Lubin, M.A.; Hofmann, M.; Holland, F.C.; Holland, N.M.; Homan, S.R.; Jones, A.G.; Kershner, R.B.; King, D.; Kumar, A.; Langland, E.J.; Leavey, J.; Leverenz, D.L.; Locke, D.M.; Logan, W.; Losano, W.A.; McCarthy, K.M.; McCrea, B.R.; Michel, S.; Murchek, J.; Nygren, S.; Nelson, M.; Paxson, J.; Perlette, J.M.; Powell, J.P., Jr.; Ray, R.B.; Reid, M.; Rudnytsky, P.; Schmidt, P.; Schueller, M.; Seelye, J.D.; Shaw, H.B.; Shoaf, R.A.; Smith, C.; Smith, J.; Smith, S.; Snodgrass, C.G.; Thompson, R.M.; Thomson, R.S.; Tillman, C.A.; Trueblood, F.; Turim, M.; Twitchell, J.B.; Ulmer, G.L.; Wade, S.; Wegner, P.

Undergraduate Coordinator: A.C. Bredahl
Graduate Coordinator: D. Ault

Office: Turlington 4008 (392-0777)

American Literature

(See also ENGLISH: GENERAL for other courses in American Literature).

AML 2070 Survey of American Literature
Credits: 3.
This course is designed to fulfill the Gordon Rule requirement while introducing students to some of the major writers, issues, and forms found in the history of American literature. The breadth and focus of this survey will be determined by the instructor. (C, H)

AML 2410 Issues in American Literature and Culture
Credits: 3.
This course is designed to fulfill the Gordon Rule requirement while introducing students to some of the most important issues that arise in the study of American literature and culture. The breadth and focus of the topic will be determined by the instructor. (C,H)

AML 3031 American Literatures I
Credits: 3.
Selected texts from the Contact Period to 1865, in diverse historical and cultural contexts, usually organized around a theme or several themes.

AML 3041 American Literatures II
Credits: 3.
Selected texts from 1865 to the present, in diverse historical and cultural contexts, usually organized around a theme or several themes.

AML 3270 Survey of African-American Literatu
Credits: 3.
This course surveys the development of African-American literature from its beginning up to 1945.

AML 3272 Survey of African American Literatures II
Credits: 3.
This course surveys the development of African-American Literature from 1945 to the present.

AML 3284 Surveys in American Women's Literatures.
Credits: 3; may be repeated with a change of content up to a total of up to 9 credits.
Survey of one or more traditions in American women's writings. At the instructor's discretion, the course may cover a wide range of texts or focus on a single theme, genre, period, literary movement, or cultural tradition. Topics may include women's writings about feminism, family, work, nationalism, or social justice; women's autobiography, poetry, experimental prose, or domestic fiction; nineteenth-century literature by women, contemporary women's poetry, or colonial women's writing; realist, postmodern, or sentimental fiction by American women; African American, New England, Native American, Southern, or working-class women's writing; Chicana, Litana, or lesbian literary traditions; etc.

AML 3285 Variable Surveys of American Literatures
Credits: 3; may be repeated with a change of content up to a total of 9 credits.
This course focuses on some of the rich cultural traditions found in American literature. Topics may inc' Gay and Lesbian, Jewish-American, Chicar Latino/a, Native American, Southern, and other atures.

†† Grading is on S-U basis only.

MAP 4413 Fourier Series and Transforms 1. S.
Credits: 3; Prereq: MAC 3313 (or MAC 3474) and MAP 3302; MAP 4305 recommended.
roduction to linear systems and transforms, aplace, Fourier and Z transforms and their mutual relationship, convolutions. Operational calculus, computational methods including the fast Fourier transform, second order stationary process, their autocorrelation functions, and problems of interpolation, extrapolation, filtering and smoothing or second order stationary processes.

Mathematics: Algebraic Structures

MAS 3113 Matrices and Vector Spaces. F, S.
Credits: 3; Prereq: MAC 3311 or MAC 3472 or MAC 3233.
Linear equations and matrices, elementary determinants, linear geometry of Euclidean spaces, vector spaces and linear transformations, eigenvalues. (M)

MAS 3114 Computational Linear Algebra. F, S.
Credits: 3; Prereq: MAC 3312 (or MAC 3512 or MAC 3473) and a scientific programming language.
Linear equations, matrices and determinants. Vector spaces and linear transformations. Inner products and eigenvalues. This course emphasizes computational aspects of linear algebra. (M)

MAS 3300 Numbers & Polynomials. F, SS.
Credits: 3; Prereq: MAC 3312 or MAC 3512 or MAC 3473.
Algebraic and order properties of the real numbers, introduction to number theory, rational numbers and their decimal expansions, uncountability of the real numbers, complex numbers, irreducible polynomials over the integral, rational, real and complex numbers, ientary theory of equations. This course is particu- useful for prospective secondary school mathe- dics teachers. (M)

MAS 4105 Linear Algebra 1. F, S, SS.
Credits: 4; Prereq: MAC 3313 or MAC 3474; MAS 3300 recommended.
Linear equations, matrices, vector spaces, linear transformations, determinants, eigenvalues, inner product spaces.

MAS 4107 Linear Algebra 2. S.
Credits: 3; Prereq: MAS 4105.
Further topics in linear algebra.

MAS 4124 Introïduction to Numerical Linear Algebra. F.
Credits: 3; Prereq: MAS 4105 or MAS 3114 and a scientific programming language.
Topics in linear algebra most useful in applications with emphasis on the numerical methods involved: direct and iterative solutions to systems of linear equations, matrix norms, Householder transformations, singular value decomposition, least squares and the generalized inverse, QR method for computing eigenvalues, condition of linear systems and eigensystems.

MAS 4156 Introduction to Vector Analysis. S, SS.
Credits: 3; Prereq: MAC 3313 or MAC 3474.
Review of vector algebra, lines, planes and space curves; vector fields, their divergence and curl; line surface and volume integrals including the Divergence Theorem and Stokes' Theorem.

MAS 4203 Introduction to Number Theory. F, SS.
Credits: 3; Prereq: MAC 3312 or MAC 3512 or MAC MAS 3300 recommended.
troduction to elementary number theory and its applications to computer science and cryptology; divisibility, primes, Euclidean Algorithm, congruences, Chinese Remainder Theorem, Euler-Fermat Theorem, primitive roots. Selected applications to decimal fractions, continued fractions, computer file storage and hashing functions, and public-key cryptography. (M)

MAS 4301 Abstract Algebra 1. F, S, SS.
Credits: 3; Prereq: grade of C or better in MAS 4105.
Sets and mappings, groups and subgroups, homomorphisms and isomorphisms, permutations, rings and domains, arithmetic properties of domains, fields. The course involves learning to prove theorems.

MAS 4302 Abstract Algebra 2. S.
Credits: 3; Prereq: MAS 4301.
Further topics in abstract algebra.

Mathematics

MAT 4905 Individual Work. F, S, SS.
Credits: 1 to 3; Maximum of 10 credits; Prereq: MAC 3313 and permission of departmental undergraduate coordinator. May be repeated for credit.
For special topics not obtainable in the regular course offerings.

MAT 4930 Special Topics in Mathematics. F, S, SS.
Credits: 1 to 3; Prereq: Permission of a departmental adviser. May be repeated for credit. Maximum of 16 credits.

MAT 4949 Co-Op Work Experience. F, S, SS.
Credits: 1; Prereq: MAC 3313 and junior or senior standing.
Practical co-op work experience as administered through the Cooperative Education Program of the Career Resource Center and coordinated by the mathematics department Cooperative Education Adviser.

Mathematics: General and Finite

MGF 1202 Fundamental Concepts of Mathematics. F, S, SS.
Credits: 3.
A general education course which includes an introduction to logic and set theory, algebra, probability and statistics, an elementary introduction to linear programming and game theory, and a review of geometry and measurement. (M)

Mathematics: History and Foundations

MHF 3202 Sets & Logic. F, SS.
Credits: 3; Prereq: MAC 3312 or MAC 3512 or MAC 3473..
Examples of sets, operations on sets, set algebra, Venn diagrams, truth tables, tautologies, applications to mathematical arguments and mathematical induction. (M)

MHF 4102 Elements of Set Theory. F.
Credits: 3; Prereq: MAS 4105.
The basic axioms and concepts of set theory. Students present proofs.

MHF 4203 Foundations of Mathematics. S.
Credits: 3; Prereq: MHF 4102 or MHF 3202.
Models and proofs. Foundations of the real and natural numbers, algorithms, Turing machines, undecidability and independence. Examples and applications in algebra, analysis, geometry and topology.

MHF 4404 History of Mathematics. SS.
Credits: 3; Prereq: MAC 3312 or MAC 3512 or MAC 3473.
A survey of the historical development of precalculus mathematics. (M)

Mathematics: Topology and Geometry

MTG 3212 Geometry. S.
Credits: 3; Prereq: MAC 3312 or MAC 3512 or MAC 3473.
A systematic study of the axiomatic structure of Euclidean geometry, including a comparison of the metric (Birkhoff) and synthetic (Hilbert) developments of absolute geometry; parallelism, similarity, area, lines and planes in space, solid mensuration. This course is particularly useful for prospective secondary school mathematics teachers. (M)

MTG 4302 Elements of Topology 1. F.
Credits: 3; Prereq: MAS 4105.
The basic concepts of general topology.

MTG 4303 Elements of Topology 2. S.
Credits: 3; Prereq: MTG 4302.
Continuation of MTG 4302.

Mechanical Engineering
College of Engineering

INSTRUCTIONAL STAFF 1995-96

Tiederman, W.G., Chair; Crane, C.D.; Duffy, J.; Gaither, R.B.; Gater, R.A.; Goswami, D.Y., Green, A.E.S.; Hansen, E.C.; Hsieh, C.K., Graduate Coordinator; Ingley, H.A.; Klausner, J.F.; Kumar, A.V.; Lear, W.E.; Mason, P.A.; Matthew, G.K.; Micklow, G.J.; Peterson, J.E.; Proctor, C.L.; Reisinger, K.D.; Roan, V.P.; Schueller, J.K.; Seireg, A.; Sherif, S.; Smith, K.S.; Sowls, R.E., Undergraduate Coordinator; Tlusty, J.; Wiens, G.J.; Ziegert, J.C.; Zhang, Z.M.

EGN 2033 Man, Civilization and Technology. S.
Credits: 3.
An objective comparison of political, scientific, technological and social thought. Interrelationships between technological and social development. This course is introductory and exploratory in nature and primarily qualitative in scope. (H)

EGN 3123 Advanced Computer Assisted Drafting and Design. F.
Credits: 3; Prereq: Knowledge of FORTRAN, EML 3023 or permission of instructor.
The use of computer assisted graphics in analytical design. Solution of representational problems in many areas, including CAD.

EML 3005C Introduction to Mechanical Design. F, S, SS.
Credits: 4; Prereq: EML 3023, PHY 3048; Coreq: EGM 3520.
Study and application of the design process, as related to mechanical and thermal systems. Exercises in problem definition, idea generation, decision making, selection of standard parts, and graphical, written and oral communication. Drawing laboratories are integrated with the lecture material.

EML 3023 Computer Assisted Drafting and Design. F, S, SS.
Credits: 3.
Hand sketching, descriptive geometry, elementary computer graphics, computer aided drafting, and simple design projects.

EML 3100 Thermodynamics 1. F, S, SS.
Credits: 3; Prereq: MAC 3313, PHY 3048, CHM 2045 or 2041.
Application of the first and second laws of thermodynamics to closed and open systems and to cyclic heat engines. This includes the development of procedures for calculating the properties of multiphase and singlephase pure substances.

†† Grading is on S-U basis only.

EML 3101 Thermodynamics 2. F, S, SS.
Credits: 3; Prereq: EML 3100.
A continuation of EML 3100 with an emphasis on applications that involve imperfect gases, gas-vapor mixtures (psychrometrics), or chemically reacting gases (combustion).

EML 3262 Kinematics and Dynamics of Machinery. F, S, SS.
Credits: 3; Prereq: EGM 3400 or 3401, and CGS 3422, EML 3023, and EML 3520.
The study of mechanisms used in machinery. The design of motion, the creation of dynamic models and analysis of the resulting forces.

EML 3301C Instrumentation and Measurements Laboratory.F, S, SS.
Credits: 2; Prereq: EEL 3003 or 3111; Coreq: EML 3520.
Use of precision instruments and measurement standards in mechanical engineering. Preparation of engineering reports.

EML 3520 Analytic Methods in Mechanical Engineering. F, S.
Credits: 3; Prereq: MAP 3302 or EGM 3311.
Matrix operations and properties. Techniques for solving simultaneous linear algebraic equations. Numerical formulation and solution of first and second order partial differential equations. Quadrature integration. Vector algebra and differential calculus. Emphasis on operational procedures and applications.

EML 3806 Geometric Modeling of Robotic Manipulators. F.
Credits: 3; Prereq: MAC 3313, PHY 3048.
Geometry, kinematics and statics of robot manipulators.

EML 4140 Heat Transfer 1. F, S, SS.
Credits: 2; Prereq: EML 3100, MAP 3302, EML 3520, CGS 3422.
Steady state and transient analysis of conduction and radiation heat transfer in stationary media.

EML 4140L Thermal Sciences Lab 1. F, S, SS.
Credits: 1; Prereq: EML 3101, EML 3301; Coreq: EML 4701, 4140.
Experimental verification and demonstration of thermal and thermochemical phenomena.

EML 4141 Heat Transfer 2. F, S, SS.
Credits: 2; Prereq: EML 4140; Coreq: EML 4702.
Heat transfer in fluid systems; forced convection; free convection; phase change. Heat exchanger design and selection.

EML 4141L Thermal Sciences Lab 2. F, S, SS.
Credits: 1; Prereq: EML 4140L; Coreq: EML 4141, EML 4702.
Continued experimental verification and demonstration of thermal and thermochemical phenomena.

EML 4220 Mechanical Vibrations. F, S.
Credits: 3; Prereq: EGM 3400 or 3401, CGS 3422, EGM 3520, EML 3520.
The single degree of freedom systems, multiple degree of freedom systems. Application to mechanical systems with problems employing computer techniques.

EML 4312 Control of Mechanical Engineering Systems. F, S.
Credits: 2; Prereq: MAP 3302, EGM 3400 or 3401.
Theory, analysis, and design of controls of mechanical engineering systems; including mechanical, electromechanical hydraulic, pneumatic and thermal components and subsystems.

EML 4315L Mechanical Controls Lab. F, S, SS.
Credits: 1; Prereq: EML 3005 and 3301; Coreq: EML 4312 and 4220.
Experimental verification and demonstration of dynamic mechanical engineering systems and their control.

EML 4321 Manufacturing Engineering. F, S.
Credits: 3; Prereq: EGM 3520, EML 4312, EMA 3010; Coreq: EML 4140, EML 4220.
Descriptive and analytical treatment of manufacturing processes and production equipment, automation, computer control, integrated systems. Applications of mechanics stress analysis, vibrations, controls, heat transfer. Discrete time simulation.

EML 4410 Combustion Engineering. S.
Credits: 1 to 3; Prereq: EML 3101.
Analysis of combustion systems; evaluation of combustion in engines and boilers, examination of pollutant formation; analysis of open flames and fires, fire safety. Each of 3 parts may be taken together or in separate terms.

EML 4414 Heat Power Engineering. F.
Credits: 3; Prereq: EML 3101; Coreq: EML 4141, 4702.
Steam power plants and their auxiliary equipment.

EML 4415 Mechanical Propulsion Systems. S.
Credits: 3; Prereq: EML 3101.
Gas and liquid fuels, internal combustion engines. Automotive, aircraft, and Diesel power plants.

EML 4416 Solar Energy. F.
Credits: 3; Prereq: 3100 or permission of instructor.
Nature and availability, collection and storage, solar properties of materials, conversion to heat, power and electricity for domestic and industrial consumption including transportation.

EML 4419 Aircraft Propulsion. F.
Credits: 3; Prereq: EML 3100; EML 4702 or equivalent, CGS 3422.
Physical basis of propulsion, gas turbines and ramjet fundamentals. Introduction to compressor and turbine design. Propulsion performance. Unconventional means of propulsion in space.

EML 4421L Mechanical Propulsion Systems Laboratory.
Credits: 1; Coreq: EML 4415.
Testing of lubricants, gasoline, automobile engines, aircraft engines and high and low speed Diesel engines.

EML 4450 Energy Conversion. S.
Credits: 3; Prereq: EML 3101.
Thermomechanical and thermoelectric energy conversion. Conventional and unconventional techniques and analysis for energy systems interactions.

EML 4500 Machine Analysis and Design 1. F, S, SS.
Credits: 3; Prereq: EGM 3520, CGS 3422, EML 3520, EML 3005.
Stress analysis and design of machine elements; finite element analysis; optimization techniques.

EML 4501 Machine Analysis and Design 2. F, S, SS.
Credits: 3; Prereq: EML 3005; Coreq.: EML 4321, EML 4500.
Advanced problems in design, and the design of a complete machine.

EML 4548 Codes and Standards.
Credits: 3; Prereq: EML 3005C or equivalent.
Applied engineering design using patents, technical literature, consensus codes and standards, federal regulations, statutes and local codes.

EML 4600 Heating and Air Conditioning. S.
Credits: 3; Prereq: EML 4601.
Heating and air conditioning systems. E .nt selection, system arrangement and duct design.

EML 4601 Refrigeration and Air Conditioning. F.
Credits: 3; Prereq: EML 3101, EML 4702; Coreq: EML 4141.
Refrigerating and air conditioning; apparatus and their applications to the industrial, commercial and residential fields.

EML 4701 Fluid Dynamics 1. F, S, SS.
Credits: 2; Prereq: EGM 3400 or 3401; EML 3100, EML 3520, CGS 3422.
Conservation equations of dynamic fluid systems with emphasis on integral methods. Applications to flow analysis of thermal hydraulic systems.

EML 4702 Fluid Dynamics 2. F, S, SS.
Credits: 2; Prereq: EML 4701.
Analysis of viscous flow systems. Dynamics and thermodynamics of compressible fluid flow. Turbomachinery.

EML 4703 Fluid Dynamics.
Credits: 2; Prereq: EGN 3353, EML 3100.
Thermodynamics and mechanics of fluid flow systems, compressible and incompressible flow systems.

EML 4905 Individual Study in Mechanical Engineering. F, S, SS.
Credits: 1 to 3; Prereq: Approval of department counselor. GPA 2.3; May be repeated with a change of content up to a maximum of 6 credits.
Selected problems or projects in the student's field of engineering study.

EML 4920 Professional Orientation. F.
Credits: 1; Prereq: Senior engineering student.
Principles of mechanical engineering practice, professional standards and ethics.

EML 4926 Mechanical Consulting Practice. SS.
Credits: 3; Prereq: Senior standing.
Synthesis and analysis of mechanical engineering systems, planning and execution of engineering contracts, supervision of construction and tests.

EML 4930 Special Topics in Mechanical Engineering. F, S, SS.
Credits: 1 to 3; Prereq: Permission of instructor. May be repeated up to a maximum of 12 credits.
Variable Mechanical Engineering Course content not offered in other formal courses.

EML 4936 Mechanical Engineering Seminar. S.
Credits: 1; Prereq: Senior engineering student.
Presentation of papers on current developments in mechanical engineering.

EML 4945 Practical Work in Mechanical Engineering. F, S, SS.
Credits: 1 to 3; Prereq: EG Classification; 2.0 GPA.
Practical engineering work under industrial supervision, as set forth in the College of Engineering Regulations.

EML 4949 Co-op Work Experience. F, S, SS.
Credits: 1††; Prereq: EG Classification. 2.0 GPA.
Practical co-op work experience under appro industrial supervision.

†† Grading is on S-U basis only

UNIVERSITY OF
Miami

COLLEGE OF ENGINEERING

Bachelor of Science in Architectural Engineering

Architectural engineers specialize in the planning, design and construction of buildings. The emphasis in the architectural engineering curriculum includes: Structural design, architectural design, design of mechanical, electrical, acoustical and illumination systems; development of materials and construction methods; building construction management; and the integration of building components.

Architectural Engineering differs from Architecture in that architects concentrate on building aesthetics, functional layout, site location and orientation, while architectural engineers concentrate on the design, analysis, and construction of buildings and their functional components.

Architectural engineering graduates seek careers in the building and construction industries. Major employers include: architectural and engineering firms, construction companies, development companies, universities, and governmental code enforcement or regulatory agencies.

Dual-Degree Program

The dual-degree program leads to Bachelor of Science degrees in both Civil Engineering and Architectural Engineering. The dual degree program is very popular and highly recommended, and if planned in advance takes only one more semester than the degree programs in either Architectural Engineering or Civil Engineering.

Tuition Scholarships

Tuition scholarships are available for juniors and seniors in Architectural Engineering who are legal residents of Florida. Under the Postsecondary Education Planning Commission program, the State of Florida pays the difference between tuition at University of Miami and State University tuition for qualified students.

The Faculty

Linda M. Hanagan; Assistant Professor, Ph.D. (Virginia Polytechnic Institute) P.E., structural engineering. Denis Hector; Assistant Professor, M. S. Arch. (University of Pennsylvania), R.A., aesthetics of structures. Jan Hochstim; Professor, B. Arch. (University of Illinois), M.A. (University of Miami), architecture. Aristides J. Millas; Associate Professor, B. Arch. (Carnegie Institute of Technology), M. Arch. (Harvard University), architecture. Stephen Memory; Assistant Professor, Ph.D. (University of London), heating, ventilating and air conditioning. Ahmad H. Namini; Associate Professor; Ph.D. (University of Maryland), structural engineering. Michael K. Phang; Professor, Ph.D. (Rensselaer Polytechnic Institute) P.E., structural engineering. Agustin A. Recio; Associate Professor, Ph.D. (University of Havana) P.E., illumination. Mehrdad Soltani; Associate Professor, Ph.D. (Johns Hopkins) P.E., structural engineering, architectural engineering. Wimal Suaris; Associate Professor, Ph.D. (Northwestern) P.E., structural engineering. Luis E. Trelles; Lecturer, B. Arch. (University of Miami), architecture. Teofilo Victoria; Associate Professor, B. Arch. (Rhode Island School of Design), M. Arch. (Columbia University), architecture. Ralph Warburton; Professor, B. Arch. (Massachusetts Institute of Technology), M. Arch. (Yale Univeristy), M.C.P. (Yale University), architecture. Ronald F. Zollo; Professor, Ph.D. (Carnegie-Mellon) P.E., structural engineering.

Admission Requirements

Principal factors to be considered in deciding the admission of an applicant to the freshman class are:(1) The applicant must be a graduate, or in the process of completing graduation requirements of an accredited secondary school. Algebra, trigonometry, analytic geometry, chemistry, physics and computer literacy are high school subjects that are appropriate for students planning an engineering career. (2) Results of the SAT or the ACT test must be submitted in support of all applications; (3) Recommendations from the principal or guidance counselor concerning the academic and personal qualities of the applicant.

For more information, contact:

Dr. Michael K. Phang
Director of Architectural Engineering
Department of Civil and Architectural Engineering
University of Miami
P.O. Box 248294
Coral Gables, Florida 33124-0630, USA
Telephone: (305)284-3391
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Rev: 5/15/96

AEN	Architectural Engineering
CEN	Civil Engineering
ARC	Architecture
EEN	Electrical Engrg.
MEN	Mechanical Engrg.
IEN	Industrial Engrg.

UNIVERSITY OF MIAMI
DEPARTMENT OF CIVIL & ARCHITECTURAL ENGINEERING
BACHELOR OF SCIENCE IN ARCHITECTURAL ENGINEERING - 132 Credits
1996 - 1997

Freshman Year:					
AEN 101	Architectural Engineering Seminar	1	CEN 350	Transportation Engrg. I	3
CHM 111	Principles of Chemistry I	4	ARC 294	Intro. Development Architecture	3
ENG 105	English Composition I	3	ENG 107	Writing About Science	3
MTH 110	Analytical Geometry & Calculus I	5	MTH 112	Calculus II	4
AEN 170	Computer-Aided Drafting	3	PHY 205	University Physics I	3
	Total	16		*Total*	16

Sophomore Year:					
CEN 210	Mechanics of Solids I	3	CEN 211	Mechanics of Solids II	3
ARC 261	Arc. Tech. I, Matls. & Meth. Const. I	3	CEN 212	Structural Lab	1
ARC 292	Introduction to Architecture Design I	3	EEN 205	Principles of Electrical Engineering I	3
PHY 206	University Physics II	3	ARC 293	Introduction to Architecture Design II	3
PHY 208	University Physics II Lab	1	PHY 207	University Physics III	3
MTH 211	Calculus III	3	PHY 209	University Physics III Lab	1
				SS/H Elective	3
	Total	16		*Total*	17

Junior Year:					
CEN 310	Structural Analysis	3	CEN 321	Design of Steel Structures	3
AEN 301	Computer Application in Architectural Engineering	3	CEN 370	Geotechnical Engineering I	3
MEN 303	Thermodynamics I	3	CEN 371	Geotechnical Lab	1
IEN 311	Applied Probability & Statistics	3	EEN 406	Illumination	3
CEN 330	Fluid Mechanics	3	MEN 408	Heating, Ventilating & Air Conditioning	3
	SS/H Elective	3	MTH 311	Ordinary Differential Equations	3
	Total	18		*Total*	16

Senior Year:					
CEN 320	Design of Concrete Structures	3	AEN 402	Professionalism & Ethics	3
AEN 420	Building Serv. Design	3	AEN 482	Architectural Engineering Design Project II	2
AEN 481	Architectural Engineering Design Project I	1		Technical Elective	3
ARC 476	Architecture History VI	3		AEN Technical Elective	3
	Basic Science Elective	3		AEN Design Elective	3
	SS/H Elective	3		SS/H Elective	3
	Total	16		*Total*	17

SS/H electives and other electives are to be selected from a list of approved electives maintained in the department at the University of Miami

Rev. 5/15/96

531. Engineering Hydrology
3 cr.
Practical aspects of surface water, groundwater hydrology and stormwater management. Modern hydrologic, hydrodynamic, statistical and numerical methods with main emphasis on their applications to water supply, stormwater management, drainage, rainfall-runoff analyses, groundwater studies, hydrologic budgets. *Prerequisite: CEN 430, or equivalent.*

532. Groundwater Engineering
3 cr.
Basic equations governing groundwater flow in the saturated and unsaturated zone. Engineering applications of groundwater flow equations, well hydraulics and wellfield design. Introduction to geochemistry and contaminant transport in aquifers. Legal aspects of groundwater protection. *Prerequisite: CEN 430, 440, or equivalent.*

540. Environmental Chemistry
3 cr.
Kinetics, equilibrium, acid-base, oxidation-reduction, and reaction chemistry applied to water and wastewater engineering. *Prerequisite: CHM 112 or permission of instructor.*

541. Public Health and Environmental Microbiology
3 cr.
Disease control by water and waste treatment, solid waste disposal, occurrence and control of communicable diseases, water and food borne disease outbreaks, epidemiology, public health radiology, radioactive waste disposal, planning, microbial ecology. *Prerequisite: Permission of instructor.*

542. Solid and Hazardous Waste Engineering
3 cr.
Solid-waste characteristics, recyling, incineration, hazardous waste characteristics, prevention, and physical and chemical treatment. Design projects. *Prerequisite: CEN 340.*

551. Traffic Engineering
3 cr.
Human and vehicle characteristics, studies and analysis of traffic volumes, speed, delay, and traffic stream characteristics. Accident analysis, parking studies. Signalized and unsignalized intersection capacity and control. Freeway capacity analysis. *Prerequisite: CEN 301, 450 or consent of instructor.*

552. Geometric Design
3 cr.
Driver-vehicle characteristics, safety, highway failure modes, alignment, roadside design, cross-sections, intersection. *Prerequisite: CEN 450.*

553. Transportation Systems Planning and Demand Modeling
3 cr.
Transportation demand analysis and forecasting. Sampling techniques, collection and analysis of survey data. Disaggregate and aggregate models. Trip generation, distribution, modal split and assignment. Transportation network equilibrium. Transportation system management. *Prerequisite: IEN 311, CEN 301 or consent of instructor.*

570. Foundation Engineering
3 cr.
Subsurface exploration programs, shallow foundations, deep foundations, flexible and rigid retaining systems, structural design of foundation elements, foundations on difficult soils, advanced slope stability. *Prerequisite: CEN 370 and 470, or permission of instructor.*

590-594. Special Topics
2-3 cr. each
Sub-titles describing the topics to be offered will be shown in parentheses in the printed class schedule, following the title "Special Topics." *Prerequisite: Permission of instructor.*

599. Special Problems
1-4 cr.
Project course introducing methods of research; individual investigation of current problems. Offered by special arrangement only. *Prerequisite: Permission of department chairman.*

Courses open only to graduate students (600 level) are listed in the *Bulletin* of the Graduate School.

ARCHITECTURAL ENGINEERING

Architectural Engineering is the art and science of engineering design and analysis of building systems and their components. The BSAE program provides basic education in integrated building systems, structures, construction engineering and management, acoustics, illumination, heating, air conditioning, building materials, and computer aided design, as well as an introduction to, and appreciation of, architecture.

Architectural Engineering graduates are qualified for careers as consulting engineers, building contractors, construction managers, structural engineers, and as knowledgeable specialists in related areas of building design and analysis.

An important objective of the educational program is to instill within the student a sense of professionalism, and a desire to serve society by the solution of its problems in ways which are environmentally and socially acceptable, while at the same time being respectful of the need to conserve precious natural resources.

The program is designed to produce a desirable interaction with students in Architecture, and in the other engineering disciplines, in preparation for the professional career which follows.

Through consultation with their academic advisors, students may take one of several selected options at the undergraduate level, such as Integrated Building Engineering, Structural Engineering, and Construction Engineering and Management.

A tabular listing of the course requirements for the degree Bachelor of Science in Architectural Engineering is shown below:

ARCHITECTURAL ENGINEERING

FRESHMAN YEAR

Fall Semester

AEN 101 *Introduction to Architectural Engineering* 1
CHM 111 *Principles of Chemistry I* 4
ENG 105 *English Composition I* 3
MTH 110 *Analytic Geometry and Calculus I* 5
AEN Computer-Aided Drafting 3
16

Spring Semester

CEN 350 *Transportation Engineering I* 3
ARC 294 *Introduction to the Development of Architecture* 3
ENG 107 *Writing about Science* 3
MTH 112 *Calculus II* 4
PHY 205 *University Physics I* 3
16

SOPHOMORE YEAR

Fall Semester

CEN 210 *Mechanics of Solids I* 3
ARC 261 *Architecture Technology I: Materials and Methods of Construction I* 3
ARC 292 *Introduction to Architecture Design I* 3
PHY 206 *University Physics II* 3
PHY 208 *University Physics II Lab* 1
MTH 211 *Calculus III* 3
16

Spring Semester

CEN 211 *Mechanics of Solids II* 3
CEN 212 *Structural Laboratory* 1
EEN 205 *Principles of Electrical Engineering—I* 3
ARC 293 *Introduction to Architecture Design II* 3
PHY 207 *University Physics III* 3
PHY 209 *University Physics III Lab* 1
*SS/H Elective 3
17

JUNIOR YEAR

Fall Semester

CEN 310 *Structural Analysis* 3
AEN 301 *Computer Applications in Civil/Architectural Engineering* 3
MEN 303 *Thermodynamics I* 3
EN 311 *Applied Probability and Statistics* 3
EN 330 *Fluid Mechanics* 3
*SS/H Elective 3
18

Spring Semester

CEN 321 *Design of Steel Structures* 3
CEN 370 *Geotechnical Engineering I* 3
CEN 371 *Geotechnical Laboratory* 1
EEN 408 *Illumination* 3
MEN 408 *Heating, Ventilating and Air Conditioning* 3
MTH 311 *Ordinary Differential Equations* 3
16

SENIOR YEAR

Fall Semester

CEN 320 *Design of Concrete Structures* 3
AEN 420 *Building Services Design* 3
AEN 481 *Architectural Engineering Design Project I* 1
ARC 476 *Architecture History VI: 19th and 20th Century* ..3
*Basic Science Elective 3
*SS/H Elective 3
16

Spring Semester

AEN 402 *Architectural and Civil Engineering Ethics, Professionalism, and Administration* 3
AEN 482 *Architectural Engineering Design Project II* 2
*Technical Elective 3
*AEN Technical Elective 3
*AEN Design Elective 3
*SS/H Elective 3
17

ARCHITECTURAL ENGINEERING COURSES

101. Introduction to Architectural Engineering
1 cr.
A weekly meeting of Architectural Engineering freshmen that introduces the students to the various areas and topics included in the Architectural Engineering profession. *Prerequisite: Freshman standing or permission from instructor.*

111. Introduction to Engineering I
3 cr.
Use of engineering tools for problem solving. Use of computer techniques in data analysis and presentation, software design and computer aided drafting. Development of design skills through several design and building competitions.

*To be selected from lists of approved Social Science/Humanities and Technical, Design, and Basic Science electives.

6.

210. Behavior of Structural Systems I
3 cr.
Design and testing of experimental models for qualitative and quantitative prediction of full scale structural behavior. Investigation of single and multi-story rectangular frames, curved structures and longspan buildings. Application of graphical and analytical techniques to determine basic system layout and preliminary dimensioning of key subsystems and members. *Prerequisite: AEN 110. Corequisite: ARC 204.*

301. Computer Applications in Civil/Architectural Engineering
3 cr.
Exploration and modeling of Architectural/Civil Engineering systems. Topics will include numerical analysis, constrained and unconstrained optimization, systems analysis, and software evaluation. Students will solve problems using existing packages and software developed by them. *Prerequisite: MTH 211, CEN 210.*

310. Behavior of Structural Systems II
3 cr.
Overall analysis of simple and multi-story frame structures. Consideration of flat plates, prestressed concrete flat slabs, slab and beam, joist and girder, waffle and space truss systems, columns, wall and rigid frame subsystems under vertical and horizontal loads. Application of structural model analysis to supplant or supplement mathematical analysis. *Prerequisite: AEN 210. Corequisite: ARC 305.*

399. Cooperative Education
0 cr.
Practical application of classroom theory through alternating semester or summer employment with firms offering positions consistent with the student's field of study. May be repeated.

400. Professional Seminar
1 cr.
Consideration of opportunity for professional employment, ethics, professional duties and responsibilities, engineering societies, current problems. *Prerequisite: Graduating senior in Engineering.*

401. Computer Aided Design and Drafting for A/E Applications I
3 cr.
Principles of computer graphics. Study and use of microcomputer-based CADD packages for architectural engineering applications. Integration of commercially available packages with customized software. Exploration of the use of computer methods and devices as aids to architectural engineering design, and acquisition of experience in applying the design process to solving open-ended problems. *Prerequisite: AEN 301, ARC 191 or equivalent.*

402. Architectural and Civil Engineering Ethics, Professionalism, and Administration
3 cr.
A discussion of professionalism and ethics in the practice of engineering, including the philosophy and methodology of engineering and the foundation of ethics and engineering ethics. Techniques for coordinating decisions and actions of the participants involved in the design and construction of Architectural/Civil Engineering projects. Principles of engineering economics and cost analysis. Legal, contractual, and behavioral aspects of architectural/civil engineering projects. Case histories illustrating these concepts will be discussed. Presentations by practicing engineers on topics relevant to this course will be given. *Prerequisite: Senior standing.*

420. Building Services Design
3 cr.
Design of building service systems for: water supply and waste removal, fire alarms and protection, telephone, television, computer terminals, compressed air message delivery, elevators and escalators, recreational facilities, driveway and parking lots, security, drainage, landscaping irrigation, and acoustics. *Prerequisite: EEN 201, CEN 330.*

421. Building System Design
3 cr.
Comprehensive integration of architectural engineering in building analysis and design. *Prerequisite: ARC 261, CEN 320, MEN 408.*

460. Construction Scheduling and Control
3 cr.
Study of construction project planning, scheduling and control. Application of arrow and precedence networking techniques. Development of cost vs. time curves. Activity crashing, equipment and manpower leveling, multiproject scheduling. CPM and PERT using computers. *Prerequisite: Senior level standing.*

481. Architectural Engineering Design Project I
1 cr.
Project groups will be assigned realistic Architectural Engineering design problems which may involve several different disciplines. The Project coordinator and several practicing design engineers would provide consultation, guidance and recommendation on aspects such as problem definition, evaluation of design approaches, project planning and scheduling. An engineering proposal to solve the design problem is to be developed and presented. (Laboratory) *Prerequisite: Senior standing or permission of instructor.*

482. Architectural Engineering Design Project II
2 cr.
Project groups would execute the design proposed in the preceding semester in AEN 481. The main objectives of the course are to let the students apply the analytical methods learned throughout the engineering curriculum and to provide an opportunity to work as a member of a project group. Final project documents will be prepared and presented. (Laboratory) *Prerequisite: AEN 481 or CEN 481.*

500. Architectural Engineering Seminar
0 cr.
Presentation by selected speakers dealing with topics of interest in Architectural Engineering. Attendance required of all students registered in Architectural Engineering graduate programs. *Prerequisite: Graduate standing.*

501. Computer-Aided Design and Drafting for A/E Applications II
3 cr.
Computer-aided structural analysis and design of building system components. Computer-aided design of HVAC system. Utilization of both commercially available and in-house developed software packages. Integration of commercially available packages with customized software. *Prerequisite: Graduate standing. AEN 401, CEN 320, 321 or permission of instructor.*

520. Integrated Building Design
3 cr.
Design of low rise buildings, performance criteria and limitations, natural and man-made hazards, consideration of seismic and wind forces, load combinations, design of structural systems, lateral force distribution, shear walls, connections, footings, wood structures, non-structural elements, contents and equipment. *Prerequisite: CEN 320, 321.*

521. Hospital and Health Care Facility Design
3 cr.
Design and construction of modern hospital and health care facilities. Design criteria for functional services and required safety. Design standards. Discussion of construction related topics and problems. *Prerequisite: CEN 320 or 321, or permission of instructor.*

522. Electrical Systems in Buildings
3 cr.
Design and control of electrical and illumination systems for commercial and industrial facilities; specific emphasis in design practice and integration with codes and standards. *Prerequisite: EEN 406 or permission of instructor.*

570. Foundation Engineering
3 cr.
Subsurface exploration programs, shallow foundations, deep foundations, flexible and rigid retaining systems, structural design of foundation elements, foundations on difficult soils, advanced slope stability. *Prerequisite: CEN 320, 470, or permission of instructor.*

590-594. Special Topics
1-3 cr. each
Sub-titles describing the topics to be offered will be shown in parentheses in the printed class schedule, following the title "Special Topics." *Prerequisite: Permission of instructor.*

599. Special Problems
1-4 cr.
Project course introducing methods of research; individual investigation of current problems. Offered by special arrangement only. *Prerequisite: Permission of Department Chairman.*

Graduate study is offered leading to the degree Master of Science in Architectural Engineering. For detailed information relative to graduate studies, see the *Bulletin* of the Graduate School.

ENVIRONMENTAL ENGINEERING

Environmental engineers specialize in the design of systems which protect human health by minimizing exposures to pollution. They design systems which improve the quality of water, air, and soil, and design systems which promote the function of beneficial ecosystems. Sub-specialities within environmental engineering include: water and wastewater treatment, water distribution, water quality, air pollution control, air quality, solid and hazardous waste management, and industrial hygiene.

Many career opportunities exist for environmental engineering graduates. Major employers include private consulting practices, engineering design firms, environmental service organizations, and government regulatory agencies. Environmental engineers also conduct research and teach in environmental engineering programs.

Students in the Environmental Engineering program at the University of Miami take introductory courses in all of the environmental engineering specialties, and in-depth study in all specialties are available through elective courses. Students are encouraged to enroll in the dual-degree program, leading to Bachelor of Science degrees in *both* Environmental Engineering and Civil Engineering. The dual-degree program is very popular and highly recommended, and if planned in advance takes only one more semester than the degree programs in either Environmental Engineering or Civil Engineering.

Graduate study is offered leading to the degrees of Master of Science, and Doctor of Philosophy. For detailed information on these graduate programs, see the *Bulletin* of the Graduate School.

Tabular listings of the course requirements for the degree of Bachelor of Science in Environmental Engineering and the dual-degree program are shown below:

ENVIRONMENTAL ENGINEERING

FRESHMAN YEAR

Fall Semester

Environmental Engrg. Seminar	1
CHM 111 *Principles of Chemistry I*	4
ENG 105 *English Composition I*	3
MTH 110 *Analytic Geometry and Calculus I*	5
SS/H Elective*	3
	16

Spring Semester

CHM 112 *Principles of Chemistry II*	4
AEN Computer-Aided Drafting	3
ENG 107 *Writing About Science*	3
MTH 112 *Calculus II*	4
PHY 205 *University Physics I*	3
	17

*To be selected from lists of approved Social Science/Humanities, Technical, Design, and Basic Science electives.

117. PASCAL and Introduction to Software Engineering
3 cr.
Introduction to digital computers. Data representation. Introduction to algorithms. Fundamental ideas of software design principles. Pascal language. Procedures and functions. Software engineering principles. Software design project.

118. Introduction to C and Software Engineering
3 cr.
Introduction to digital computers. Problem solving and program design, C language fundamentals, software engineering principles, and software design projects.

201. Electrical Circuit Theory
3 cr.
Fundamentals of DC-AC circuit laws, including steady state and transient analysis. Lecture, 3 hours. *Prerequisite or corequisite: MTH 112.*

204. Electrical Circuits Laboratory
1 cr.
Laboratory work employing the techniques of circuit theory to physical components, devices, and circuits. Use of electronic computing techniques to relate analytical and empirical investigations. Laboratory, 3 hours. *Prerequisite: EEN 201.*

EEN

205. Principles of Electrical Engineering—I
3 cr.
Fundamentals of DC and AC Circuits. Survey of Electrical Machinery and Electronics. Not open to students with credits in EEN 201. Lecture, 3 hours. *Prerequisite or corequisite: MTH 112.*

301. Electromagnetic Field Theory
3 cr.
Theory of static and time-varying fields. Maxwell's equations. Propagation of electromagnetic waves. Transmission line theory and applications. *Prerequisite or corequisite: MTH 312.*

302. Electrical Machine Theory
3 cr.
Theory of electromechanical energy conversion, covering transformers, relays, rotating machines, and automatic control closed loop systems. Lecture, 3 hours. *Prerequisite or corequisite: EEN 307.*

303. Computer Aided Circuit Design
1 cr.
Electric circuit analysis and design using computer aided design programs such as SPICE, MICROCAP, etc. *Prerequisite or corequisite: EEN 306.*

304. Logic Design
3 cr.
Boolean algebra and its applications in analysis and design of logic circuits. Introduction to SSI and MSI circuits as building blocks. Memory elements. Analysis and synthesis of synchronous and asynchronous sequential systems. *Prerequisite: EEN 117 or MTH 120 or IEN 124.*

305. Electronics I
3 cr.
Introduction to semiconductor physics and devices. Diodes, bipolar junction transistors (BJT), and field-effect transistors (FET). DC and AC analysis of electronic circuits. *Prerequisite: EEN 201.*

306. Electronics II
3 cr.
Continuation of EEN 305. Emphasis on integrated circuits. Frequency response of amplifiers; feedback and operational amplifiers. *Prerequisite: EEN 305. Prerequisite or corequisite: EEN 307.*

307. Linear Circuits and Signals
3 cr.
Laplace transforms. Circuit and waveform analysis using Laplace transform. Convolution. Fourier series and integral. *Prerequisite: EEN 201.*

308. Linear Control Systems
3 cr.
Introduction to system theory, transfer function and state variable modeling of linear continuous time systems, analysis and design in frequency and time domain, root locus, Nyquist criterion, Bode plot, frequency compensation, feedback and feedforward controller design, observer design. *Prerequisite: EEN 307, MTH 210, and 311.*

309. Discrete Systems and Automata
3 cr.
Sets and relations. Combinations. Functions and relations. Graphs, Finite state machines. Turing machines. Computability *Prerequisite: MTH 110 and EEN 304.*

310. Electrical Machine Laboratory
1 cr.
Laboratory course in conjunction with course EEN 302. *Prerequisite or corequisite: EEN 302.*

311. Electronics Laboratory
1 cr.
Laboratory course in conjunction with courses EEN 305 and 306. *Prerequisite: EEN 204. Prerequisite or corequisite: EEN 306.*

312. Microprocessor
4 cr.
Microprocessor systems, programming languages and applications with hands on experience. Lecture, 3 hours; laboratory, 3 hours. *Prerequisite: EEN 304.*

315. Digital Design Laboratory
1 cr.
Familiarization with properties and use of various logic gates, flip-flops and integrated circuit packages. Design of synchronous and asynchronous digital systems. *Prerequisite or corequisite: EEN 304.*

317. Algorithms and Data Structures in C++
3 cr.
Introduction to C++. Features of C++ that apply to data structures. Recursive algorithms. Complexity Analysis. Sorting and Searching. Computability. Problem-solving strategies. Parallel and distributed algorithms. *Prerequisite: EEN 118.*

324. Systems Programming
3 cr.
Programming using basic and advanced systems tools, including shell programming, networking tools, graphical interfaces, application programming interfaces and other systems programming facilities. Coverage of multiple platforms. *Prerequisite: EEN 309. Prerequisite or corequisite: EEN 312.*

330. Marine Science Technology
3 cr.
Overview of technological developments in ocean exploratory systems for non-engineering students, including scientific and commercial remotely operated vehicles and remote sensing techniques. *Prerequisite: PHY 102, Calculus.*

399. Cooperative Education
0 cr.
Practical application of classroom theory through alternating semester or summer employment with firms offering positions consistent with the student's field of study. May be repeated.

404. Communication Systems
3 cr.
Theory and application of amplitude modulation, single sideband modulation, frequency modulation, noise figures and communication links. Lecture, 3 hours. *Prerequisite: EEN 305, 307.*

406. Illumination
3 cr.
Illumination, light sources, light control, application, circuit and wiring, control equipment, floodlighting. Lecture, 3 hours. *Prerequisite: EEN 201 or junior standing.*

409. Introduction to Filtering and Signal Processing
3 cr.
General frequency and time domain filter concepts. Bode plots and time domain approximations. Two-port parameters. Butterworth, Chebyshev, elliptic, and Bessel filters. Active lowpass filter design. Active filter components including operational amplifiers. (Lecture, problems, three hours). *Prerequisite: EEN 307. Prerequisite or corequisite: EEN 305.*

414. Computer Organization and Design
3 cr.
Organization and design of computers. Hardware description language. Instruction set architecture. Control unit implementation, microprogramming, memory organization, and high speed arithmetic unit. *Prerequisite: EEN 304 and (MTH 228 or EEN 312).*

416. Electrical Design
3 cr.
Application of the theory of electronic and electromagnetic circuits to the design and construction of modern apparatus and instruments. Lecture, 2 hours; supervised work, 3 hours. *Prerequisite: Electrical Design Elective.*

417. Embedded Microprocessor System Design
2 cr.
Study of microcomputer system design, scientific methods for quantifying system performance, embedded controller applications using high level languages, debugging strategies. Lecture, 1 hour; laboratory, 3 hours. *Prerequisite: EEN 315. Prerequisite or corequisite: EEN 324 and 414.*

418. Senior Project Planning
0 cr.
Survey of digital systems performing distinct tasks in order to select, define and do the planning for a suitable senior design project. *Prerequisite: Senior standing.*

419. Computer Engineering Senior Project
3 cr.
The purpose of this course is to integrate the student's knowledge in hardware, software, and project management. A major digital system will be designed, implemented, debugged, and documented. *Prerequisite: EEN 418, 417, 454.*

452. Professional Seminar
1 cr.
Review of material in preparation for the Florida State Engineering Intern examination. Only available on "credit-only" basis. *Prerequisite: Graduating senior in Engineering.*

454. Digital System Design
4 cr.
Functional building blocks and concepts of control and timing in digital design. Descriptive techniques for digital systems and design for maintainability. Project laboratory demonstrating the techniques necessary to design, implement and debug a large system. *Prerequisite: EEN 315. Prerequisite or corequisite: EEN 414.*

500. Engineering Analytical Techniques
3 cr.
Engineering applications of complex variables, vector and tensor analysis, partial differential equations, special functions, matrices, eigenvalues and related topics. *Prerequisite: MTH 311.*

503. Principles of Electro-optics
3 cr.
Principles of optics, optical fibers, and electro-optics; light wave propagation in anisotropic and periodic media; guided waves and integrated optics; electro-optic devices including sources and detectors; optical fiber communication; optics for medical and biomedical applications. *Prerequisite: PHY 206, 207 and EEN 301 or equivalent.*

506. Solid-State Electronics
3 cr.
Principles of semiconductor electronics: energy bands of semiconductors; Fermi level; carrier distribution and transport mechanisms. Application of semiconductor theory to various junction and field effect devices. *Prerequisite: EEN 305.*

506. Solid-State Devices
3 cr.
Principles of operation, properties and applications of semiconductor devices: junction; metal-semiconductor and metal- oxide-semiconductor; optoelectronic; bulk-effect and charge-coupled. *Prerequisite: EEN 505 or PHY 520.*

507. Active Filter Design
3 cr.
Active lowpass filter design. Gain-tuning and passive-tuning, immittance calculations, and high-frequency lowpass filters. Frequency and time domain analysis of lowpass, highpass, bandpass, and bandstop filters. Classical filters. Active filter classification including gain-sensitivity limitations. *Prerequisite: EEN 409 or permission of instructor.*

508. Digital Control Systems
3 cr.
Basic concepts relevant to the analysis and design of digital computer controlled systems; sampling, z-transform, discrete transfer function, discrete-time state space modeling, analysis and design in time and frequency domains including stability, reachability, observability, state and output feedback, disturbance modeling and identification techniques. *Prerequisite: EEN 308.*

510. Passive Filter Design
3 cr.
Design of RLC passive filters. Properties of positive-real functions and Brune test. Design of driving-point and transfer immittances of RC, RL, LC, and RLC one-port and two-port networks. Design of Butterworth, Chebyshev, and elliptic ladder filters. *Prerequisite: EEN 409 or permission of instructor.*

511. Software Engineering
3 cr.
Modern programming methodologies. Structured programming and data abstractions. Specification, design, implementation, testing and maintenance of Large Scale Software. *Prerequisite: EEN 117, or 312, or 324.*

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141. On-Site Survey of European Architecture and Urbanism
3-6 cr.
Introduction to architecture and the city, and historical review of most European periods from classical to contemporary through the on-site survey of European architectural and urbanistic precedents in important selected locations. Elective course for all majors; lecture/seminar format on the site visits. *Prerequisite: Permission of instructor.*

171. Architecture: The Natural and the Man made, Style and Content
3 cr.
A review of the relationship between man, the landscape, and architecture from American pre-history to the twentieth century.

191. Introduction to Architecture Graphics
3 cr.
Focus: Methods of graphic simulation for non-architecture majors. Subjects: Orthographic, oblique and conical projections; architectural graphic conventions; plan, elevation, section, perspective. Format: Problem solving exercises, studio 2 hours, lecture 2 hours, two classes per week.

203. Architecture Design III
6 cr.
Focus: Environmental component; architectural response to natural environmental and site requirements. Topics: Site analysis and design, climate, access and circulation, landscape, relation to larger context. Format: Problem solving exercises, studio 6 hours, lecture 3 hours, three classes per week. *Prerequisite: ARC 102. Corequisite: ARC 241.*

204. Architecture Design IV
6 cr.
Focus: Technology component; materials and structure as active constituents of architecture design. Topics: Orientation, enclosure, low-energy responses, selection and assembly of construction materials, short and intermediate span structural systems. Format: Problem solving exercises, studio 6 hours, lecture 3 hours, three classes per week. *Prerequisite: ARC 203. Corequisite: ARC 262, AEN 210.*

213. Architecture Methods III: Computer I
3 cr.
This seminar and lab introduces the students to the new electronic design tools available to architects today. Topics: CADD, Image Processing and an overall lecture series on the history and future of computing in the profession. Format: Lecture, problem solving exercises and laboratory. *Prerequisite: ARC 102 or permission of instructor.*

223. Architecture Theory III: Environmental Component I
3 cr.
Focus: Architectural response to natural environmental requirements. Topics: Climate, control, natural energy use, ecosystems, energy flows, environmental intervention, case studies of indigenous buildings. Format: Lecture and problem solving exercises. Lecture 3 hours, two classes per week. *Prerequisite: ARC 102. Corequisite: ARC 204.*

231. Structure in Architecture
3 cr.
Structure in Architecture. Focus: The structural behavior and tectonic form of the basic elements of buildings. Topics: Loads, stability, equilibrium, strength, and dimensions of structural form. Format: Lecture and Problem solving exercises, 3 hours, 2 classes per week. *Prerequisite: PHY 103.*

261. Architectural Technology I: Materials and Methods of Construction I
3 cr.
Focus: Material characteristics of enclosure and structural systems, case studies in traditional and modern building construction. Topics: Properties of building materials; wood, masonry, concrete, steel and glass construction techniques; on-site and off-site processes; interior and exterior finish; assemblies, detailing and building codes. Format: Lecture and problem solving exercises, lecture 3 hours, two classes per week. *Prerequisite: ARC 102. Corequisite: ARC 203.*

271. Architectural History Survey I: Ancient, Medieval and Renaissance
3 cr.
Focus: History of architecture and urban design. Topics: Religious and secular monuments and their settings, domestic architecture and infrastructure, regional constructional and compositional traditions from prehistory to the end of the sixteenth century. Format: Lectures and seminars.

272. Architecture History Survey II: Baroque through Contemporary
3 cr.
Focus: History of architecture and urban design. Topics: Religious and secular monuments and their settings, domestic architecture and infrastructure, regional constructional and compositional traditions from the end of the sixteenth century through to the present. Format: Lectures and seminars.

292. Introduction to Architecture Design I
3 cr.
Focus: Survey of the architecture profession and introduction to architecture design for non-architecture majors. Subjects: Role, opportunities, vocabulary, visual awareness, techniques and procedures of design. Format: Problem solving exercises, studio 2 hours, lecture 2 hours, two classes per week.

293. Introduction to Architecture Design II
3 cr.
Focus: Continuation of ARC 292 and an introduction to the interactions between architecture and the engineering disciplines for non-architecture majors. Subjects: Theories of building and site design, technology as an integral component of design, program, site, climate and methodology. Format: Problem solving exercises, studio 2 hours, lecture 2 hours, two classes per week. *Prerequisite: ARC 191, 292.*

294. Introduction to the Development of Architecture
3 cr.
Focus: Introduction to architecture for non-architecture majors. Topics: Vocabulary, themes, principles and processes of design, cultural, social, economic and technological influences demonstrated through historic examples. Format: Lecture 3 hours, two meetings per week. *Prerequisite: Sophomore standing or permission of instructor.*

ARC

476. Architecture History VI: 19th and 20th Century
3 cr.
Focus: History of architecture and human settlements. Topics: America and Europe during the 19th and 20th centuries; cultural, technological and theoretical developments. Format: Lecture 3 hours, two classes per week. *Prerequisite: ARC 204 or 292, 294 or 371 or 372 or 373 or permission of the instructor.*

477. Architecture History VII: South Florida
3 cr.
Focus: History of architecture and human settlements. Topics: Significant architectural landmarks and urban design of the South Florida Region, chronological growth of Miami, Miami Beach, Coral Gables, Key West and Palm Beach. Format: Lecture 3 hours, two classes per week. *Prerequisite: ARC 204 and permission of instructor.*

481-483. Special Problems
1-3 cr. each
Group or individual investigations of significant architectural issues, offered by special arrangement only. *Prerequisite: Permission of Program Director.*

501. Architecture Design and Theory I
6 cr.
Focus: Cultural, human and environment component and architectural responses to these. Topic: Social and aesthetic concepts, architectural psychology, climatic principles, programming analysis and design. Format: Problem solving exercises, studio, lecture. *Prerequisite: Graduate standing.*

502. Architecture Design and Theory II
6 cr.
Focus: Technology component; materials, structure, and environmental control systems as a framework for architectural design. Topics: Construction materials and methods, structural systems, mechanical systems. Format: Problem solving exercises, studio, lecture. *Prerequisite: ARC 501.*

503. Architectural Design and Theory III
6 cr.
Focus: Legal and economic component; government and finances as active constituents of architecture design. Topics: zoning regulations, building codes, principles of public health, safety and welfare, market and feasibility studies. Format: Problem solving exercises, studio, lecture. *Prerequisite: ARC 502.*

509. Architecture Design IX
6 cr.
Focus: Specialization component: student/faculty selected areas of in-depth study. Topics: Theory; environment, e.g., energy, waterfront; human, e.g., elderly housing; building type, e.g., hotels, housing, commercial; urban design; community design. Format: Problem solving exercises, studio 6 hours, lecture 3 hours, three classes per week. *Prerequisite: ARC 408.*

510. Architecture Design X
6 cr.
Focus: Specialization component: student/faculty selected areas of in-depth study. Topics: Theory; environment, e.g., energy, waterfront; human, e.g., elderly housing; building type, e.g., hotels, housing, commercial; urban design; community design. Format: Problem solving exercises, studio 6 hours, lecture 3 hours, three classes per week. *Prerequisite: ARC 509.*

511. Methods in Architecture I: Graphics
3 cr.
Focus: Graphic representation and exploration of visual ideas. Topics: Projections, light, shade and shadow, perspective, freehand sketching. Format: Problem solving exercises, studio, lecture. *Prerequisite: Graduate standing and permission of instructor.*

513. Methods in Architecture II: Computing in Design
3 cr.
Focus: Introduces students to various computer applications in design. It integrates a series of lectures covering the past, present, and future of computing in design with an intensive hands-on introduction to available software for processing text, numbers and graphics. Format: lecture, laboratory and exercises. *Prerequisite: Graduate standing and permission of instructor.*

521. Architecture Theory: The Architecture of the American Cities
3 cr.
Focus: Study of theories on relationships between architectural objects and urban space based on works which include Sitte, Rossi, and Norberg-Schulz. Application of selected theoretical principles to the contemporary American cities. Format: Lecture, research exercises and seminars. Three hours per week, two classes. *Prerequisite: ARC 374.*

522. Architecture Psychology
3 cr.
Focus: Environmental behavior research applications to design and review of case studies. Format: Lecture and research exercises and seminars. *Prerequisite: Permission of instructor.*

529. Research in Design-Methods and Procedures
3 cr.
Focus: Application of research methods and procedures to design issues. Topics: Historical, descriptive, analytic, experimental research methods; tools for data manipulation and communication. Format: Lectures and seminars. *Prerequisite: Permission of Program Director.*

531. Structures in Architecture I
3 cr.
Focus: The basic structural behavior of all structural systems. Topics: Elementary statics of stress, tension, compression, shear and bending; beams and columns. Format: Problem solving exercises, lecture, laboratory. *Prerequisite: Graduate standing and permission of instructor.*

532. Structures in Architecture II
3 cr.
Focus: The structural behavior of simple frame structures. Topics: techniques to determine basic system layout and preliminary dimensioning of key subsystems and members. Format: Problem solving exercises, and lecture. *Prerequisite: ARC 531.*

533. Structures in Architecture III
3 cr.
Focus: The structural behavior of complex structures. Topics: Prestressed systems, waffle and space trusses, curved structures and longspan buildings. Format: Problem solving exercises, and lecture. *Prerequisite: ARC 532.*

Education: Curriculum Innovation and Integration, Santa Barbara, CA.

ARCHITECTURAL ENGINEERING IN THE 1990'S: A DECADE OF CHALLENGE AND OPPORTUNITY

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INTRODUCTION

Architectural engineering is the profession in which a knowledge of mathematics and natural sciences, gained by study, experience, and practice, is applied with judgement to the development of ways to use, economically and safely, the materials and forces of nature in the engineering design and construction of buildings and their environmental systems.

Some changes in curricula emphasis and direction in the 1960's through 1980's tend to eliminate technology from architectural curricula, while at the same time electrical engineering reduced its study of illumination and building power systems and mechanical engineering reduced its study of heating, ventilation and air conditioning (HAVC) systems. Consequently, the building industry has been faced with a shortage of professional engineers addressing the technologies of design for some time and as architectural engineers look to the nineties, the profession faces both new challenges and opportunities.

Architectural engineering programs are now seeing a rejuvenation throughout the United States in which students are trained to interface with both architects and construction personnel in providing the technical expertise in the design of structural systems; heating, ventilation and air conditioning systems; illumination systems and the management and construction processes for the building industry.

There are three areas of main emphasis in architectural engineering. First is that of structural aspects of engineering of building systems; that is, what holds the building structure up and together. The second is that of integrated building engineering where building environmental control, the equipment, processes and design are all necessary to make the building habitable by man. Included are illumination, plumbing, sanitation, air-conditioning systems, electrical services, heating, acoustical control and other such things required to make the building useful and serve its intended purpose. The third is that of the engineering aspects of the actual building construction, covering such things as site planning, job organization, scheduling and project management control of costs, progress and quality.

This paper will elaborate the demand for, and the success of, architectural engineering programs in the United States and expand some of the research and development activities currently performed in architectural engineering.

PROGRAM HISTORY

Architectural engineering, as an educational and professional pursuit, first achieved prominence in the United States in the 1940's. During that period, most architectural engineering programs were offered in conjunction with programs in

architecture. In general, architectural engineering is a four-year program which leads to the degree of Bachelor of Science in Architectural Engineering. Architecture, on the other hand, was a five-year program which led to the degree of Bachelor of Architecture. At most of the schools in which both degrees were offered, a certain measure of commonality existed between the programs. For example, it was not uncommon for architecture majors to take the same courses in mathematics, the physical sciences, and structural analysis and design, as did the engineering majors. Furthermore, engineering majors often took many of the art, drawing, socio-humanistic, and architectural design courses with the architecture majors. The differences, although being slight on the surface, were often major in philosophy and interest. Architectural engineering students were generally interested in the calculation or "engineering" of building design and construction, while architecture majors were more interested in the conceptual, aesthetic, and functional aspects of building design. Engineering was considered more of a science, and architecture more of an art. Both the architectural engineering and architecture programs were considered valid educational programs for students interested in pursuing professional careers.

During the 1950's there appeared a growing dissatisfaction in the architectural community toward the acceptance of the four-year architectural engineering program as a valid prerequisite for licensing as an architect. With the advent of the 1960's, many states proceeded to pass laws specifically requiring students to have a five-year architectural degree as a prerequisite to take the state board exam for architects. At the same time, many departments of architecture proceeded to separate from engineering and form their own special schools with their own faculty and students. Mathematics and the physical sciences were de-emphasized and art, psychology, history, and the humanities offerings were expanded to fill the gap.

During this same period, with few exceptions, architectural engineering enrollments suffered, largely as a result of the de-emphasis of mathematics and the physical sciences, and as a result of the separation of the schools of architecture from engineering. At the same time, the advent of the space age, in the 1950's and 1960's, served to focus increased attention in engineering curricula on more basic science, and less of applications. Engineering students were being exposed to more basic fundamentals in material science, solid state electronics and the like, and less to solid everyday applications of engineering design and analysis that are so needed in the building and construction engineering fields. A resulting void began to be created with architecture leaving the physical sciences and engineering, and with engineering leaving the applied and somewhat less exotic building and construction engineering subjects.

DEGREE PROGRAMS

Rapid advances of technology and the complexity of building systems necessitate the involvement of architectural engineers in fields such as: integrated building engineering, structural engineering, environmental systems for buildings, computer aided engineering, construction and construction management, and all safety aspects in construction, hazardous material handling/transportation, fire protection, and security systems. The concept of architectural engineering education is, therefore, to provide a broad understanding of total building systems. Engineers having this broad background,

yet capable of providing in-depth professional services in one of these areas, are highly attractive to the building profession.

TABLE 1 lists those institutions that have or have had an architectural engineering accredited program, including the years the institutions were accredited. Today the number of accredited programs stands at thirteen institutions with strong indications that the number will continue to increase over the next several years.

TABLE 2 shows those accredited institutions in the U.S. that offer architectural engineering programs along with areas of emphasis, number of years, and graduate programs.

TABLE 1

NUMBER OF ARCHITECTURAL ENGINEERING ACCREDITED PROGRAMS

YEARS	NO. OF PROGRAMS
1936	2
1937	11
1938-1939	13
1940-47	16
1948-49	17
1950	19
1951-1956	20
1957-58	19
1959	15
1960-61	14
1962-64	12
1965	11
1966-67	9
1968	8
1969-73	9
1974-77	8
1978-79	9
1980-85	10
1986-87	11
1988-90	12
1991-	13

TABLE 2

ABET ACCREDITED ARCHITECTURAL ENGINEERING PROGRAMS

Institution	Areas of Emphasis	No. of Years	Graduate Program
Cal. Poly State (San Luis Obispo)	ST, ARC	4	M.S.
Colorado (Boulder)	ST, IE, HVAC, CM	4	M.S.
Drexel	ST, HVAC	4	
Kansas	ST, IE, HVAC, CM	5	M.S. D.E.
Kansas State	ST, CM, ES	5	M.S.
Miami	ST, IBE	4	M.S.
Milwaukee	ST	4	
N.C. A&T State	ST, HVAC	5	
Oklahoma St.	ARC	5	
Penn State	ST, CM, ES	5	M.S. Ph.D.
Tennessee St.	ST	4	
Texas (Austin)	ST, CM, ES	4	M.S.
Wyoming	ST	4	

ARC - Architecture
ST - Structural
IE - Illum/Electrical
HVAC - Mechanical/Solar
IBE - Integrated Building Engrg.
CM - Construction Management
ES - Environmental Systems

Undergraduate study in architectural engineering is founded upon a strong basic science curriculum as any other engineering discipline. In a typical four year Bachelor of Science in Architectural Engineering (BSAE) curriculum, the students take courses in engineering science, mechanics and advanced courses in structural engineering and design. They also enroll in architectural design courses and courses offered in other engineering disciplines which enable them to gain knowledge in electrical and mechanical systems. However, the interdisciplinary nature of the program does not normally permit a thorough enough coverage of design within

a four year program, which explains why some schools in the country have a five year undergraduate program in the Bachelor of Architectural Engineering (BAE). The degree programs have some suggested concentrations such as integrated building engineering, environmental systems, structural engineering, and construction engineering and management. A master's program is also to provide the students with an additional opportunity to broaden their knowledge. Students are assisted in choosing design/technical electives which will prepare them for a degree of specialization compatible with their future goals. Sequences of courses are available for these concentrations.

OPPORTUNITIES IN RESEARCH AND DEVELOPMENT

Many professionals in the building and construction industry realize the need for research and development. There are numerous collaborative efforts by construction owners, designers and contractors to further the industry through research and development efforts. It is important to note that research will help to narrow the communication gap between architects and engineers as well as between engineers of different fields (e.g. structural, mechanical, electrical) who must work together in the design and construction of buildings are optimal.

They are also engaged in a continuous effort to identify critical issues that impact the construction and building industry, researching new technologies in project management, environmental systems and structural systems, and implementing the findings through various seminars, conferences, and workshops.

Some examples of research currently being conducted in architectural engineering programs are listed. The topic is not all inclusive, but intended only to give a flavor for the type of research being done at the various institutions.

- Computer Application/Software Development
  - Wood truss envelopes generation - automates the layout of wood roof and floor trusses.
  - HVAC diagnostics using an expert system.
  - Expert system for energy audits - computerized approach to energy audits.
  - Artificial intelligence applies to structural design.
- Construction and Project Management
  - Constructability and contractibility concepts in construction industry.
  - Analysis of pre-construction delays on public projects - identification of causes and quantification impacts.
  - Control of construction project scope - study of the causes and effects of poor project scoping.
- Energy Efficiency in Building/Solar Systems
  - Contracting, construction and acceptance testing for energy efficient buildings.
  - Simplified solar design methods - development of fast, accurate methods for sizing and economically optimizing solar systems.
  - Innovative design of building structural systems - energy approaches to architectural and structural systems.
  - Energy usage monitoring of residential and commercial structures.

Advanced Building Materials/Products/Methods

- Behavior of wood-joist floors in manufactures housing.
- Sandwich panels - reinforced foam cores for long-span panels.
- Fiber reinforced concrete for building systems.
- Reclamation, reconstruction and reuse of waste phosphogypsum for building materials.

o Acoustics and Illumination

- Open offices - application document for open office acoustics.
- Computer graphics - development of a computer graphic system to create perspective representations of the effect of proposed interior lighting system for evaluation at the design stage.
- Source luminance - the effect of source luminance on the perception of environmental brightness.

o Structural Analysis/Design

- Semi-rigid connections - analytical study of the effect of connection rotation on the strength and behavior of single story rigid frames.
- Structural analysis and design using spreadsheet concept.
- Development of a knowledge-based expert system for earthquake analysis of buildings.

SUMMARY

There are currently thirteen accredited undergraduate architectural engineering programs available in the United States with several more under development. In the opinion of many in this field, architectural engineering is becoming the best educational base for those engineers seeking a career in the building and construction industry. Architectural engineering is still an emerging specialty education and, therefore, there is room for innovation and flexibility in future curriculum development as well as implementation of more effective teaching methodologies.

The architectural engineering programs are dedicated to engage in activities necessary for improving the building and construction industry. One of the anticipated areas of research activity of architectural engineering programs should reflect both trends that will affect building design practices in the twenty first century and actions that are needed to address the coming changes.

REFERENCES

R. Helmes, "Architectural Engineering and Architecture: A History of Accreditation", NSAE Times, Vol, 4, No. 1, 1989.

P.A. Seaburg, "Research in Architectural Engineering", ASEE Annual Conference Proceedings, Reno, Nevada, 1987.

ENGINEERING

Educational Institution Accreditation Organization -

Engineering Accreditation Commission (EAC)
Accreditation Board for Engineering and Technology, Inc. (ABET)
345 East 47th Street
New York, NY 10017-2397
PH: 212/705-7687/FAX: 212/838-8062

Curricula Content Criteria[6]

An adequate foundation in mathematics and basic science, the humanities and the social sciences, engineering sciences, and engineering design methods is required:

Mathematics and basic sciences - mathematics courses must emphasize concepts and principles rather than computation; science courses shall include general chemistry and calculus-based general physics. Additional work in life and earth sciences depending on discipline of engineering.

Humanities and Social Sciences - courses such as history, literature, fine arts, sociology, economics, or others in the interest of making engineers fully aware of their social responsibilities and better able to consider related factors in the decision-making process.

Engineering - engineering science courses which extend basic sciences and mathematics to creative application such as mechanics, thermodynamics, electrical and electronic circuits, material science, computer science, and others; engineering design courses in which mathematics, basic sciences, and engineering sciences are applied to convert resources to meet a stated objective. Courses shall include fundamental elements such as establishment of objectives, synthesis, analysis, construction, testing, and evaluations. Further, courses shall include a variety of realistic constraints such as economic factors, safety, reliability, aesthetics, ethics, and social impact.

ARCHITECTURE

Educational Institution Accreditation Organization -

National Architectural Accrediting Board, Inc. (NAAB)
1735 New York Avenue, N.W.
Washington, DC 20006
PH: 202/783-2007/FAX: 202/626-7421

Curricula Content Criteria[14]

An adequate foundation in architectural design, of which the body of knowledge encompasses fundamental knowledge, design, communication, and practice, is required:

Fundamental knowledge -

Social: courses in liberal studies, architectural history, culture, and human behavior;

Environmental: courses in climate, geography, and other natural phenomena and characteristics that affect the setting for architecture;

Aesthetic: courses on the visual and emotional components of the architectural experience;

Technical: courses in the physical systems necessary to create a beneficial environment that responds to both human behavior and the laws of nature.

Design - the process and product that results from the synthesis of fundamental knowledge into a cohesive and unified architectural entity.

Communication - skills to study, illustrate, and document work as well as exchange information.

Practice -

Project Process and Economics: understanding of activities included in a representative architectural project from inception through completion of construction;

CRITERIA FOR ACCREDITING PROGRAMS IN ENGINEERING IN THE UNITED STATES

Effective for Evaluations During the
1997-98 Accreditation Cycle
(Incorporates all changes approved by the ABET Board of Directors as of November 2, 1996)

Engineering Accreditation Commission
Accreditation Board for
Engineering and Technology, Inc.
111 Market Place, Suite 1050
Baltimore, MD 21202
Telephone: (410) 347-7700
Fax: (410) 625-2238
Website: http://www.abet.ba.md.us

NOTE

To comment on proposed changes to the current criteria, see procedures outlined on page 23.

To comment on Engineering Criteria 2000, see procedures outlined on page 28.

CRITERIA FOR ACCREDITING PROGRAMS IN ENGINEERING IN THE UNITED STATES

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Program Criteria

Proposed Changes to Criteria

CRITERIA FOR ACCREDITING PROGRAMS IN ENGINEERING IN THE UNITED STATES*

For Programs Evaluated During the 1997-98 Accreditation Cycle

I. INTRODUCTION

I.A. Purposes

Among the purposes of the Accreditation Board for Engineering and Technology (hereafter referred to as ABET) as delineated in the Constitution, the following relate to accreditation:

I.A.1. Organize and carry out a comprehensive program of accreditation of pertinent curricula leading to degrees, and assist academic institutions in planning their educational programs.

I.A.2. Promote the intellectual development of those interested in engineering and engineering-related professions, and provide technical assistance to agencies having engineering-related regulatory authority applicable to accreditation.

I.B. Responsibilities

I.B.1. ABET accomplishes its purposes through standing committees or commissions, one of which is the Engineering Accreditation Commission (hereinafter referred to as EAC or EAC of ABET). The accreditation commissions are charged with the following responsibilities:

I.B.1.a. The accreditation commissions shall propose policies, procedures, and criteria to the ABET Board of Directors for approval. The Board of Directors shall review policies, procedures, and accreditation criteria and may specify changes to be made in them to the appropriate accreditation commissions.

I.B.1.b. The accreditation commissions shall administer the accreditation process based on policies, procedures, and criteria approved in advance by the Board of Directors. The accreditation commissions shall make final decisions, except for appeals, on accreditation actions.

I.B.2. Procedures and decisions on all appeals to accreditation actions shall be the responsibility of the Board of Directors.

I.B.3. Accreditation decisions are based solely on the *Criteria for Accrediting Programs in Engineering in the United States* as published by ABET. Other documents published by ABET or Participating Bodies are advisory in nature.

I.C. Objectives of Accreditation

The purpose of accrediting is to identify those institutions which offer professional programs in engineering worthy of recognition as such. In keeping with the broad purposes of ABET as given above, accreditation is intended to accomplish the following specific objectives:

I.C.1. To identify to the public, prospective students, educational institutions, professional societies, potential employers, governmental agencies, and state boards of examiners, the institutions and specific programs that meet minimum criteria for accreditation.

I.C.2. To provide guidance for the improvement of the existing educational programs in engineering and for the development of future programs.

I.C.3. To stimulate the improvement of engineering education in the United States.

I.D. National Recognition

ABET is recognized by the U.S. Department of Education as the sole agency responsible for accreditation of educational programs leading to degrees in engineering. The wide acceptance of the ABET list of accredited engineering programs by organizations such as the National Council of Examiners for Engineering and Surveying, by nearly all of the individual state boards, by the professional engineering societies, by employers of engineers, and by the institutions themselves, is gratifying evidence of the cooperation and respect of the institutions and organizations concerned.

I.E. Development

The first statement of the Engineers' Council for Professional Development (ECPD, now ABET) relating to accreditation of engineering educational programs was proposed by the Committee on Engineering Schools and approved by the Council in 1933. It was subsequently approved by the constituent member organizations of ECPD. Amendments and additions to the statement have from time to time been adopted. The original statement and its amendments and additions are combined here into a unified statement of the policies, methods of evaluation, criteria, and procedures which pertain to the accreditation of engineering programs.

II. POLICIES

II.A. Accreditation Policies

Through continuing and careful study of the problems of accreditation, ABET has evolved the following basic policies:

II.A.1. To accredit educational programs rather than institutions, departments, or degrees, for it is well recognized that programs of quite different quality may sometimes be found at the same institution. In order for a program to be accredited, all routes to completion of the program must be accreditable.

II.A.1.a. Definition of Program - An engineering program is an organized educational experience that consists of a cohesive set of courses or other educational modules sequenced so that reasonable depth is obtained in the upper-level courses. A definite engineering stem should be obvious in the program and, again, depth should be reached in pursuing courses in the engineering stem. Furthermore, the program should develop the ability to apply pertinent knowledge to the practice of engineering. An engineering program must also involve the broadening educational objectives expected in modern postsecondary education. For engineering disciplines, ABET has developed program criteria (see section IV.B.2.) that define specific program requirements within the general realm of engineering.

II.A.1.b. Program Differentiation - ABET criteria for accrediting programs address faculty, curriculum, students, administration, facilities, and commitment (see sections IV.C.1. to 7.). Programs may be differentiated and separately accredited if there are differences in any of the above categories so that the configuration of one program offering is subject to

* Incorporates all changes approved by the ABET Board of Directors as of November 2, 1996.

judgments different from other patterns. Not only do different curricula and disciplines require separate accreditation, but the use of two or more substantially different faculties, facilities, student characteristics, or administrations within the same discipline implies that there are two or more programs, each of which may require separate accreditation.

II.A.1.c. Options - Alternative curricula within a major engineering program (commonly called options) leading to a degree in a sub-field of the major discipline may be accredited and listed as separate programs at the request of the institution. In such cases the option must have been formally designated by the institution prior to the request for evaluation. It must conform to the general criteria and to any program criteria applicable to independent programs in the same curricular area as the option. The accreditation status of the option must be clearly identified and distinguished from any non-accredited options within the same major program, and from any other programs.

II.A.1.d. Cooperative Work-Study Programs - In addition to accrediting programs against general criteria and appropriate program criteria, an institution may request accreditation for the cooperative education feature of some or all of its programs in accordance with criteria for cooperative education programs (section IV.D.).

II.A.2. To invite institutions to submit programs without persuasion or pressure.

II.A.3. To require as a prerequisite to EAC of ABET evaluation and accreditation of its engineering educational programs that the institution be in one of the following categories:

II.A.3.a. Institutions currently accredited by a regional or national institutional accrediting agency or formally approved by a state authority recognized by the U.S. Department of Education.

II.A.3.b. Institutions holding appropriate approval by a state authority to offer only engineering, engineering technology or engineering-related programs, or a combination thereof, and not offering programs in any other field or discipline; or other institutions offering programs in engineering whose accreditation would further the objectives of ABET.

II.A.3.c. Institutions that comply with II.A.3. and operate a branch campus outside the United States under the direct supervision and control of the home campus, and conduct a program that is substantially equivalent to one located on the home campus, will be considered.

II.A.4. To accredit programs at either the basic or advanced level. Our complex society demands increasing numbers of engineers with a level of competence achieved by completion of advanced programs as well as significant numbers of engineers who are graduates of basic programs of shorter duration. Advanced-level accreditation is intended to identify programs that have met the specific minimum general and program criteria established for advanced-level study. Institutions are invited to submit their advanced-level programs for accreditation review as a means of promoting broadly the value of new and innovative program designs and as a way in which to ensure the maintenance of the traditionally high levels of excellence in engineering education. To allow institutions maximum flexibility in developing their educational offerings, the choice of level of accreditation (either basic or advanced), the degree awarded, and the length of the program are left to the institution. For example, one institution may seek advanced-level accreditation for a five-year program resulting in a baccalaureate degree, another may have a five-year program resulting in a master's degree, while still another may have a one-year program resulting in a master's degree. Criteria for basic-level accreditation are defined in Section IV.C. of this document, while the criteria for advanced-level programs are described in Section IV.E. However, a program may be accredited at only one level in a particular curriculum at a particular institution.

II.A.5. To favor broad basic programs in engineering that will prepare a student to take advantage of as many different opportunities as possible. ABET prefers to minimize the number of specially designated programs to be considered for accreditation.

II.A.6. To deny accreditation to programs which omit instruction in a significant portion of a subject in which engineers in a particular field may reasonably be expected to have competence. This policy is intended to be a safeguard to the public. It should be noted that programs which are perhaps contiguous to engineering but do not develop the basic abilities of the engineer are not eligible for accreditation as engineering programs, however excellent and useful they may be.

II.A.7. To avoid rigid standards as a basis for accreditation in order to prevent standardization or ossification of engineering education, and to encourage well-planned experimentation.

II.A.7.a. Recognizing the value of innovation and experimentation in engineering education and the possibility that innovative programs may have difficulty in meeting fixed quantitative criteria, the Engineering Accreditation Commission will evaluate such programs, on request, on the basis of their demonstrated ability to meet the overall objectives of these criteria and to produce graduates fully qualified to enter the practice of engineering.

II.A.7.b. It is incumbent on the institution wishing to offer a program for evaluation under these provisions to provide complete documentation, in Volume II of the self-study questionnaire (see section III.A.), of the means by which the objectives of these criteria are met in each instance where the program is not in strict compliance with the stated requirements.

II.A.8. To assess qualitative as well as quantitative factors in making an accreditation decision. These are assessed by a visit to the institution by a competent team of engineers.

II.A.9. To grant initial accreditation only if students have graduated from a program prior to the on-site visit. If the EAC determines that the program followed by these graduates is essentially the same as that reviewed, then such accreditation action may extend to the graduates of the program in the academic year prior to the visit.

II.A.10. To require institutions to represent the accreditation status of engineering programs accurately and without ambiguity.

II.A.10.a. The title of an EAC of ABET accredited program must be properly descriptive of the content of the program and be shown on the graduating student's transcript. An institution may not use the same program title to identify both an accredited program and a nonaccredited program. Although the selection of program titles is the prerogative of educational institutions, ABET discourages the proliferation of engineering program titles, because different titles for essentially the same programs are confusing or misleading to the public, including students, prospective students, and employers.

II.A.10.b. If an institution offers a nonaccredited program at the same level in the same field as an engineering program that is accredited by EAC of ABET, the institution must indicate in the descriptions of its programs that are made available to the public that the nonaccredited program is not accredited by EAC of ABET.

II.A.10.c. All engineering programs must include the word "engineering" in the program title.*

* An exception has been granted for programs accredited prior to 1984 under the title Naval Architecture.

II.A.11. To submit the findings and recommendations of the visiting team for review by the institution, by officers of EAC of ABET, and finally by the full membership of EAC of ABET.

II.A.12. To publish a list of accredited programs only. Information as to whether a program or institution not on the accredited list had been under consideration by EAC of ABET will not be made available except to the appropriate officials of the institution in question.

II.B. Revocation of Accreditation

Questions regarding the continued compliance of programs during the period of accreditation may be directed to ABET. If it appears that an accredited program is not in compliance with ABET criteria, the institution is so notified. If the response from the institution is not adequate, ABET may institute revocation for cause procedures. The institution is notified as to the cause why revocation is to be instituted. An on-site visitation is scheduled to determine the facts. A comprehensive document showing the reasons for revocation is provided to the institution for its analysis and its response. If the institution's response is not adequate, revocation for cause is implemented. The institution is promptly notified by the president of ABET of such action together with a supporting statement showing cause. A revocation constitutes a "not to accredit" action and is appealable. Accreditation is continued until the appeal procedure has terminated.

II.C. Appeal

Provision is made for appeal of "not to accredit" actions to the ABET Board of Directors. (See V.E. on page 10.)

II.D. Public Release Policy

II.D.1. Accreditation by EAC of ABET is based on satisfying minimum educational criteria. As a measure of quality, it assures only that an accredited program satisfies the minimum standards. The various periods or terms of accreditation do not represent a relative ranking of programs in terms of quality. At no point is an institution allowed to publish or imply the term or period of accreditation. Public announcement of the accreditation action should only relate to the attainment of accredited status. Because accreditation is specific to a program, all statements on accreditation status must refer only to those programs that are accredited. No implication should be made by an announcement or release that accreditation by EAC of ABET applies to any programs other than the accredited ones.

II.D.2. Direct quotation in whole or in part from any statement by EAC of ABET to the institution is unauthorized. Correspondence and reports between the accrediting agency and the institution are confidential documents and should only be released to authorized personnel at the institution. Any document so released must clearly state that it is confidential. Wherever institution policy or state or federal laws require the release of any confidential documents, the entire document must be released.

II.D.3. The institution must avoid any implication that programs offered are accredited under program criteria against which they have not been evaluated. Where sub-designators such as "option," "area or concentration," or similar nomenclature are used for programs, the institution must clearly identify the program criteria under which accreditation has been obtained.

II.D.4. In addition to an accredited advanced-level program, an institution may offer one for which it may not seek accreditation. There are many advanced-level programs of high quality which do not meet the objectives of the current criteria. Where these differences exist, two different advanced-level programs may be offered which must be clearly distinguished as to their title, content, objectives, and accreditation status.

II.D.5. Information published for students, prospective students, and the general public on an engineering program should provide sufficient definition of the program to show that it meets the ABET accreditation criteria. For example, if some fraction of the total elective courses must be taken in one curricular area in order for the criteria to be met, this requirement should be published, even though adequate counseling of students by faculty members may be shown to achieve the same objective.

II.D.6. College catalogs and similar publications must clearly indicate the programs accredited by EAC of ABET as separate and distinct from any other programs or kinds of accreditation. No implication should be made in any listing that all programs are accredited because of an institution's regional or institutional accreditation. Accredited engineering programs should be specifically identified as "accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700."

III. METHOD OF EVALUATION

III.A. Questionnaire

An institution's engineering educational programs will be initially evaluated on the basis of data submitted by the institution to ABET in the form of a self-study questionnaire.

III.B. On-site Visit

The questionnaire will be supplemented by a report of an on-site visit by a carefully selected team representing ABET and its Participating Bodies. The purpose of the on-site visit is three-fold:

III.B.1. It should assess factors that cannot be adequately described in the questionnaire. The intellectual atmosphere, the morale of the faculty and the students, the stability and continuity of the faculty and the students, the caliber of the staff and student body, and the outcome of the education offered as evidenced by the character of the work performed are examples of intangible qualitative factors that are difficult to document in a written statement.

III.B.2. The visiting team should help the institution assess its strong as well as its weak points.

III.B.3. The team should examine in further detail the material compiled by the institution and relating to:

III.B.3.a. Auspices, control, and organization of the institution and of the engineering division.

III.B.3.b. Educational programs offered and degrees conferred.

III.B.3.c. Age of the institution and of the individual educational programs.

III.B.3.d. Basis of and requirements for admission of students.

III.B.3.e. Number of students enrolled:

III.B.3.e.(1) in the engineering college or division as a whole, and

III.B.3.e.(2) in the individual educational programs.

III.B.3.f. Teaching staff and teaching loads.

III.B.3.g. Physical facilities - the educational plant devoted to engineering education.

III.B.3.h. Finances - investments, expenditures, sources of income.

III.B.3.i. Curricular content.

III.B.3.j. Representative samples of student work that reveal the spectrum of educational outcome.

III.C. Interpretation of Criteria

Considerable latitude in the choice and arrangement of subject matter in the curriculum is allowed. While the qualitative factors are more important than the quantitative assignment of credit hours to any particular area, the general principles outlined in the criteria will be checked closely by analyzing each particular curriculum. The coverage of basic information rather than the offering of specific courses is the important criterion.

It is emphasized that any program accredited by EAC of ABET must offer primarily an engineering curriculum with or without some modifier in its title. Therefore, the prime considerations in evaluating any engineering curriculum are (1) that it is considered satisfactory as an engineering curriculum regardless of any modifying word or phraseology used in the title, and (2) that the curriculum or curriculum option merits the designation of the modifier. If a program title is identified with one or more of the fields for which program criteria have been approved (see section IV.B.2.), that program must also meet the requirements of any relevant program criteria. Curricula not covered by other program criteria must meet the program criteria for nontraditional programs.

Methods for delivery of instruction and their use are developing, and ways for evaluating the learning accomplishment are evolving as well. When a course offered as part of an engineering program employs a method for delivery of instruction that differs from the more frequently encountered methods (e.g., lecture, discussion, laboratory) there must be a provision for evaluating the learning accomplishment to ensure that educational objectives are met.

IV. CRITERIA

The proposed changes to the General and Program Criteria, which are found as the last section of this publication beginning on page 23, have been developed by appropriate Participating Bodies of ABET, reviewed by the Engineering Accreditation Commission (EAC), and approved in principle by the Board of Directors of ABET. Before being adopted for implementation in the accreditation process, criteria are to be circulated among the institutions with accredited programs, as well as other interested parties, for review and comment.

Comments will be considered until June 15, 1997. Based upon comments received, the ABET Board of Directors will determine, with the advice of the EAC, the content of the adopted criteria. The adopted criteria will become effective following the ABET Annual Meeting in the fall of 1997 and will first be applied by the EAC for accreditation actions during the 1998-99 academic year and the following years.

Comments relative to the proposed General and Program Criteria should be addressed to the Accreditation Director for Engineering, Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012.

IV.A. Program Design and Level

In order to be considered for accreditation, engineering programs must be designed to prepare graduates for the practice of engineering at a professional level. Programs designed to prepare graduates for supporting roles in engineering (e.g., engineering technology) are not eligible, nor are programs which do not provide an adequate base for the application of fundamental concepts to the practice of engineering. To assist in the identification and recognition of characteristics of engineering programs for accreditation purposes, the criteria that follow have been adopted by ABET.

IV.B. Intent of Criteria

IV.B.1. General criteria are intended to assure an adequate foundation in science, the humanities and the social sciences, engineering sciences, and engineering design methods, as well as preparation in a higher engineering specialization appropriate to the challenge presented by today's complex and difficult problems. They are intended to afford sufficient flexibility in science requirements so that programs requiring special backgrounds, such as in the life or earth sciences, can be accommodated. They are designed to be flexible enough to permit the expression of an institution's individual qualities and ideals. They are to be regarded as a statement of principles to be applied with judgment in each case rather than as rigid and arbitrary standards. Finally, they are intended to encourage and stimulate and not to restrain creative and imaginative programs. In any case in which EAC of ABET is convinced that well-considered experimentation in engineering educational programs is under way, it shall give sympathetic consideration to departures from the criteria.

IV.B.2. Program criteria relative to the accreditation of engineering programs in particular disciplines are developed by the cognizant Participating Bodies of ABET or, at the request of EAC of ABET, by other societies or groups having appropriate expertise. The program criteria provide the specificity needed for interpretation of the general criteria as applicable to a given discipline. Program criteria must be accepted by the EAC and ABET before they can have effect in the accreditation process. When approved, program criteria are published as an integral part of this document, following the general criteria. A program in a curricular area covered by approved program criteria must be in compliance with both the general criteria and the program criteria in order to be accredited. Provisions of the program criteria may be more restrictive than related provisions of the general criteria.

If a program, by virtue of its title, becomes subject to two or more sets of program criteria, then that program must satisfy each set of program criteria, understanding that overlapping requirements need to be satisfied only once. However, the general criteria are emphatic that there must be sufficient faculty and resources to assure that program objectives are met. These programs must have faculty and resources sufficient to meet the additional curricular objectives implied by the expanded title.

IV.C. General Basic-Level Criteria

IV.C.1. Faculty

This section of the criteria relates to the size and competence of the faculty, the standards and quality of instruction in the engineering departments and in the scientific and other operating departments in which engineering students receive instruction, and evidence of concern about improving the effectiveness of pedagogical techniques.

IV.C.1.a. The heart of any educational program is the faculty. All other matters are secondary to a competent, qualified, and forward-looking faculty that can give an overall scholarly atmosphere to the operation and provide an appropriate role model for engineering students.

IV.C.1.b. The overall competence of the faculty may be judged by such factors as the level of academic training of its members; the diversity of their backgrounds; their non-academic engineering experience; their experience in teaching; their ability to communicate fluently in English; their interest in and enthusiasm for developing more effective teaching methods; their level of scholarship as shown by scientific and professional publications; their registration as Professional

Engineers; their degree of participation in professional, scientific and other learned societies; their participation in professional development programs; recognition by students of their professional acumen; and their personal interest in the students' curricular and extracurricular activities.

IV.C.1.c. A program at the basic level must have no fewer than three-full-time faculty members (i.e., the fractions of time devoted to the basic-level program by each faculty member must add to at least three.) This statement shall not be interpreted to preclude the accreditation of programs offered primarily by part-time faculty members. The institution must demonstrate that effective mechanisms are in place to assure adequate levels of student-faculty interaction, student advising, and faculty concern for and control over the curriculum, as would be expected in programs offered primarily by full-time faculty members. If the faculty has additional obligations, such as graduate teaching and/or research, additional faculty members must be present to ensure that at least three full-time-equivalent faculty members are devoted to each basic-level program. Under no circumstances should a program be critically dependent on one individual.

IV.C.1.d. Stability, continuity, and morale of the faculty are important to inspire confidence and respect in students and to ensure that their education will be consistently and effectively directed throughout their programs. High turnover rates and signs of serious divisions or lack of communication among faculty members are considered weaknesses in the program.

IV.C.1.e. *Teaching loads* must be consistent with the stated program objectives and expectations for research and professional development. Engineering faculty members, regardless of their individual capabilities, cannot function effectively either as teachers or seekers of new understanding if they are too heavily burdened with classroom assignments. Stimulation of student minds presupposes continuing professional growth of the faculty through study of new developments in areas of technology and science and in areas of instructional innovation.

IV.C.1.f. The engineering faculty must assume the responsibility of assuring that the students receive proper *curricular and career advising*. Those individuals responsible for and involved in advising must know and understand ABET criteria for accrediting engineering programs.

IV.C.2. Curricular Objective

Engineering is that profession in which knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind. A significant measure of an engineering education is the degree to which it has prepared the graduate to pursue a productive engineering career that is characterized by continued professional growth.

This section of the criteria relates to the extent to which a program develops the ability to apply pertinent knowledge to the practice of engineering in an effective and professional manner.

Included are the development of: (1) a capability to delineate and solve in a practical way the problems of society that are susceptible to engineering treatment, (2) a sensitivity to the socially-related technical problems which confront the profession, (3) an understanding of the ethical characteristics of the engineering profession and practice, (4) an understanding of the engineer's responsibility to protect both occupational and public health and safety, and (5) an ability to maintain professional competence through life-long learning. These objectives are normally met by a curriculum in which there is a progression in the course work and in which fundamental scientific and other training of the earlier years is applied in later engineering courses.

Institutions are expected to develop and articulate clearly program goals that are in keeping with the overall institutional goals, the student body served, and any other constraints that affect the program. In addition, they are expected to demonstrate success in meeting these goals.

IV.C.3. Curricular Content

Course work which meets the ABET engineering criteria may be accomplished in fewer academic years than are normally required by an institution for completion of a degree program. Although additional time is thus available in an accreditable engineering program for the implementation of individual educational objectives of students or their institutions, additional course work in engineering or related areas beyond that specifically required by ABET will be needed to fulfill the objective of preparing the graduate adequately to enter the engineering profession. The program must not only meet the specified minimum content but must also show evidence of being an integrated experience aimed at preparing the graduate to function as an engineer. The institution must address these needs and objectives in developing the program and its content. The institution should consider also the quality of its educational programs and assure sufficient individual attention to each student by the faculty. Section enrollments appropriate to class objectives and accessibility of faculty to students are considerations appropriate to the assessment of educational quality. Admission requirements should be established both to strengthen the quantitative approach to engineering and to support the development of the social and humanistic aspects of the engineering student's education.

In the statements that follow, one-half year of study can, at the option of the institution, be considered to be equivalent to 16 semester credit hours (24 quarter hours). *

IV.C.3.a. For those institutions which elect to prepare graduates for entry into the profession at the basic level, ABET expects the curricular content of the program to include the equivalent of at least three years of study in the areas of mathematics, basic sciences, humanities and social sciences, and engineering topics. The course work must include at least:

IV.C.3.a.(1) one year of an appropriate combination of mathematics and basic sciences

IV.C.3.a.(2) one-half year of humanities and social sciences, and

IV.C.3.a.(3) one and one-half years of engineering topics.

IV.C.3.b. The overall curriculum must provide an integrated educational experience directed toward the development of the ability to apply pertinent knowledge to the identification and solution of practical problems in the designated area of engi-

* For a program of 128 semester hours (192 quarter hours), one-half year of study equals exactly 16 semester hours (24 quarter hours). For a program requiring more than 128 semester hours or 192 quarter hours, 16 semester hours or 24 hours may be considered to constitute one-half year of study in any of the curricular components specified by the ABET criteria. For a program requiring fewer total credit hours, one-half year of study is considered to be one-eighth of the total program. Programs using measurements other than semester or quarter credit hours will be evaluated on a reasonably comparable basis to the above.

neering specialization. The curriculum must be designed to provide, and student transcripts must reflect, a sequential development leading to advanced work and must include both analytical and experimental studies. The objective of integration may be met by courses specifically designed for that purpose, but it is recognized that a variety of other methods may be effective.

Some of the requirements in a particular curricular area may be met through elective courses. However, it is incumbent upon the institution to publish in its catalog or printed advisement guide directions for choosing electives that will assure that ABET engineering criteria are met by all students.

IV.C.3.c. The classification of a course into one or more of the curricular areas depends on the course content rather than the course title or the name of the offering department. A course may be classified as being partially in one curricular area while the remainder of it is in another.

IV.C.3.d. While ABET favors a flexible approach to the design of curricular content, it also recognizes the need for specific coverage in each curricular area. These are:

IV.C.3.d.(1) Mathematics and Basic Sciences

IV.C.3.d.(1)(a) Studies in mathematics must be beyond trigonometry and must emphasize mathematical concepts and principles rather than computation. These studies must include differential and integral calculus and differential equations. Additional work is encouraged in one or more of the subjects of probability and statistics, linear algebra, numerical analysis, and advanced calculus.

IV.C.3.d(1)(b) The objective of the studies in basic sciences is to acquire fundamental knowledge about nature and its phenomena, including quantitative expression. These studies must include both general chemistry and calculus-based general physics at appropriate levels, with at least a two-semester (or equivalent) sequence of study in either area. Also, additional work in life sciences, earth sciences, and or advanced chemistry or physics may be utilized to satisfy the basic sciences requirement, as appropriate for various engineering disciplines.

IV.C.3.d.(1)(c) Course work devoted to developing skills in the use of computers or computer programming may not be used to satisfy the mathematics/basic sciences requirement.

IV.C.3.d.(2) Humanities and Social Sciences

IV.C.3.d.(2)(a) Studies in the humanities and social sciences serve not only to meet the objectives of a broad education but also to meet the objectives of the engineering profession. Therefore, studies in the humanities and social sciences must be planned to reflect a rationale or fulfill an objective appropriate to the engineering profession and the institution's educational objectives. In the interests of making engineers fully aware of their social responsibilities and better able to consider related factors in the decision-making process, institutions must require course work in the humanities and social sciences as an integral part of the engineering program. This philosophy cannot be overemphasized. To satisfy this requirement, the courses selected must provide both breadth and depth and not be limited to a selection of unrelated introductory courses.

IV.C.3.d.(2)(b) Such course work must meet the generally accepted definitions that humanities are the branches of knowledge concerned with man and his culture, while social sciences are the studies of individual relationships in and to society. Examples of traditional subjects in these areas are philosophy, religions, history, literature, fine arts, sociology, psychology, political science, anthropology, economics, and foreign languages other than English or a student's native language. Nontraditional subjects are exemplified by courses such as technology and human affairs, history of technology, and professional ethics and social responsibility. Courses that instill cultural values are acceptable, while routine exercises of personal craft are not. Consequently, courses that involve performance must be accompanied by theory or history of the subject.

IV.C.3.d.(2)(c) Subjects such as accounting, industrial management, finance, personnel administration, engineering economy, and military training may be appropriately included either as required or elective courses in engineering curricula to satisfy desired program objectives of the institution. However, such courses usually do not fulfill the objectives desired of the humanities and social sciences content.

IV.C.3.d.(3) Engineering Topics

IV.C.3.d.(3)(a) Engineering topics include subjects in the engineering sciences and engineering design.

IV.C.3.d.(3)(b) The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. Such subjects include mechanics, thermodynamics, electrical and electronic circuits, materials science, transport phenomena, and computer science (other than computer programming skills), along with other subjects depending upon the discipline. While it is recognized that some subject areas may be taught from the standpoint of either the basic sciences or engineering sciences, the ultimate determination of the engineering science content is based upon the extent to which there is extension of knowledge toward creative application. In order to promote breadth, the curriculum must include at least one engineering course outside the major disciplinary area.

IV.C.3.d.(3)(c) Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences and mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation. The engineering design component of a curriculum must include most of the following features: development of student creativity, use of open-ended problems, development and use of modern design theory and methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, production processes, concurrent engineering design, and detailed system descriptions. Further, it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics, and social impact.

IV.C.3.d.(3)(d) Each educational program must include a meaningful, major engineering design experience that builds upon the fundamental concepts of mathematics, basic sciences, the humanities and social sciences, engineering topics, and communication skills. The scope of the design experience within a program should match the requirements of practice within that discipline. The major design experience should be taught in section sizes that are

small enough to allow interaction between teacher and student. This does not imply that all design work must be done in isolation by individual students; team efforts are encouraged where appropriate. Design cannot be taught in one course; it is an experience that must grow with the student's development. A meaningful, major design experience means that, at some point when the student's academic development is nearly complete, there should be a design experience that both focuses the student's attention on professional practice and is drawn from past course work. Inevitably, this means a course, or a project, or a thesis that focuses upon design. "Meaningful" implies that the design experience is significant within the student's major and that it draws upon previous course work, but not necessarily upon every course taken by the student.

IV.C.3.d.(3)(e) The public, from catalog statements and other advising documents, and ABET, from the self-study questionnaire, should be able to discern the goals of a program and the logic of the selection of the engineering topics in the program. In particular, the institution must describe how the design experience is developed and integrated throughout the curriculum, show that it is consistent with the objectives of the program as required by section IV.C.2. above, and identify the major, meaningful design experiences in the curriculum.

IV.C.3.d(3)(f) Course work devoted to developing drafting skills may not be used to satisfy the engineering design requirement.

IV.C.3.e. Other courses, which are not predominantly mathematics, basic sciences, the humanities and social sciences, or engineering topics, may be considered by the institution as essential to some engineering programs. Portions of such courses may include subject matter that can be properly classified in one of the essential curricular areas, but this must be demonstrated in each case.

IV.C.3.f. Appropriate laboratory experience which serves to combine elements of theory and practice must be an integral component of every engineering program. Every student in the program must develop a competence to conduct experimental work such as that expected of engineers in the discipline represented by the program. It is also necessary that each student have "hands-on" laboratory experience, particularly at the upper levels of the program. Instruction in safety procedures must be an integral component of students' laboratory experiences. ABET expects some course work in the basic sciences to include or be complemented with laboratory work.

IV.C.3.g. Appropriate computer-based experience must be included in the program of each student. Students must demonstrate knowledge of the application and use of digital computation techniques for specific engineering problems. The program should include, for example, the use of computers for technical calculations, problem solving, data acquisition and processing, process control, computer-assisted design, computer graphics, and other functions and applications appropriate to the engineering discipline. Access to computational facilities must be sufficient to permit students and faculty to integrate computer work into course work whenever appropriate throughout the academic program.

IV.C.3.h. Students must demonstrate knowledge of the application of probability and statistics to engineering problems.

IV.C.3.i. Competence in written communication in the English language is essential for the engineering graduate. Although specific course work requirements serve as a foundation for such competence, the development and enhancement of writing skills must be demonstrated through student work in engineering work and other courses. Oral communication skills in the English language must also be demonstrated within the curriculum by each engineering student.

IV.C.3.j. An understanding of the ethical, social, economic, and safety considerations in engineering practice is essential for a successful engineering career. Course work may be provided for this purpose, but as a minimum it should be the responsibility of the engineering faculty to infuse professional concepts into all engineering course work.

IV.C.4. Student Body

This section of the criteria relates to the admission, retention, and scholastic work of students and the records of graduates both in further academic study and in professional practice.

IV.C.4.a. An important consideration in the evaluation of an engineering program is the quality and performance of the students and graduates. When students are carefully selected either at the time of admission or by appropriate retention standards, the level and pace of instruction can be high.

IV.C.4.b. In view of the increasing number of students who take their initial college-level work at institutions other than the degree-granting schools having programs accredited by EAC of ABET, it is appropriate for the degree-granting institutions to establish policies for the acceptance of transfer students and for the validation of credit for courses taken elsewhere. The institution must have in place procedures to assure that the programs of all transfer students satisfy all applicable ABET general and program criteria.

IV.C.4.c. Sources of information on the quality of student work include examples of examinations, homework problems, laboratory exercises, designs, and reports. These items, which include the competence of students in both subject matter areas and communication skills, must be made available to the visiting team.

IV.C.4.d. The record that graduates are making in the profession or in further academic study in other institutions is a factor to be considered in accrediting. An institution applying for accreditation of a program should be prepared, if possible, to produce records of graduates over a period of at least three years.

IV.C.5. Administration

This section of the criteria relates to the attitude and policy of the administration of the engineering division toward teaching, research, and scholarly production, and the quality of leadership at all levels of administration of the division.

IV.C.5.a. A capable faculty can perform its functions best in an atmosphere of good relations with the administration. This requires good communication between faculty members and administrators, and a mutual concern with policies that affect the faculty.

IV.C.5.b. The college administration should have four basic roles: selection, supervision, and support of the faculty; selection and supervision of the students; operation of the facilities for the benefit of the faculty and students; and interpretation of the college to members of the profession and to the public. In performing many of these functions, the administrators should not operate alone, but should seek advice from individual faculty members, faculty committees, and special consultants.

IV.C.5.c. Constructive leadership by the dean of the college and by the heads or chairs of the departments is important. Characteristics of successful administrators often include engi-

neering background and scholarly attainments, participation in the affairs of engineering organizations, positive interest in the educational process, cooperation with other administrators, and willingness to assume the responsibilities of the position.

IV.C.6. Institutional Facilities

IV.C.6.a. An engineering program must be supported by adequate physical facilities, including office and classroom space, laboratories, and shop facilities suitable for the scope of the program's activities.

IV.C.6.b. The libraries in support of the engineering unit must be both technical and nontechnical, to include books, journals, and other reference material for collateral reading in connection with the instructional and research programs and professional work. The library collection should reflect the existence of an active acquisition policy; this policy should include specific acquisitions on the request and recommendation of the faculty of the engineering unit. While the library collections should be reasonably complete and should go well beyond the minimum collection required for use by students in specialized programs, there should be in existence such arrangements as are necessary for computer-accessible information centers and inter-library loan services for both books and journals. The library collections, whether centralized or decentralized, should be readily available for use with the assistance of a trained library staff, or through an open-stack arrangement, or both. The ultimate test of the library is the use made of it by the students and faculty. Use of the library depends on many factors including opening and closing hours, reading room space, availability and helpfulness of the staff, and accessibility of material.

IV.C.6.c. The computer facilities available to the engineering students and faculty must be adequate to encourage the use of computers as a part of the engineering educational experience. These facilities must be appropriate for engineering applications such as engineering computation, modeling and simulation, computer-assisted design, and laboratory applications. Students and faculty should have ready access to computational facilities. These facilities should have reasonable turnaround and response time and a competent support staff. The ultimate test of the computer facilities is the use made of them by the students and the faculty.

IV.C.6.d. The laboratory facilities must reflect the requirements of the offered educational program. The laboratories must be equipped with instruments and equipment of kind and quality to ensure the effective functioning of the laboratory.

Each curriculum must have a carefully constructed and functioning plan for the continued replacement, modernization, maintenance, and support of laboratory equipment and related facilities. This plan is an essential part of these criteria and must be carefully presented, monitored, and implemented.

IV.C.7. Institutional Commitment

This section of the criteria relates to the commitment of the institution, both financially and philosophically, to the program in engineering. This commitment may be evidenced by the relationship of the engineering unit to the institution as a whole, by the fiscal policy toward and the financial resources available to the engineering unit, and by the suitability of facilities including laboratories, libraries, and computer facilities.

IV.C.7.a. The organizational structure of a university should be designed to bring together and to correlate its resources effectively. ABET is specifically interested in the general status of the engineering unit and its programs in the institution, and in the overall administration as it relates to the engineering unit and the achievement of its educational objectives.

IV.C.7.b. A sound fiscal policy must ensure the provision of sufficient funds for the acquisition, retention, and continued professional development of a well-qualified faculty; the acquisition, maintenance, and operation of office and laboratory facilities, equipment, and instrumentation; the creation and maintenance of a library, both technical and nontechnical; and the creation, maintenance, and operation of computer facilities appropriate to the needs and requirements of the engineering unit.

IV.C.7.c. The institution must provide facilities adequate for the support of the engineering programs offered, as defined in section IV.C.6.a.

IV.D. Cooperative Education Criteria

IV.D.1. Identification - The requirements which must be fulfilled by students who enter and complete the cooperative education program should be identified in an official publication of the institution.

IV.D.2. Requirements - In addition to meeting the general criteria for engineering programs, a cooperative education program must include the following requirements.

IV.D.2.a. Admission of students to co-op programs must be the responsibility of the educational institution.

IV.D.2.b. Formalized alternation of periods of full-time academic college training with periods of full-time work experience of approximately equal length.

IV.D.2.c. At least one calendar year of institution-supervised work experiences in several industrial periods.

IV.D.2.d. Enrollment by the student in the co-op program during the periods of employment. Evidence of cooperative education participation, progress, and employer evaluation of the student must be maintained as a matter of permanent institutional record.

IV.D.2.e. Productive academic relationship between the faculty of the college and the co-op program administrators.

IV.D.2.f. Efforts must be made to ensure that work assignments are related to academic and career goals, and that progressively more responsible positions are realized in the work experience periods.

IV.D.2.g. Students must be informed of the evaluation of their work experience.

IV.D.3. Employer Commitment - There should be evidence of marked commitment on the part of the institution and the participating employers of the program. The cooperative work experience period should be more than incidental employment—it should be part of an industry training activity, recognized as an acceptable part of a professional employee development program.

IV.E. General Advanced-Level Criteria

General advanced-level criteria are established to encourage the development of new, innovative, and/or experimental advanced-level engineering programs. The range of programs for which EAC of ABET will consider advanced-level accreditation includes, but is not limited to, programs that, when compared to the basic level, provide additional depth in a student's primary engineering discipline; provide additional breadth in engineering areas related to the primary discipline; provide a deeper immersion in cultural, social, and/or business studies related to engineering practice; emphasize broad study in manufacturing, construction, engineering management, and/or engineering entrepreneurship; and that are offered jointly by the engineering unit and another academic unit that

result in one or more degrees with the title "engineering."

IV.E.1. Faculty - Advanced-level criteria for faculty are the same as those for the basic level (section IV.C.1.) with the following exception: In a program that involves an additional year of study and relies on entering students having already completed a basic-level program, three full-time-equivalent faculty members must be primarily committed to the program. All other programs submitted for advanced-level accreditation must have no fewer than four full-time-equivalent faculty members whose primary commitments are to that program.

IV.E.2. Curricular Objective (Amplifies basic-level criteria section IV.C.2.)

IV.E.2.a. The institution must clearly specify the educational objectives of the advanced-level program in terms of the desired competencies to be developed by the program's graduates.

IV.E.2.b. The institution must define programs of study that students must follow to meet the educational objectives (e.g., defined curriculum, projects, laboratories, equipment, etc.).

IV.E.2.c. The program must have a well-developed process for assessing the extent to which the educational objectives are being achieved by the graduates (e.g., grading system, videotapes of students' oral defenses of theses, reviews of experimental techniques, critiques of written communication skills, measures of project comprehensiveness, etc.).

IV.E.2.d. There must be reasonable institution-established criteria and standards of performance that must be met by the students for them to qualify as meeting the educational objectives (e.g., a specified grade level in course work, significant project or research, content and quality of reports or theses, performance in oral defense, etc.).

IV.E.3. Curricular Content (Replaces basic-level criteria section IV.C.3.)

IV.E.3.a. The advanced-level program must ensure that each graduate has satisfied (at the institution being evaluated or another) all of the general basic-level curricular content criteria and at least one of the sets of basic-level program curricular content criteria (including nontraditional).

IV.E.3.b. The program must include the equivalent of at least one year of study beyond that specified in criteria section IV.E.3.a. above. This additional year must consist primarily of subject material at an advanced level not normally associated with a basic-level program.

IV.E.3.c. The program must include an engineering project or engineering research activity (experimental or analytical) of significant depth requiring innovation and creativity and resulting in a thesis or report that demonstrates both mastery of the subject matter and a high level of written communication skills.

IV.E.4. Student Body - Advanced-level criteria for the student body are the same as those for the basic level (criteria section IV.C.4.).

IV.E.5. Administration - Advanced-level criteria for the administration are the same as those for the basic level (criteria section IV.C.5.).

IV.E.6. Institutional Facilities - Advanced-level criteria for institutional facilities are the same as those for the basic level (criteria section IV.C.6.).

IV.E.7. Institutional Commitment - Advanced-level criteria for institutional commitment are the same as those for the basic-level (criteria section IV.C.7.).

V. PROCEDURE

V.A. Application and Preparation for Visit

V.A.1. Consideration of engineering educational programs with a view toward accrediting is done at the invitation of the institution. EAC of ABET is prepared to examine, for approval, any programs that appear likely to satisfy its criteria for education for professional entry or advanced specialized competence.

V.A.2. An institution that wishes to have any or all of its engineering programs considered for accreditation may communicate directly with ABET. Arrangements will then be made for securing information by questionnaire and for an evaluation of the educational facilities of the institution by a visiting team chaired by a member or recent member of EAC of ABET. It is suggested that an institution contemplating an accreditation evaluation for the first time contact ABET prior to making the formal request. This request should be made not later than January 31 preceding the academic year in which the campus visit is desired.

V.B. Confidentiality of Information

Information supplied by the institution is for the confidential use of ABET and its agents and will not be disclosed without the specific written authorization of the institution concerned.

V.C. Visit and Report

V.C.1. Each visiting team is selected, on the basis of the programs to be considered, from lists provided by the professional societies. The visiting team reports its preliminary findings and recommendations in writing to the officers of EAC of ABET for editing and transmission to the institution visited.

V.C.2. Between the time of the visit and the annual meeting of EAC of ABET the responsible administrative officer of the institution may submit to the Commission any supplemental information which he or she believes may be useful to the Commission in its consideration and appraisal of the visiting team's report. With reference to formal responses from institutions to the preliminary statements, the Commission will retain a flexible attitude but, in general, will base its accreditation actions on the status of the respective programs at the time of the on-site visit. The primary purpose of the response is to correct errors of fact or observation that were made at the time of the visit. Deficiencies existing at the time of the visit are considered to have been corrected only when the correction or revision has been made effective during the year of the visit and is substantiated by official documents signed by the responsible administrative officers. Where action has been initiated to correct a problem but has not yet taken full effect, or where only indications of good intent are given, the effectiveness of the corrective action (such as the employment of a new faculty member, the addition of new course work, the provision of additional funding or new equipment, for example) must be evaluated by ABET at the time of the next scheduled visit or progress report.

V.C.3. The reports of the visiting teams on programs in chemical engineering are viewed also by the Committee on Chemical Engineering Education and Accreditation of the American Institute of Chemical Engineers, which transmits its recommendations to EAC of ABET.

V.D. Accreditation Action

V.D.1. Final decision on accreditation rests with EAC of ABET, which acts on the recommendations made to it by the visiting team and on consideration of the institution's response to the preliminary report of findings or, in the case of actions based on progress reports, on the institution's report.

V.D.2. Accreditation of a program is granted for a specific period, usually three or six years. The term of accreditation is subject to review for cause at any time during the period of accreditation. Accreditation is granted if current conditions are judged to be meeting or exceeding the minimum requirements. If, for any reason, the future of a program appears precarious, or definite weaknesses exist, the accreditation will be granted for a shorter period, usually three years. Factors which might limit the term of accreditation include uncertainty as to financial status, uncertainty due to the nature of the administrative organization, a need for additions to or improvements in staff or equipment, a new or changing curriculum, undue dependence upon a single individual, etc.

V.D.3. A "not to reaccredit" action under "show cause" is effective as of the beginning of the academic year closest to September 30 of the calendar year following the year of the "not to reaccredit" decision by an accreditation commission or by the Board of Directors in appeal cases. The notification to the institution shall indicate (a) that the termination supersedes the accredited status listing of the program in the current annual report and (b) that ABET expects the institution to formally notify students and faculty affected by the termination of the program's accredited status, not later than September 30 of the calendar year of the "not to reaccredit" action. When accreditation of a program has been denied by EAC and not reversed by the ABET Board of Directors on appeal, ABET will include a note in its next annual listing of accredited program indicating the date of expiration of accreditation.

V.D.4. From time to time, an institution may decide to discontinue a program. ABET will work with the institution to assure validity of accreditation until the desired discontinuation date, providing that the following steps are taken.

V.D.4.a. For programs being discontinued by the educational institution within the period for which accreditation has been granted, accreditation may be extended from the date of notification to the date of discontinuation on a year-by-year basis subject to acceptance by the EAC of a satisfactory continuation report by the institution.

V.D.4.b. For programs being discontinued on a specific date that is no more than three years beyond the current period of accreditation, EAC may choose to extend accreditation to that specific date with a "Termination" ("T") action. A visit will be required to implement this action.

V.D.4.c. ABET will include a note in its next annual listing of accredited programs indicating the expected date of discontinuation of programs receiving a "termination" action.

V.D.5. A comprehensive evaluation of an institution's total program under EAC of ABET purview, including all engineering programs accredited or seeking accreditation and the supporting and related offerings, will be held at intervals not exceeding six years. Interim accreditations of individual programs will not normally extend beyond the next scheduled comprehensive evaluation and accreditation date.

V.D.6. A list of programs which have been accredited by EAC of ABET is prepared annually and published in the ABET Accreditation Yearbook. The accredited status of a program listed in the ABET Accreditation Yearbook applies to all graduates who completed the program during the preceding year. In order to keep the list dependable and up-to-date, re-evaluations based on campus visits are made as required at intervals of six years or less.

V.D.7. The functions of ABET are restricted by its Participating Bodies to the granting of accreditation and the publication of a list of those programs that are approved. It has no authority to impose any restrictions or standardizations upon engineering colleges, nor does it desire to do so. On the contrary, it aims to preserve the independence of action of individual institutions and thereby to promote the general advancement of engineering education.

V.E. Appeal

In the event an institution wishes to appeal an action of "not to accredit" taken by EAC of ABET, written notice of intent to appeal must be given to the executive director of ABET within thirty days of the date of notification of the action. Upon receipt of such notice the president of ABET will appoint a special committee of the Board of Directors having a minimum of three members. This special committee will schedule a meeting at the ABET headquarters or other location as soon as practical and convenient for all parties concerned. Appropriate administrative officers of the institution and representatives of EAC of ABET shall be present at this meeting to consider the importance and relevance of statements submitted in support of the appeal. The findings of the special committee will be reported at the next scheduled meeting of the Board of Directors and the final action will then be taken.

V.F. Changes During Period of Accreditation

It is the obligation of the administration officer responsible for the engineering program at the institution to notify ABET of any significant changes in staffing, administration, content and/or title of curriculum during the period of accreditation and to submit catalog revisions of accredited programs to ABET when the catalog revisions are published.

V.G. Further Information

Requests for further information relative to ABET and the engineering accreditation program may be addressed to the Executive Director, Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012.

PROGRAM CRITERIA

As noted in section IV.B.2. of the Criteria for Accrediting Programs in Engineering in the United States, the Board of Directors of ABET has approved the concept of adopting program criteria that are specifically applicable to programs in specified disciplinary areas of engineering. These program criteria, when approved by ABET, become an integral part of the accreditation criteria.

The program criteria which follow have been developed by the appropriate Participating Bodies of ABET, reviewed by the Engineering Accreditation Commission (EAC), and approved by the Board of Directors of ABET. They will be applied by the EAC for accreditation actions during the 1997-98 academic year and following years. All programs not covered by society-generated program criteria must meet the Program Criteria for Nontraditional Programs (at the end of this section).

PROGRAM CRITERIA FOR
AEROSPACE AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Institute of Aeronautics and Astronautics, Inc.

1. Applicability.

These program criteria apply to engineering programs which include "aerospace," "aeronautical," "astronautical," and similar modifiers in their titles.

2. Curriculum.

a. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

All aeronautical engineering programs must include topics in aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control.

All astronautical engineering programs must include topics in orbital mechanics, space environment, attitude determination and control, telecommunications, space structures, and rocket propulsion.

Aerospace engineering programs or other programs combining aeronautical engineering and astronautical engineering may emphasize either area by satisfying the criteria for that area and including some topics from the area not emphasized.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

There must be at least one conceptual or preliminary design course that integrates pertinent technical areas through the use of trade-off studies. These studies shall highlight the compromises necessary to meet a stated design objective. The remainder of the design requirement can be fulfilled by those portions of other courses that can be designated as design. In order to satisfy the quality and integration objectives which are paramount in engineering design, approximately one-half year of engineering design is expected.

3. Administration. (Amplifies criteria section IV.C.5.)

AIAA favors a separate faculty for aerospace engineering with a chair or head equal in status to the chair or head of other engineering or science departments. It has been demonstrated that strong aerospace engineering programs can also flourish either as joint programs in a multidisciplinary department or as options under other engineering disciplines. If such should be the case, the aerospace engineering program must have an identifiable faculty with sufficient curricular and administrative control to accomplish appropriate program objectives.

PROGRAM CRITERIA FOR
AGRICULTURAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Society of Agricultural Engineers

1. Applicability.

These program criteria apply to engineering programs which include "agricultural" and similar modifiers in their titles. They also apply to agriculturally-based programs in biological, food, and forest engineering.

2. Faculty.

a. **Size of Faculty.** (Amplifies criteria section IV.C.1.b.)

An agricultural engineering program must be supported by a minimum of five faculty members, or as an alternative, three full-time-equivalent teaching faculty members.

b. **Faculty Qualifications.** (Amplifies criteria section IV.C.1.b.)

Faculty members who teach basic agricultural engineering courses must have engineering degrees and those teaching design should be registered or preparing themselves for registration.

3. Curriculum.

a. **Curriculum Objectives and Content.** (Amplifies criteria section IV.C.2. and 3.)

The agricultural engineering curriculum must emphasize the application of engineering and the basic and applied sciences to agriculture and the food system; the biological engineering curriculum must emphasize the application of engineering and the basic sciences to biological processes and systems; the food engineering curriculum must emphasize the application of engineering and the basic sciences to processing, preservation, packaging, and transportation of food products; the forest engineering curriculum must emphasize the application of engineering and the basic sciences, including forestry, to resource management, regenerating, growing, harvesting, transportation, and processing of forest products.

Emphasis shall be placed on the engineering relationships between plants, animals, and related natural resources and humans. Included are machines, processes, and energy for the production and processing of food, feed, fiber, biomass, forest, and other biologically based products.

b. **Basic and Engineering Sciences.** (Amplifies criteria sections IV.C.3.d.(1)(b) and (3)(b))

A curriculum in agricultural engineering or forest engineering must include instruction in biological sciences and/or natural resource sciences.

A curriculum in biological engineering or food engineering must include inorganic and organic chemistry plus one-half year of biological science courses. A portion of the biological science courses may be used to satisfy the basic science requirement, as needed. Up to one-fourth of an academic year of the biological science courses (such as: food science, soil science, microbiology, animal science, plant science, etc.) may be counted toward the engineering science requirements, provided that such a biological science course is taught as an application of science that qualifies it as engineering science.

c. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Designing systems and machines for agricultural and biological applications requires the integration of biological sciences in the design process. A significant portion of the courses in the engineering topics must include open-ended design problems.

4. **Administration and Institutional Commitment.**
(Amplifies criteria sections IV.C.5. and IV.C.7.)

When the agricultural engineering program is administered outside a college or school of engineering, there must be demonstrated evidence that the guidance of the program is under the management of a qualified agricultural engineering faculty and that budgetary support, curricular development, and instruction are equivalent to those ordinarily found in an engineering department of a college or school of engineering.

PROGRAM CRITERIA FOR
ARCHITECTURAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Society of Civil Engineers, Inc. (Lead Society in Cooperation with The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.)

1. **Applicability.**

These program criteria apply to engineering programs which include "architectural" and similar modifiers in their titles.

2. **Faculty.**

a. **Faculty Size.** (Amplifies criteria section IV.C.1.c.)

The minimum number of full-time faculty members must be four (4). Their major responsibilities shall be teaching in the architectural engineering program.

b. **Faculty Qualifications.** (Amplifies criteria section IV.C.1.b.)

The majority of the full-time engineering members of the faculty should be registered Professional Engineers. A majority of those faculty teaching courses which are primarily engineering design in content must be registered Professional Engineers. A majority of those faculty teaching courses which are primarily architectural design in content must be either registered Professional Engineers or Registered Architects.

c. **Teaching Loads.** (Amplifies criteria section IV.C.1.d.)

A full-time faculty workload must reflect other appropriate activities, e.g. research, advising, institutional and committee service, and professional society responsibilities. The evaluation of the teaching load should reflect class size, modality of instruction, cost instructional support, and contact hours.

d. **Faculty Participation.** (Amplifies criteria sections IV.C.1. and IV.C.2.)

Faculty members shall be involved with the professional development of students, providing students with the opportunity to interact with practitioners in their major fields of interest. Such opportunities could be provided through a student organization, or equivalent experience, that has the demonstrated support of the academic unit administering the program.

3. **Curriculum.**

a. **Objective and Content.** (Amplifies criteria sections IV.C.2. and IV.C.3.)

To achieve a broad base of coverage, the curriculum structure must provide coverage in at least two of the three areas of structures, environmental systems, and construction/construction management.

b. **Engineering Science.** (Amplifies criteria section IV.C.3.d.(3)(b))

Engineering Science must include statics, strength of materials, thermodynamics, fluid mechanics, electric circuits, and engineering economics.

c. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

A minimum of one-half year is required in engineering design. The program is encouraged to develop innovative means of integrating design concepts and methodology throughout the curriculum, which must culminate in a major comprehensive design experience. Since the architectural engineering design process generally involves a team approach, team design projects are highly recommended. The final design experience should include practitioner involvement whenever appropriate and possible. Student reports and presentations should be an integral part of the final design experience.

d. **Humanities and Social Sciences.** (Amplifies criteria section IV.C.3.d.(2))

At least one course in architectural history must be included.

e. **Other courses.** (Amplifies criteria section IV.C.3.e.)

In addition to engineering design, at least six semester hours or the equivalent in architectural design must be included. Graduates must have a demonstrated ability to communicate graphically.

f. **Student body.** (Amplifies criteria section IV.C.4.b.)

For a design course to be acceptable for transfer credit, its content must have been reviewed by a faculty member of the program.

PROGRAM CRITERIA FOR
BIOENGINEERING AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Institute of Electrical and Electronics Engineers, Inc.
(Lead Society in cooperation with the American Institute of Chemical Engineers, the American Society of Agricultural Engineers, the American Society of Mechanical Engineers, and the National Institute of Ceramic Engineers)

1. **Applicability.**

These program criteria apply to bioengineering programs and others which include "biomedical" and similar modifiers in their titles (with the exception of agriculturally-based biological engineering programs).

2. **Faculty.**

a. **Faculty Qualifications and Size.** (Amplifies criteria section IV.C.1.b. and c.)

A faculty must be large enough to provide experience and capability in a significant portion of the broad range of bioengineering interests and to provide meaningful technical interaction among the faculty members so as

to support these interests. The bioengineering program must be the responsibility of a faculty of at least four persons who by training and/or practice are competent in bioengineering and whose primary commitment is to the program. This faculty must have sufficient responsibility for the curriculum to accomplish appropriate program objectives.

b. **Teaching Loads.** (Amplifies criteria section IV.C.1.d.)

Teaching loads must leave time for continuing professional development of the faculty through activities such as bioengineering research, instructional innovation, engineering consulting, or sabbatical leaves.

3. **Curriculum.**

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

Programs must require substantial work in basic engineering sciences, as well as work in the life sciences, which provide the framework for the interdisciplinary bioengineering courses. Programs with an emphasis in a single traditional engineering area, e.g. electrical, mechanics, chemical, and materials, must have some engineering course work outside that emphasis area.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d. (1)(a))

At least one of the following additional topics is highly desirable: linear algebra and matrices, probability and statistics, numerical analysis, advanced calculus, and complex variables.

c. **Basic Sciences.** (Amplifies criteria section IV.C.3.c.(1)(b))

A minimum of one-fourth year of biology and one-fourth year of chemistry are expected.

d. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

The requirement for "one course which is primarily design, preferably at the senior level, and predicated on the accumulated background of the curricular components" can be satisfied in several ways. As a minimum, a course that satisfies this requirement must have a content that is more than one-half engineering design and must be in the junior or senior year of the program. It must not be a beginning course in the program but must have as a prerequisite at least one course in the discipline.

e. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

The bioengineering program must provide the student with a meaningful laboratory experience, which implies an emphasis on practical engineering problems as well as on the basic functioning of biological systems. In particular, bioengineering laboratories must include the unique problems associated with making measurements and interpreting data in living systems and should emphasize the importance of considering the interaction between living and non-living materials. An objective of the laboratory experience should be to educate engineers to be proficient in experimental work.

PROGRAM CRITERIA FOR
CERAMIC AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the National Institute of Ceramic Engineers

1. **Applicability.**

These program criteria apply to engineering programs which include "ceramic," "glass," and similar modifiers in their titles. All programs in the materials disciplines share these criteria, including programs with materials, materials processing, ceramics, glass, polymer, metallurgical and similar modifiers in their titles.

2. **Faculty.**

Size of Faculty. (Amplifies criteria section IV.C.1.c.)

There must be a minimum of four full-time-equivalent faculty members, which may include the department head, whose primary commitments are to the basic-level program.

3. **Curriculum.**

a. Curricular Objective and Content. (Amplifies criteria section IV.C.2. and 3.)

All programs in the materials disciplines shall reflect the emphasis indicated in the program modifiers. Programs designated as materials programs must include instruction in ceramic, metallic, polymeric, and composite materials.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

Additional work in statistics or linear algebra or advanced calculus is required.

c. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b))

All programs must include one course year of college-level chemistry with laboratory, and one course year of college-level physics taught with calculus and laboratory. In addition, two courses chosen from advanced chemistry, advanced physics, or some other basic science must be an integral part of the program.

d. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

The engineering sciences component must provide a coherent program of instruction including thermodynamics, material and energy balances, transport phenomena, statics, strength of materials, electrical and electronic circuits, and fundamental courses in the structure and properties of materials. A significant portion of the engineering sciences must be devoted to the production, processing, behavior, selection, and uses of materials.

e. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Engineering design, with some treatment of engineering economics, must be an integral part of the curriculum. An important aspect of this requirement in all programs must be the design function as applied to processing.

The creative and original effort required for an effective design component can be met in several ways, such as through portions of courses, projects or research problems, or special problems that go beyond the limited activity of observation and analysis. However, a capstone engineering design experience in the final year of the program is required in order to integrate the various curricular components.

PROGRAM CRITERIA FOR
CHEMICAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Institute of Chemical Engineers

1. **Applicability.**

These program criteria apply to engineering programs which include "chemical" and similar modifiers in their titles.

2. **Curriculum.**

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

Chemical engineers must receive thorough grounding in chemistry, and the chemistry courses they take should be the same as, or equivalent to, those taken by chemistry majors. An accreditable chemical engineering curriculum must include at least one-half year of advanced chemistry in addition to the usual two-semester (or three-quarter) freshman-level course in general chemistry. Up to one-eighth of an academic year of other advanced natural science may be substituted for advanced chemistry. Other advanced natural science must build on basic science prerequisites and may include physics, life sciences, and materials science. A portion of the advanced chemistry may be used to satisfy the basic science requirement as needed, and up to one-fourth of an academic year of advanced chemistry may be counted toward the engineering sciences requirement, provided that such advanced chemistry demonstrates an application of theory that qualifies it as chemical engineering science. In general, engineering science credits may not be used to satisfy the advanced chemistry requirement.

b. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

A coherent plan of instruction in the chemical engineering sciences must be provided to include material and energy balances in chemical processes; thermodynamics with emphasis on physical and chemical equilibria; heat, mass, and momentum transfer; chemical reaction engineering; continuous and stage wise separation operations; and process dynamics and control. (Also see 2.a. above.)

c. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

The various elements of the curriculum must be brought together in one or more capstone engineering design courses built around comprehensive, open-ended problems having a variety of acceptable solutions and requiring some economic analysis.

d. **Computer Use.** (Amplifies criteria section IV.C.3.g.)

Appropriate use of computers must be integrated throughout the program. Acceptable computer use will include most of the following: (1) programming in a high-level language; (2) use of software packages for analysis and design; (3) use of appropriate utilities such as editors; (4) simulation of engineering problems.

3. Administration and Institutional Commitment. (Amplifies criteria sections IV.C.5. and IV.C.7.)

When the chemical engineering program is administered outside a school or college of engineering, it must be demonstrated that the program is guided by qualified chemical engineering faculty and that the budgetary support and freedom of action are equivalent to those ordinarily found in a department of an engineering school.

PROGRAM CRITERIA FOR
CIVIL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Society of Civil Engineers

1. Applicability.

These program criteria apply to engineering programs which include "civil" and similarly modifiers in their titles.

2. Faculty.

a. **Teaching Loads.** (Amplifies criteria section IV.C.1.d.)

A full-time faculty workload must reflect other appropriate activities, e.g., research, advising, institutional and committee service, and professional society responsibilities. The evaluation of the teaching load should reflect class size, modality of instruction, cost, instructional support, and contact hours.

b. **Faculty Qualifications.** (Amplifies criteria section IV.C.1.c.)

The minimum number of full-time civil engineering faculty members must be four (4). The primary assignment of these faculty members must be to the basic undergraduate program. The faculty as a whole must be competent in at least four (4) major discipline areas of civil engineering.

The majority of the full-time members of the civil engineering faculty who are eligible should be registered Professional Engineers. A majority of those faculty teaching courses which are primarily design in content must be registered Professional Engineers.

c. **Faculty Participation.** (Amplifies criteria sections IV.C.1. and IV.C.3.j.)

Faculty members shall be involved with the professional development of students, providing students with the opportunity to interact with practitioners in their major fields of interest. Such opportunities could be provided through a student organization, or equivalent experience, that has the demonstrated support of the academic unit administering the program.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

A minimum of one-half year is required in civil engineering courses. To achieve a broad base of coverage, a minimum of four of the major civil engineering discipline areas must be included in each student's program.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

A minimum of one-half year of engineering design is required. The program is encouraged to develop innovative means of integrating design concepts and methodology throughout the curriculum, which must culminate in a major comprehensive design experience. Since the civil engineering design process generally involves a team approach, team design projects are highly recommended. The final design experience should include practitioner involvement whenever appropriate and possible. Student reports and presentations should be an integrated part of the final design experience.

c. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

The laboratory experience should be integrated with other learning situations and include such characteristics as creativity; team effort; open-ended decision making; use of oral and written communication skills; design of experimental procedures and processes; and use of experimental methods for problem solving, discovery and self-learning.

4. Student Body. (Amplifies criteria section IV.C.4.b.)

a. **Transfer Credit**

For a design course to be acceptable for transfer credit, its content must have been reviewed by a faculty member of the program seeking accreditation.

PROGRAM CRITERIA FOR
CONSTRUCTION AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Society of Civil Engineers

1. Applicability.

These program criteria apply to engineering programs which include "construction" and similar modifiers in their titles.

2. Faculty.

a. **Teaching Loads.** (Amplifies criteria section IV.C.1.d.)

A full-time faculty workload must reflect other appropriate activities, e.g., research, advising, institutional and committee service, and professional society responsibilities. The evaluation of the teaching load should reflect class size, modality of instruction, cost, instructional support, and contact hours.

b. **Faculty Qualifications.** (Amplifies criteria section IV.C.1.b.)

The faculty should include members who have had full-time experience and decision-making responsibilities in the construction industry and who are professionally registered or preparing for registration.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria sections IV.C.2. and 3.)

A minimum of one-half year of course work must consist of management content, with topics such as economics, statistics, ethics, decision and optimization methods, process analysis and design, engineering management, safety, and cost engineering. If all or part of such topics satisfy ABET General and Program Criteria Curricula requirements, credit hours may be counted in both categories simultaneously.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

The one-half year in engineering design should provide a general grounding in the basics of the construction profession as well as permit some progress towards specialization.

PROGRAM CRITERIA FOR ELECTRICAL, ELECTRONIC(S), COMPUTER AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by The Institute of Electrical and Electronics Engineers, Inc.

1. Applicability.

These program criteria apply to engineering programs which include "electrical," "electronic(s)," "computer" and similar modifiers in their titles.

2. Faculty.

a. **Size of Faculty.** (Amplifies criteria section IV.C.1.c. and IV.E.1.)

In addition to meeting the General Criteria, the faculty of a basic or advanced program must be sufficiently large and diversified to provide breadth in the field, and depth in accord with the stated objectives of the program. The faculty must have clearly defined responsibility for establishing curricular objectives and content, and be sufficiently dedicated to the program to assure that it will be kept up-to-date.

b. **Faculty Qualifications.**

The major professional competence of the faculty for each program must span the range of topics associated with each program.

3. Curriculum.

a. The structure of the curriculum must provide both breadth and depth across the field of topics implied by the title of the program. Programs containing computer in their title must include sufficient curricular breadth to provide a balanced view of hardware, software, hardware-software tradeoffs, and basic modelling techniques used to represent the computing process. Breadth requires both the coverage of multiple topics as well as a balance of topics appropriate for the program. Depth requires both a series of topical areas that build upon one another as students progress through the program and a minimum of one topical area at an advanced level.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

Additional study is required in one or more topical areas that are consistent with the title of the program, and sufficient for the goals and objectives of the program. These topics are to be appropriately distributed throughout the program.

PROGRAM CRITERIA FOR
ENGINEERING MANAGEMENT AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Institute of Industrial Engineers (Lead Society in cooperation with the American Institute of Chemical Engineers, The American Society of Civil Engineers, The American Society of Mechanical Engineers, The Institute of Electrical and Electronics Engineers, Inc., Society of Manufacturing Engineers, Society of Petroleum Engineers).

1. Applicability.

These program criteria apply to engineering programs which include "management" and similar modifiers in their titles.

2. Faculty.

a. **Size of Faculty.** (Amplifies criteria section IV.C.1.c.)

The faculty group must be clearly identified and have curricular and administrative responsibility for the program sufficient to accomplish appropriate program objectives.

b. **Teaching Loads.** (Amplifies criteria section IV.C.1.d.)

Teaching loads must allow sufficient time for faculty professional development and growth activities such as research, instructional innovation, consulting, publications, institutional service, and related professional activities.

c. **Qualifications.** (Amplifies criteria section IV.C.1.b.)

The major professional competence of the faculty should rest in engineering and, in addition, the faculty should be experienced in the management of engineering and/or technical activities.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

The engineering management curriculum must emphasize the application of the management function in the technological setting while recognizing the basic and applied sciences in engineering systems. Emphasis shall be placed on the engineering relationships between the management tasks of organizing, staff, planning, financing, and the human element in production, research, and service organizations.

b. In the basic-level program, no more than three-fourths of one year of study may come from courses normally taught by schools of Business, Public Administration, Industrial Management, etc.

c. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

Course work in mathematics must include study in the subject area of calculus-based probability and statistics.

d. **Engineering Science and Design.** (Amplifies criteria sections IV.C.3.d.(3)(b) and (c))

The curriculum must include engineering management course content that complements the fulfillment of the engineering sciences and engineering design requirements as appropriate to an engineering management curriculum.

e. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

The program must include meaningful laboratory experiences that emphasize the integration of management systems into a series of different technological environments. Laboratory experiences in an environment of business and industry are encouraged.

f. **Communication.** (Amplifies criteria section IV.C.3.i.)

A strong emphasis on communication skills including specific course work (i.e., written and oral presentations) is required.

g. **Advanced-level Programs.** (Amplifies criteria section IV.E.)

Programs at the advanced level must adhere to such requirements as apply to basic-level programs for faculty, communication, laboratories, computer use, and administration. No more than fifty percent of the graduate course work may come from courses normally taught by schools of Business, Public Administration, Industrial Management, etc.

4. **Administration.** (Amplifies criteria section IV.C.5.)

The faculty identified for this program must include a designated person who is responsible for managing and coordinating the program.

PROGRAM CRITERIA FOR ENGINEERING MECHANICS AND SIMILARLY NAMED PROGRAMS

Submitted by The American Society of Mechanical Engineers

(Lead Society in cooperation with the American Society of Civil Engineers and the Society of Automotive Engineers)

1. **Applicability.**

These program criteria apply to engineering programs which include "engineering mechanics," "mechanics," "applied mechanics," "engineering science & mechanics," and similar modifiers including the word "mechanics" in their titles.

2. **Faculty Qualifications and Size.** (Amplifies criteria sections IV.C.1.b. and c.)

The minimum number of full-time faculty members shall be three who have demonstrated professional ability in engineering mechanics, and the majority of whom have had practical experience in a non-academic environment.

3. **Curriculum.**

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

The curriculum must include a sufficient number of free elective hours to allow students to undertake interdisciplinary studies in a special field, if they so choose. It should be designed to provide an understanding of the process of mathematical modeling coupled with digital and analog computer usage.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

At least one course in mathematics must be at the junior or senior level.

c. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

The curriculum must offer a coherent group of junior- and senior-level courses in each of the following engineering sciences areas: solid mechanics, fluid mechanics, dynamics and vibrations, and materials.

d. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Design projects must be included in which students are exposed to design experiences involving at least two of the engineering sciences areas listed above.

PROGRAM CRITERIA FOR ENVIRONMENTAL, SANITARY AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Academy of Environmental Engineers

(Lead Society in cooperation with the American Institute of Chemical Engineers, the American Society of Agricultural Engineers, the American Society of Civil Engineers, the American Society of Heating, Refrigerating and Air-Conditioning Engineers, the American Society of Mechanical Engineers, the Society of Automotive Engineers, and the Society for Mining, Metallurgy, and Exploration, Inc.)

1. **Applicability.**

These program criteria apply to engineering programs which include "environmental," "sanitary," and similar modifiers in their titles.

2. **Faculty Qualifications.** (Amplifies criteria section IV.C.1.b.)

The majority of the engineering members of the environmental engineering faculty should be registered or should be Engineers-in-Training.

3. **Curriculum.**

a. **Curricular Objectives and Content.** (Amplifies criteria section IV.C.2. and 3.)

At least two areas of environmental engineering must be provided in the curriculum from among the following: air pollution control engineering; water and waste-water engineering; solid and hazardous wastes engineering; and environmental and occupational health engineering.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Design courses should emphasize an integrated approach that consid-

ers all environmental media in the prevention and control of environmental problems. System and facility operation and maintenance should be stressed in design courses. A minimum of one-half year of engineering design is required.

c. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

Environmental engineering laboratories must provide a relevant experience in the physical, chemical, and biological sciences. This experience should also include applications to processes utilized in environmental engineering.

PROGRAM CRITERIA FOR GEOLOGICAL ENGINEERING PROGRAMS

Submitted by the Society for Mining, Metallurgy, and Exploration, Inc.

1. **Applicability.**

These program criteria apply to engineering programs which include "geological" and similar modifiers in their titles.

2. **Curriculum.**

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

Geological engineering encompasses but is not limited to (1) exploration for and development of mineral and fuel deposits, (2) geomechanics, (3) environmental site planning and/or natural hazard investigations, and (4) hydrogeology. The program in geological engineering must provide the integration of science, mathematics, engineering, and communication in comprehensive design courses, problems, and reports concerning geological engineering. The undergraduate program must include physical geology, mineralogy, introductory petrology, structural geology, principles of sedimentation or stratigraphy, field geology, and elements of geophysics.

b. Engineering Sciences. (Amplifies criteria section IV.C.3.d.(3)(b))

The curriculum must include at least one course in (1) mechanics, including statics and properties of materials, and (2) geomechanics, along with appropriate prerequisites (i.e., subjects relating to the response of natural materials to deformation or application of stress and/or strain energy).

PROGRAM CRITERIA FOR INDUSTRIAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Institute of Industrial Engineers, Inc.

1. **Applicability.**

These program criteria apply to engineering programs which include "industrial" and similar modifiers in their titles.

2. **Faculty.**

a. **Faculty Qualifications and Size.** (Amplifies criteria sections IV.C.1.b. and c.)

A majority of the full-time-equivalent faculty members devoted to undergraduate teaching, counseling, and curriculum matters, and in no case fewer than three, must have at least one degree in industrial engineering.

b. **Teaching Loads.** (Amplifies criteria section IV.C.1.d.)

A full-time faculty workload must reflect other appropriate activities, e.g., research, advising, institutional and committee service, and professional society responsibilities. The evaluation of the teaching load should reflect class size, modality of instruction, cost, instructional support, and contact hours.

3. **Curriculum.**

a. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

A capstone engineering design experience is required.

b. **Computer Use.** (Amplifies criteria section IV.C.3.g.)

Appropriate use of computers shall be integrated throughout the curriculum. Programming competence in a high-level language such as PASCAL, FORTRAN, or C, as well as simulation techniques, should be demonstrated.

c. **Probability and Statistics.** (Amplifies criteria section IV.C.3.h.)

Calculus-based probability and statistics instruction shall be included.

4. **Administration.** (Amplifies criteria section IV.C.5.)

It must be demonstrated that the program is guided by qualified industrial engineering faculty with sufficient curricular and administrative control to achieve program objectives.

PROGRAM CRITERIA FOR MANUFACTURING AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Society of Manufacturing Engineers

1. **Applicability.**

These program criteria apply to engineering programs which include "manufacturing" and similar modifiers in their titles.

2. **Faculty.** (Amplifies criteria sections IV.C.1.b. and e.)

All manufacturing faculty members shall be suitably qualified by both education and experience and shall maintain knowledge of current manu-

facturing practice. The institution shall provide a statement of the methods and resources by which all manufacturing faculty develop and maintain current manufacturing expertise. Faculty members shall be involved with the professional development of students, providing students with the opportunity to interact with practitioners in their major fields of interest. Such opportunities could be provided through student organizations, or equivalent experiences, that have the demonstrated support of the academic unit administering the program.

3. Curricular Content.

a. **Basic-Level Curriculum.** (Amplifies criteria section IV.C.3.a.(3))

The courses in the major (those which identify a curriculum as manufacturing engineering) will normally require a minimum of one year of study. The major course work must include both engineering science and engineering design. The program must include at least one course in each of the four major areas listed below. The institution must provide a statement of program objectives and show how these objectives are met through integrated sequences of courses from these areas.

(1) Materials and manufacturing processes.

These courses study behavior and properties of materials and materials processing.

(2) Process, assembly, and product engineering.

These courses relate to the design of products and the equipment and tooling necessary for their manufacture.

(3) Manufacturing productivity and quality.

These courses deal with management of manufacturing enterprises. Topics such as productivity, quality, cost, human resources, product safety and liability, social concerns, international issues, environmental impact, and product life cycle may be included in this area.

(4) Manufacturing integration methods and systems design.

These courses deal with the design and operation of manufacturing systems. Simulation, modeling, control, architecture, and information systems are appropriate topics for this area.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

(1) A minimum of one-half year of engineering design is required.

(2) A capstone engineering design experience that integrates specialty areas is required.

c. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

A hands-on laboratory experience in manufacturing processes where process variables are measured and technical inferences are made is required.

d. **Advanced-Level Curriculum.** (Amplifies criteria section IV.E.)

The curriculum must contain a team experience, hands-on laboratory experience, and a thesis or project. The curriculum must include a minimum of one graduate-level course from each of the four major areas specified in 3.a. above for basic-level programs. The institution must provide a statement of program objectives and show how these objectives are met through its course requirements.

4. Administration. (Amplifies criteria section IV.C.5.)

a. Where the manufacturing engineering program is administered separately from a department titled "manufacturing engineering," or as an option within another department, the faculty must have sufficient curricular and administrative control to achieve program objectives.

b. An industrial advisory group is required with visible evidence of active support.

PROGRAM CRITERIA FOR
MATERIALS AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by The Minerals, Metals, and Materials Society

(Lead Society in cooperation with the National Institute of Ceramic Engineers, the American Institute of Chemical Engineers, and The American Society of Mechanical Engineers.)

1. Applicability.

These program criteria apply to engineering programs which include "materials," "polymer," and similar modifiers in their titles.

All programs in the materials disciplines share these criteria, including programs with materials, materials processing, ceramics, glass, polymer, metallurgical, and similar modifiers in their titles.

2. Faculty.

Size of Faculty. (Amplifies criteria section IV.C.1.c.) There must be a minimum of four full-time-equivalent faculty members, which may include the department head, whose primary commitments are to the basic-level program.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

All programs in the materials disciplines shall reflect the emphasis indicated in the program modifiers. Programs designated as materials programs must include instruction in ceramic, metallic, polymeric, and composite materials.

b. **Mathematics.** (Amplifies criteria section IV.C..3.d.(1)(a))

Additional work in statistics or linear algebra or advanced calculus is required.

c. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b)

All programs must include one course year of college-level chemistry with laboratory, and one course year of college-level physics taught with calculus and laboratory. In addition, two courses chosen from advanced chemistry, advanced physics, or some other basic science must be an integral part of the program.

d. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

The engineering sciences component must provide a coherent program of instruction including thermodynamics, material and energy balances, transport phenomena, statics, strength of materials, electrical and electronic circuits, and fundamental courses in the structure and properties of materials. A significant portion of the engineering sciences must be devoted to the production, processing, behavior, selection, and uses of materials.

e. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Engineering design, with some treatment of engineering economics, must be an integral part of the curriculum. An important aspect of this

requirement in all programs must be the design function as applied to processing.

The creative and original effort required for an effective design component can be met in several ways, such as through portions of courses, projects, or research problems, or special problems that go beyond the limited activity of observation and analysis. However, a capstone engineering design experience in the final year of the program is required in order to integrate the various curricular components.

PROGRAM CRITERIA FOR
MECHANICAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by The American Society of Mechanical Engineers

1. Applicability.

These program criteria apply to engineering programs which include "mechanical" and similar modifiers in their titles.

2. Faculty.

a. **Faculty Qualifications and Size.** (Amplifies criteria sections IV.C.1.b. and c.)

Mechanical engineering programs must have at least five full-time faculty members who by training and/or practice are competent in mechanical engineering and whose primary responsibility is the instruction of undergraduate mechanical engineering students.

b. **Faculty Workload.** (Amplifies criteria section IV.C.1.d.)

A full-time faculty workload must reflect all appropriate activities, e.g., teaching, research, advising, institutional and committee service, and professional society responsibilities. The evaluation of the teaching load should reflect class size, modality of instruction, instructional support, and contact hours.

c. **Faculty Participation.** (Amplifies criteria sections IV.C.1. and IV.C.3.j.)

Faculty members shall be involved with the professional development of students, providing students with the opportunity to interact with practitioners in their major fields of interest. Such opportunities could be provided through a student organization, or equivalent experience, that has the demonstrated support of the academic unit administering the program.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

The basic-level curriculum shall include two stems of coherent course offerings: (1) energy, and (2) structures and motion in mechanical systems.

b. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

A coherent program shall include at least one course in the electrical sciences.

c. **Engineering Design.** (Amplifies criteria sections IV.C.3.d.(3)(c), (d), and (e))

It is required that some integrated educational experience in the terminal portion of the program be dedicated primarily or in its entirety to engineering design. Documented evidence of the student's participation must be provided for the visitor's evaluation.

d. **Computer Use.** (Amplifies criteria section IV.C.3.g.)

Graduates must have substantial experience in computer applications in both the energy and mechanical systems stems.

PROGRAM CRITERIA FOR
METALLURGICAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by The Minerals, Metals, and Materials Society
(Lead Society in cooperation with the Society for Mining, Metallurgy, and Exploration, Inc.)

1. Applicability.

These program criteria apply to engineering programs which include "metallurgical" and similar modifiers in their titles.

All programs in the materials disciplines share these criteria, including programs with materials, materials processing, ceramics, glass, polymer, metallurgical, and similar modifiers in their titles.

2. Faculty.

Size of Faculty. (Amplifies criteria section IV.C.1.c.) There must be a minimum of four full-time-equivalent faculty members, which may include the department head, whose primary commitments are to the basic-level program.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

All programs in the materials disciplines shall reflect the emphasis indicated in the program modifiers. Programs designated as materials programs must include instruction in ceramic, metallic, polymeric, and composite materials.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

Additional work in statistics or linear algebra or advanced calculus is required.

c. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b))

All programs must include one course year of college-level chemistry with laboratory, and one course year of college-level physics taught with calculus and laboratory. In addition, two courses chosen from advanced chemistry, advanced physics, or some other basic science must be an integral part of the program.

d. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

The engineering sciences component must provide a coherent program of instruction including thermodynamics, material and energy balances, transport phenomena, statics, strength of materials, electrical and

electronic circuits, and fundamental courses in the structure and properties of materials. A significant portion of the engineering sciences must be devoted to the production, processing, behavior, selection, and uses of materials.

e. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Engineering design, with some treatment of engineering economics, must be an integral part of the curriculum. An important aspect of this requirement in all programs must be the design function as applied to processing.

The creative and original effort required for an effective design component can be met in several ways, such as through portions of courses, projects, or research problems, or special problems that go beyond the limited activity of observation and analysis. However, a capstone engineering design experience in the final year of the program is required in order to integrate the various curricular components.

PROGRAM CRITERIA FOR
MINING AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Society for Mining, Metallurgy, and Exploration, Inc.

1. Applicability.

These program criteria apply to engineering programs which include "mining" and similar modifiers in their titles.

2. Faculty Qualifications and Size. (Amplifies criteria sections IV.C.1.b. and c.)

Minimum faculty size will be two individuals who are assigned full time to the mining program, and other mining faculty appointments equivalent to two full-time teaching positions. The background of the faculty must demonstrate a good balance between theoretical expertise and practical mining experience.

3. Curriculum.

a. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b))

Instruction must include basic concepts in physical geology, structural geology, mineralogy, and petrology.

b. **Engineering Sciences and Design.** (Amplifies criteria sections IV.C.3.d.(3)(b) and (c))

(1) Instruction in mining subjects must account for at least one year of all course work required for a bachelor's degree. Instruction must include mining methods, rock mechanics, rock fragmentation, materials handling, safety and mine environmental engineering, mineral or coal processing, mine surveying, and mine valuation.

(2) Instruction as individual courses or major topics within other courses must be provided in statics, dynamics, strength of materials, fluid mechanics, thermodynamics, and electrical circuits.

PROGRAM CRITERIA FOR
NAVAL ARCHITECTURE AND MARINE ENGINEERING PROGRAMS

Submitted by the Society of Naval Architects and Marine Engineers

1. Applicability.

These program criteria apply to engineering programs named "naval architecture" and/or "marine engineering."

2. Curriculum.

a. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

Topics shall include fluid mechanics, solid mechanics, materials, hydrostatistics, dynamics, and energy systems. In some courses, applications to marine vehicles shall be included.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Course work should include approximately one-half year of design which shall include one capstone design experience that integrates both pertinent and broad technical areas and addresses trade-off studies, economics, and systems aspects of design.

c. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

A meaningful laboratory program should provide experience with instrumentation for measuring physical phenomena related to naval architecture and/or marine engineering as well as emphasizing good experimental procedures such as experiment design, data collection, analysis, and formal report writing.

PROGRAM CRITERIA FOR
NUCLEAR AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Nuclear Society

1. Applicability.

These program criteria apply to engineering programs which include "nuclear" and similar modifiers in their titles.

2. Faculty Teaching Loads. (Amplifies criteria section IV.C.1.d.)

Teaching loads must leave enough time for conducting professional development of the faculty. Such professional development may include activities such as engineering research, instructional innovation, engineering consulting, sabbatical leaves, and related activities.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

The basic-level curriculum must provide a background in mathematics, chemistry, and physics followed by advanced study in mathematics and engineering sciences, including atomic and nuclear physics, leading to

analysis, synthesis, design, and utilization of nuclear systems.

b. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

It is required that some integrated educational experience in the upper-division portion of the program be dedicated in its entirety to engineering design. Documented evidence of the students' participation must be provided for the visitor's evaluation.

c. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

The program must have a laboratory experience that includes nuclear processes.

4. **Administration. (Amplifies criteria section IV.C.5.)**

There must be an identifiable faculty with sufficient curriculum and administrative control and budgetary support to achieve program objectives whether the program is administered as a department of nuclear engineering, an option within another engineering department, or outside a school or college of engineering.

PROGRAM CRITERIA FOR
OCEAN AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Society of Naval Architects and Marine Engineers
(Lead Society in cooperation with the American Society of Civil Engineers and
The Institute of Electrical and Electronics Engineers, Inc.)

1. **Applicability.**

These program criteria apply to engineering programs which include "ocean" and similar modifiers in their titles.

2. **Curriculum.**

a. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b)

Topics shall include oceanography.

b. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b)

Topics shall include fluid mechanics, solid mechanics, materials, hydrostatics, dynamics, and energy systems. In some courses, applications to marine vehicles shall be included.

c. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

Course work should include approximately one-half year of design which shall include one capstone design experience that integrates both pertinent and broad technical areas and addresses trade-off studies, economics, and systems aspects of design.

d. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

A meaningful laboratory program should provide experience with instrumentation for measuring physical phenomena related to ocean engineering as well as emphasizing good experimental procedures such as experiment design, data collection, analysis, and formal report writing.

3. **Size and Qualifications of Faculty.** (Amplifies criteria section IV.C.1.b. and c.)

The faculty must be large enough to provide experience and capability in a significant portion of the broad range of ocean engineering.

4. **Administration.** (Amplifies criteria section IV.C 5.)

When the ocean engineering program is administered as a joint program in a multidisciplinary department or as an option under another engineering discipline, the program must have an identifiable faculty which has sufficient control over curriculum content and program administration to accomplish the program objectives.

PROGRAM CRITERIA FOR
PETROLEUM AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the Society of Petroleum Engineers

1. **Applicability.**

These program criteria apply to engineering programs which include "petroleum," "natural gas," or similar modifiers in their titles.

2. **Curriculum.**

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

The curriculum at the basic level must include a minimum of one year of petroleum engineering courses. Specific course sequences may be devised in a variety of ways. However, a satisfactory petroleum engineering curriculum must include the general areas described below.

(1) Well-drilling - modern design and operating practices for drilling oil and gas wells.

(2) Petroleum production - modern design and operating practices for completing, producing, and stimulating wells and for handling produced fluids at the surface.

(3) Properties of reservoir rocks and fluid - nature, estimation, and use of reservoir rock and fluid properties.

(4) Reservoir analysis and exploitation - application of modern reservoir engineering techniques to characterize and exploit petroleum reservoirs.

(5) Formation evaluation - use of well logs, cores, formation fluid samples, and pressure tests on wells to estimate reservoir rock and fluid properties.

(6) Economics - introduction to micro economics pertaining to the value of petroleum properties, economic analysis of projects, and the effect of economics on technical decisions.

(7) Geology - petroleum-related geological concepts including, as minimum, coverage in the areas of physical and structural geology.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

The curriculum should include at least one advanced mathematics topic such as linear algebra, probability and statistics, partial differential equations, numerical analysis, or advanced calculus.

c. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

The engineering sciences component must include topics in fluid mechanics, electrical circuits, strength of materials, and thermodynamics.

d. **Laboratory Experience.** (Amplifies criteria section IV.C.3.f.)

The curriculum must provide the student with a meaningful laboratory experience emphasizing core analysis, PVT behavior, and fluid flow concepts. Additionally, a meaningful laboratory experience must be provided in at least two of the following areas: rheology, gas measurement, automation, drilling, logging, and formation evaluation.

e. **Computer Use.** (Amplifies criteria section IV.C.3.g.)

Demonstration of computer proficiency in upper-level course work is required.

f. **Advanced-Level Curriculum.** The advanced-level curriculum must include a minimum of one-half year of advanced-level courses in petroleum engineering as a supplement to the basic-level requirements.

PROGRAM CRITERIA FOR SURVEYING AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Congress on Surveying and Mapping
(Lead Society in cooperation with the American Society of Civil Engineers)

1. Applicability.

These program criteria apply to engineering programs which include "surveying" and similar modifiers in their titles.

2. Faculty Qualifications. (Amplifies criteria section IV.C.1.b.)

It is expected that every surveying engineering faculty member will have had full-time experience in surveying or engineering practice in a non-academic environment. It is further expected that the faculty members in surveying who teach the design courses required for professional registration will be registered in the appropriate field.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

In order to provide a broad overview of surveying and meet the requirements of surveying sciences and design, it is strongly recommended that at least one year of surveying be required.

b. **Mathematics.** (Amplifies criteria section IV.C.3.d.(1)(a))

Course work in mathematics shall include matrix algebra and statistics.

c. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b))

Basic science course work shall include that part of physics which includes mechanics, heat, sound, light, optics, and electricity. A basic course in geology should be included. Chemistry, biology, and dendrology are suggested electives.

d. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

Care must be taken to include in this group such courses as geodesy, photogrammetry, electrical science as it relates to electronic distance measurement, and remote sensing.

e. **Engineering Design.** (Amplifies criteria section IV.C.3.d.(3)(c))

The surveyor's relationship to design might relate to engineering as in hydraulic design, site planning, urban planning, or route and construction surveying. On the other hand, the design efforts might apply to survey systems (control), boundary location and relocation, survey evidence, and cartographic design. As the student chooses a course to meet career objectives, he or she should have one capstone design course which includes the elements mentioned in section IV.C.3.d.(3) of the general criteria.

PROGRAM CRITERIA FOR NONTRADITIONAL PROGRAMS

1. Applicability.

These program criteria apply to engineering programs which are not covered by specific program criteria developed by a society or group of societies.

2. Faculty. (Amplifies criteria section IV.C.1.)

a. At least one year of course work taught by engineering faculty members should be taken by every student.

b. In small institutions with strong departments of basic sciences and no other engineering programs, at least four faculty members educated as engineers or with extensive engineering experience are necessary to provide the engineering philosophy and application in the program.

c. In institutions with a substantial number of faculty members educated as engineers and teaching in other departments, one or two engineering faculty members should be responsible for guidance and coordination of the nontraditional program.

d. **Advising.** (Amplifies criteria section IV.C.1.e.)

Students must be advised by faculty members who have been educated as engineers or who have extensive engineering experience.

3. Curriculum.

a. **Curricular Objective and Content.** (Amplifies criteria section IV.C.2. and 3.)

The content of a nontraditional, basic-level or advanced-level engineering program must meet the general criteria and must conform to the definition of a program found in section II.A.1.a. Both basic and advanced-level programs must consist of a cohesive set of courses sequenced so that reasonable depth is obtained in the upper-level courses.

b. **Basic Sciences.** (Amplifies criteria section IV.C.3.d.(1)(b))

Programs that are identified with a particular science stem must give substantial emphasis to the specific science.

c. **Engineering Sciences.** (Amplifies criteria section IV.C.3.d.(3)(b))

A definite engineering stem must be obvious in the program and depth must be reached in pursuing courses in the engineering stem.

Furthermore, the program must develop the ability to apply pertinent knowledge to the practice of engineering.

4. **Administration.** (Amplifies criteria section IV.C.5.)

The nontraditional program structures and content should be substantially determined by engineering faculty members with possible input from others related to the program. When programs are initiated by nonengineering departments, the engineering faculty should share at least an equal role in determining course sequences and content so that an engineering stem is clearly recognizable.

The following section outlines proposed changes to the Criteria for Accrediting Programs in Engineering in the United States. These proposals were approved by the Engineering Accreditation Commission (EAC), and were brought before the ABET Board of Directors on November 2, 1996 for preliminary approval. Before being approved for final implementation into the accreditation process, they are published here for circulation among the institutions with accredited programs and other interested parties for review and comment.

Comments will be considered until June 15, 1997. The ABET Board of Directors will determine, based on the comments received and on the advice of the EAC, the content of the adopted criteria. The adopted criteria will then become effective following the ABET annual meeting in the fall of 1997 and will first be applied by the EAC for accreditation actions during the 1998-99 academic year and the following years.

Comments relative to the proposed general and program criteria changes should be addressed to the Accreditation Director for Engineering, Accreditation Board for Engineering and Technology, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012. **Note that there are no changes to the general criteria to be considered in this edition.**

PROPOSED CHANGES TO PROGRAM CRITERIA

In the next edition of these criteria, it is proposed that the American Nuclear Society be given curricular responsibility for radiological engineering programs as follows:

PROGRAM CRITERIA FOR NUCLEAR OR RADIOLOGICAL AND SIMILARLY NAMED ENGINEERING PROGRAMS

Submitted by the American Nuclear Society

1. **Applicability.**

These program criteria apply to engineering programs which include "nuclear," "radiological," or similar modifiers in their titles.

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ENGINEERING CRITERIA 2000
SECOND EDITION

Review, comments, and discussion of Engineering Criteria 2000 by all interested parties is invited. Comments should be addressed to:

Director, Engineering Accreditation Commission
Accreditation Board for Engineering and Technology, Inc.
111 Market Place, Suite 1050
Baltimore, Maryland 21202-4012
Fax: (410) 625-2238
email: eac@abet.ba.md.us

Engineering Criteria 2000 will be published in January 1998 for a three-year phased implementation beginning in the 1998-99 accreditation cycle. During the three years (1998-99 through 2000-01), institutions may elect to have their programs evaluated under the current criteria or under Engineering Criteria 2000. When an institution elects Engineering Criteria 2000, all programs will be reviewed under Engineering Criteria 2000.

This is a **second edition** of ABET Engineering Criteria 2000. Two changes in meaning in the text since December of 1995 are indicated by underlining and the placement of a side bar in the right margin: (1) Criterion 4, item (a) and (2) III. Cooperative Education Criteria.

The EAC of ABET may make non-substantive editorial changes to this document based on experience gained during the pilot study period.

CRITERIA FOR ACCREDITING PROGRAMS IN ENGINEERING IN THE UNITED STATES

The Accreditation Board for Engineering and Technology (ABET) is recognized in the United States as the sole agency responsible for accreditation of educational programs leading to degrees in engineering. The first statement of the Engineers' Council for Professional Development (ECPD, now ABET) relating to accreditation of engineering educational programs was proposed by the Committee on Engineering Schools and approved by the Council in 1933. The original statement, with subsequent amendments, was the basis for accreditation until 2000. The statement presented here is required of programs beginning in 2001.

Engineering education programs may be accredited at the basic or the advanced level; however, a program may be accredited at only one level in a particular curriculum at a particular institution. All accredited engineering programs must include "engineering" in the program title.* To be considered for accreditation, engineering programs must prepare graduates for the practice of engineering at a professional level.

I. Objectives of Accreditation

The ABET accreditation process is a voluntary system of accreditation that

(1) assures that graduates of an accredited program are prepared adequately to enter and continue the practice of engineering
(2) stimulates the improvement of engineering education
(3) encourages new and innovative approaches to engineering education
(4) identifies these programs to the public.

II. Basic Level Accreditation Criteria

It is the responsibility of the institution seeking accreditation of an engineering program to demonstrate clearly that the program meets the following criteria.

Criterion 1. Students

The quality and performance of the students and graduates is an important consideration in the evaluation of an engineering program. The institution must evaluate, advise, and monitor students to determine its success in meeting program objectives.

Criterion 2. Program Educational Objectives

Each engineering program for which an institution seeks accreditation or reaccreditation must have in place

(a) detailed published educational objectives that are consistent with the mission of the institution and these criteria
(b) a process based on the needs of the program's various constituencies in which the objectives are determined and periodically evaluated
(c) a curriculum and process that ensures the achievement of these objectives
(d) a system of ongoing evaluation that demonstrates achievement of these objectives and uses the results to improve the effectiveness of the program.

Criterion 3. Program Outcomes and Assessment

Engineering programs must demonstrate that their graduates have

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs
(d) an ability to function on multi-disciplinary teams

*An exception has been granted for programs accredited prior to 1984 under the title of Naval Architecture.

(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Each program must have an assessment process with documented results. Evidence must be given that the results are applied to the further development and improvement of the program. The assessment process must demonstrate that the outcomes important to the mission of the institution and the objectives of the program, including those listed above, are being measured. Evidence that may be used includes, but is not limited to the following: student portfolios, including design projects; nationally-normed subject content examinations; alumni surveys that document professional accomplishments and career development activities; employer surveys; and placement data of graduates.

The institution must have and enforce policies for the acceptance of transfer students and for the validation of credit courses taken elsewhere. The institution must also have and enforce procedures to assure that all students meet all program requirements.

Criterion 4. Professional Component

The Professional Component requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The engineering faculty must assure that the program curriculum devotes adequate attention and time to each component, consistent with the objectives of the program and institution. Students must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier coursework and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political. The professional component must include

(a) one year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline
(b) one and one-half years of engineering topics, to include engineering sciences and engineering design appropriate to the student's field of study
(c) a general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.

Criterion 5. Faculty

The faculty is the heart of any educational program. The faculty must be of sufficient number; and must have the competencies to cover all of the curricular areas of the program. There must be sufficient faculty to accommodate adequate levels of student-faculty interaction, student advising and counseling, university service activities, professional development, and interactions with industrial and professional practitioners, as well as employers of students.

The faculty must have sufficient qualifications and must ensure the proper guidance of the program and its evaluation and development. The overall competence of the faculty may be judged by such factors as education, diversity of backgrounds, engineering experience, teaching experience, ability to communicate, enthusiasm for developing more effective programs, level of scholarship, participation in professional societies, and registration as Professional Engineers.

Criterion 6. Facilities

Classrooms, laboratories, and associated equipment must be adequate to accomplish the program objectives and provide an atmosphere conducive to learning. Appropriate facilities must be available to foster faculty-student interaction and to create a climate that encourages professional development and professional activities. Programs must provide opportunities for students to learn the use of modern engineering tools. Computing and information infrastructures must be in place to support the scholarly activities of the students and faculty and the educational objectives of the institution.

Criterion 7. Institutional Support and Financial Resources

Institutional support, financial resources, and constructive leadership must be adequate to assure the quality and continuity of the engineering program. Resources must be sufficient to attract, retain, and provide for the continued professional development of a well-qualified faculty. Resources also must be sufficient to acquire, maintain, and operate facilities and equipment appropriate for the engineering program. In addition, support personnel and institutional services must be adequate to meet program needs.

Criterion 8. Program Criteria

Each program must satisfy applicable Program Criteria. Program Criteria provide the specificity needed for interpretation of the basic level criteria as applicable to a given discipline. Requirements stipulated in the Program Criteria are limited to the areas of curricular topics and faculty qualifications. If a program, by virtue of its title, becomes subject to two or more sets of Program Criteria, then that program must satisfy each set of Program Criteria; however, overlapping requirements need to be satisfied only once.

III. Cooperative Education Criteria

Should the program include as a part of the professional component a cooperative work element, this element of the program may be examined as a separate entity and reported as part of the accreditation action.

IV. General Advanced Level Programs

Criteria for advanced level programs are the same as for basic level programs with the following additions: one year of study beyond the basic level and an engineering project or research activity resulting in a report that demonstrates both mastery of the subject matter and a high level of communication skills.

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National Society of Professional Engineers

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July 10, 1996

Margaret Barlow, Editor
Florida Architect
104 East Jefferson Street
Tallahassee, FL 32301

Dear Ms. Barlow:

I read with dismay the recent "Editorial" and "Viewpoint" entitled "Florida Engineers Are Not Educated to Design Buildings for Human Habitation" published in the Florida Architect, by the Florida Association of the American Institute of Architects. To paraphrase former President Ronald Reagan, "There you go again..."

The "Viewpoint" article begrudgingly acknowledges that civil engineering students take a significant amount of course work that overlaps with the course work taken by architectural students -- Computer Aided Design, Statics, Strength of Materials, Construction Methods and Management, Analysis and Design in Steel, Analysis and Design in Reinforced Concrete, Advanced Steel Design and Advanced Reinforced Concrete Design. As noted, these courses deal with the resolution of forces and corresponding sizes of members, such as beams and columns, shear walls, foundations and the like, while designing the structural skeleton system or structural components of a building. The article also notes that constructability issues relating to the appropriateness of various building materials are also covered in this course work.

What the "Viewpoint" article fails to acknowledge is that in addition to the areas of overlap in the typical architectural and engineering undergraduate program, civil engineering students are also required to successfully complete course work in such areas of Calculus I and II, Physics with Calculus I, II and III, Mechanics of Materials, Structural Analysis, Computational Methods in Civil Engineering, Construction Materials, Engineering Mechanics: Dynamics, Technical Writing, Statistics, Structural Steel Design, Construction Engineering, Fluid Mechanics, Environmental Engineering, Soil Mechanics, Hydraulics and Hydrology, Basic Electrical Engineering, Economic Concepts/Macro & Micro Economics, Reinforced Concrete Design, Project Evaluation, Thermodynamics and Heat Transfer. Engineering students obtain educational course work in these and other critical areas because the work they will perform has a crucial impact upon the public health and safety -- the sole justification for a state's licensure laws. The engineering curriculum's technical rigor lays a basic foundation for an engineering student's understanding of his role in protecting the public in designing buildings, structures, etc. I would ask how many architectural students are so deeply immersed in this degree of technical training -- training in matters that have such a critical affect on the public health and safety?

While the professions of architecture and engineering are defined individually by each state in its statutes and administrative codes, in the design of buildings, states have repeatedly recognized an overlap between the engineering and architecture in the design of all buildings. Some facts:

- Almost every state engineering licensure statute, including Florida's Statute, includes within the statutory definition of the "practice of engineering" the "design of buildings, structures."

- Notably one state recently amended its engineering licensure statute to define the "buildings" as "buildings intended for human habitation or occupancy."

- Within the past year, a state attorney general issued a written opinion concluding that the mere fact that the state's architect statute definition of the "practice of architecture" includes the "design of building intended for human habitation" in no way limits a qualified engineer's right to design buildings intended for human habitation or occupancy.

- Virtually all state architectural statutes contain exemptions for various types of buildings (e.g., residential, agricultural, utilities, government, warehouses, commercial buildings, etc.) intended for human habitation or occupancy making it abundantly clear that one does not have to be trained as an architect to design a wide array of buildings intended for human habitation or occupancy.

In view of these basic facts, for any group to continue to suggest that the design of buildings for human habitation or occupancy is solely the sole province of architects is to simply ignore reality.

Architects need to candidly ask themselves whether they are truly motivated by a desire to protect the public health and safety or whether they are attempting to preserve a way of thinking that has already been overtaken by the realities of modern design and construction practice.

Over time, these issues will be settled in the global marketplace, and by lawmakers who increasingly ask probing questions about the justification for licensure. Client demands and market efficiencies will drive this debate in the years ahead.

Sincerely,

Charles Carlan

Charles H. Carlan, P.E., P.L.S.
President

CHC/CB/kar

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Fall 1996 Newsletter

Continuing Professional Education

Louis Phillips and Associates, Inc.
Continuing Education - Training Consultants
Greenville, South Carolina

Too Much Content and Too Little Time

Instructors are often faced with having to teach too much content in too short a period of time. New instructors always fear they will run out of time before they run out of content and tend to overload content to ensure this doesn't happen. This often results in their having to talk fast to cover everything and in some cases eliminate or minimize participant discussion. Both options actually decrease the amount of learning that will take place. Or they can leave out some content and focus on essential information.

The latter strategy is what we train instructors to do in our train the trainer programs. By teaching instructors how to write and use learning outcomes (objectives) as a blueprint for planning, they develop strategies for determining what is essential versus nice-to-know content. By focusing on the essential content, we lead them through a process of selecting and sequencing instructional methods by keying on the action verb in each of their learning outcomes.
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CONTENTS

1996 Update on Mandatory Continuing Education

Our 20th annual survey of mandatory continuing education (MCE) for selected professions indicates new activity in almost all licensed professions. The chart below displays the number of states requiring MCE for selected professions in 10 year increments.

You will find our 1996 update on MCE for 24 licensed professions on page three. The data and past trends suggest that all professions in all states are likely to adopt MCE within a few years. States such as Hawaii, Connecticut, New York, Colorado, Virginia and Wisconsin lag far behind other states in MCE legislation.

Some professions continue to explore other options for relicensure and/or restrengthening the MCE process. The more advanced methods are found in the recertification programs of the medical speciality areas where CE and reexamination are often used. Medical boards normally recognize these forms of recertification for relicensure purposes. CPA's in some states are using CE and peer review. The nursing profession is experimenting with a computerized model for assessing competence. A number of professions are discussing or using self-assessment exams as
(Continued on pg. 4)

Number of States Requiring MCE for Selected Professions

	1976	1986	1996
Optometrists	45	46	51
Certified Public Accountants	23	47	50
Nursing Home Administrators	37	43	47
Pharmacists	14	36	47
Real Estate	11	29	50
Veterinarians	18	26	39
Physicians	17	21	26
Social Workers	6	20	34
Lawyers	7	20	38
Dentists	8	13	43
Psychologists	(na)	13	38
Nurses	6	11	23
Physical Therapists	(na)	4	21
Engineers (Prof.)	(na)	2	12
Architects	(na)	1	7

Does MCE Ensure Competence?

No examination, CE, or other process ensures competence! Licensing or certification exams do eliminate individuals who do not have minimal competencies from practice. Yet, MCE with all its shortcomings, continues to be implemented in all states.

MCE is felt to be the most feasible and least painful of the various relicensure options. It is widely accepted because it forces all licensees to engage in a process of continual learning, a critical element in maintaining one's competence. Competence is a continually CHANGING process. The parameters of practice continue to evolve as the professions discover and adopt new and better ways of solving problems. New discoveries and information appear so rapidly that it is impossible to integrate them into licensing and certification exams until some years later. For information to be included on an examination, it has to be widely accepted and understood within the profession. CE is highly flexible, provides opportunities for professionals to learn and discuss the latest information long before that information becomes part of an examination.

How one performs in the work place is a complex issue involving both the individual and the work environment. Any attempt to isolate the impact of MCE on an individual's performance is fraught with numerous variables and measurement problems. There are hundreds of studies that prove specific CE programs change the performance of individuals. Attempting to measure the impact of multiple CE programs on an individual's performance is very difficult. Several meta-analysis studies (a study of various studies) in continuing medical education tend to support the concept of MCE. Considerable anecdotal evidence from across the professions strongly support the benefits of MCE.

The elements and educational practices that make a CE program effective are quite clear. Many boards, however, fail to incorporate this information into their rules, preferring instead to focus on policies and procedures. For example, very few boards require a needs assessment, one of the most critical elements in program planning to ensure programs address specific licensees' deficiencies. Some require written learning outcomes, but do not specify how these outcomes should dictate content, instructional methods, or evaluation. Some boards focus their course review and approval process entirely on content and speaker credentials, two elements that are highly subjective and of questionable value by themselves. Consequently, many boards perpetuate weak CE programs that do little to challenge licensees to grow professionally. 🕮

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Do Your Programs Challenge Learners?

Do your CE programs allow audiences to be passive or active learners? By active learning, I mean being "mentally" involved and challenged. An understanding of Benjamin Bloom's Hierarchy of Cognitive Skills developed in the 1950s can help you make this determination. His hierarchy consists of six levels of thinking skills ranging from low order thinking skills to high order thinking skills.

(1) **Knowledge**. The possession of information just as it is presented. Only requires the learner to remember or memorize something. The lowest order of thinking.

(2) **Comprehension**. Translation of information in one's own words. (e.g., answering questions, engaging in discussion, or explaining terms).

(3) **Application**. The transfer of learning and applying learning to a different situation. The level at which critical thinking begins (e.g., problems, exercises and case studies).

(4) **Analysis**. The ability to take something apart and look at it, to see the relationship between different parts. Problems and case studies are good instructional methods at this level.

(5) **Synthesis**. The ability to bring together knowledge from different sources to form a new idea, to identify patterns or threads that tie different problems or cases together. Requires original and creative thinking and can be done

(Continued on pg. 4)

1996 STATUS OF MANDATORY CONTINUING EDUCATION FOR SELECTED PROFESSIONS

	Architects	CPA's	Dentists	Prof. Engineers	Insurance	Lawyers	Nurses	Ns. Home Adm.	Optometry	Pharmacy	Physical Therapy	Physicians	Psychology	Real Estate	Social Work	Vet. Medicine	Chiropractors	Dent. Hygienists	Funeral Directors	Land Surveyors	Landscape Arch.	Occup. Therapists	Opticians	SLPs/Aud.
Alabama	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	NL	X	
Alaska		X	X				X		X	X	X	X	X	X	X	X				NL	X	X		
Arizona		X	X	E		X		X	X	X		X	X	X	X	X	X	X			X	X	X	
Arkansas		X	X	E	X	X		X	X	X	X	E	X	X	X	X	X	X	X		X	X	X	
California		X	X	E	X	X	X	X	X	X		X	X	X	X		X	X			NL			
Colorado		X			X	X			X					X		X	X		NL		NL	NL	NL	
Connecticut		X			E				X	X				X				X			X			
Delaware		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NL	X
DC	E	X	X				X	X	X	X	X	E	X	X	E	X	X	X			X	NL	NL	
Florida	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
Georgia		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
Hawaii		X						X			X		X			X					NL			
Idaho		X	X		X	X		X	X	X			X	X	E	X	X	X				NL	NL	
Illinois		X	X		X			X	X	X				X	X	X	X	X				NL		
Indiana		X	X	E	X	X	X	X	X	X			X	X	E		X	X	X			NL	X	
Iowa	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NL	X	
Kansas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	NL	X	
Kentucky	E	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X		X		X	X
Louisiana		X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X			X	NL	X
Maine		X	X		X			X	X	X		X	X	X	X	X	X	X	X			X	NL	X
Maryland		X	X		X			X	X	X	X	X	X	X	X	X	X	X	X			X	NL	X
Massachusetts		X	X		X		X	X	X	X		X	X	X	X		X	X					X	X
Michigan	E	X	X	X	X		E	X	X	X		X	E	X		E	X	X				NL	NL	NL
Minnesota	X	X	X	E	X	X	X	X	X	X	X	X	X	X	X	X	X	X				E	NL	X
Mississippi		X	X		X	X	X	X	X	X	X		X	X	X	X	X	X				X	NL	X
Missouri		X	X		X	X		X	X	X		X		X	E		X	X		X			NL	
Montana	E	X	X	E	X	X		X	X	X	E		X	X	X	X	X	X	X			S	NL	X
Nebraska	E	X	X		X		X	X	X	X		E	X	X	X	X	X	X	X	X	X		NL	X
Nevada	E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X
New Hampshire		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NL	X	S	X
New Jersey		X	X		X	S		X	X	X					E		X	E	X	X			X	X
New Mexico		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NL	X
New York		X	X		X			X	S	E				X			S							
North Carolina	E	X	X	X	X	X		X	X	X			E	X	X	X	X	X	X	X	X	X	X	
North Dakota		X	X		X	X		X	X	X	X		X	X	X	X	X	X			NL		NL	X
Ohio	E	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X
Oklahoma		X	X	E	X	X		X	X	X			X	X	S	X	X	X	X	X		X	NL	
Oregon		X	X	E	X	X		X	X	X			X	X	X	X	X	X				X	NL	E
Pennsylvania		X	X		X	X		X	X	X		S	X	X	E	X	X						NL	
Rhode Island		X	X		X	X		X	X	X		X	X	X	X		X	X					X	
South Carolina		X	X	X	X	X		X	X	X			X	X	X	X	X	X	X				X	
South Dakota	X	X	X	X	X			X	X	X				X	X	X	X	X		X	X	X	NL	NL
Tennessee	E	X	X	E	X	X		X	X	X				X	X	X	X	X					X	X
Texas	E	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	S	X	
Utah	E	X	E	E	X	X	X	X	X	X			X	X	X	X	X		X				NL	X
Vermont		X		E		X		X	X	X			X	X			X	X	X		NL	X	X	NL
Virginia		X	X	E	X	X		X	X	X	S			X		X		X						
Washington		X			X	X		X	X	X	X	X	X	X	E	X	X	X	X			X	X	
West Virginia	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				NL	X
Wisconsin					X	X		X	S			X	X	X	E		X		X			X	NL	
Wyoming	E	X		X	X	X	X	X	X	X			E	X	X	X	X			X		X	NL	X

(X) required

(E) enabling legislation

(S) under special circumstances

(NL) no licensure, registration, or regulation required

Corrections and updates are invited.

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(Do Your Programs. . .cont. from pg. 2)

through projects, problems, or creative exercises.

(6) **Evaluation**. The highest level of thinking. Requires learners to make judgments according to certain standards. Case studies, projects, simulations, and appraisals are examples of different instructional methods.

High Order Thinking Skills

6. Evaluation
5. Synthesis
4. Analysis
3. Application
2. Comprehension
1. Knowledge

Low Order Thinking Skills

When I present this hierarchy to audiences of continuing educators, I ask them to identify the levels at which most of their courses are taught. They most frequently indicate level 1, 2 and occasionally level 3. I then ask at which level most of their participants operate in the work place. Their answers vary from level 3 to level 6. What's the message here? Most continuing educators realize their CE programs tend to focus on the lower levels of thinking skills, which requires less mental processing (active involvement) by learners and tends to promote passive learning. These responses agree with findings from our many needs assessments in which 35-45 percent of respondents indicate CE is either *too basic* or *somewhat basic* as compared to *about right, somewhat advanced, or too advanced.*

For more information about this taxonomy and how to plan instructional methods systematically to reach different levels of thinking skills, see ***The Continuing Education Guide: the CEU and Other Professional Development Criteria*** *(1994) by Louis Phillips. Call us for a descriptive brochure (864) 268-8822 or order the book directly from the publisher, Kendall-Hunt at (800) 228-0810. ISBN #9351. Cost is $24.95 plus $4 shipping.*

Coming in 1997

Our latest book, insights about learning and teaching from the learners' perspective . . .summarizing the latest research findings into useful strategies.

(Too Much. . . .cont. from pg. 1)

Unfortunately, too many people view learning outcomes as a pain and not a key planning tool. If you would like a complimentary copy of our 12 step process for dealing with too much content contact us by phone, fax or E-mail.

(1996 Update. . .cont. from pg. 1)

Two factors which have been instrumental in forcing more MCE legislation are liability insurance and sunset reviews. Early on, it was thought that sunset reviews might eliminate some MCE requirements, but just the opposite has actually happened.

About Our Services

This newsletter is sent to you as a free service of Louis Phillips and Associates, Inc., a continuing education and training consulting firm located in Greenville, SC. We have 30 years experience as adult educators. Our services include:

–Needs Assessments

We help your organization identify learner needs with interviews, focus groups and surveys. Clients include the American Speech-Language Hearing Assn., Meeting Professionals Intl., the American Assn. Of Equine Practitioners and the Technical Assn. of the Pulp and Paper Industry.

–Instructor Training

We train your presenters how to be more effective teachers. Clients include the National Judicial College, the Academy of General Dentistry, the Institute of Packaging Professionals and the Mayo Clinic.

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We help you carry out special projects on time related to all aspects of continuing professional development.

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Ohio State University [b]
Pennsylvania State University [bC]
Purdue University at West Lafayette [bC]
South Dakota State University [b]
Tennessee at Knoxville, University of [bC]
Texas A & M University [bC]
Washington State University [b]
Wisconsin-Madison, University of [b]

Bio-Resources Option in Civil Engineering
Montana State University-Bozeman [b]

Bio-Resource Engineering
Maine, University of [b]
Rutgers, The State University of New Jersey [b]

Biological and Agricultural Engineering
Arkansas, University of [b]
Louisiana State University [b]
North Carolina State University at Raleigh [bC]
Utah State University [b]

Biological Engineering
Mississippi State University [bC]

Biological Systems Engineering
California, Davis, University of [b]
Nebraska-Lincoln, University of [b]
Virginia Polytechnic Institute and State University [b]

BioSystems Engineering
Oklahoma State University [bC]

Food Process Engineering
Purdue University at West Lafayette [bC]

ARCHITECTURAL GROUP (ASCE LEAD SOCIETY, WITH ASHRAE)

(Programs in this group are accredited according to the program criteria for Architectural and similarly named engineering programs.)

Architectural Engineering
California Polytechnic State University, San Luis Obispo [bC]
Colorado at Boulder, University of [b]
Drexel University [bC]
Kansas State University [b]
Kansas, University of [b]
Miami, University of [b]
Milwaukee School of Engineering [b]
North Carolina Agricultural and Technical State University [bC]
Oklahoma State University [bC]
Pennsylvania State University [bC]
Tennessee State University [b]
Texas at Austin, University of [bC]
Wyoming, University of [b]

BIOENGINEERING GROUP (IEEE LEAD SOCIETY, WITH AIChE, ASAE, ASME, AND NICE)

(Programs in this group are accredited according to the program criteria for Bioengineering and similarly named engineering programs.)

Bioengineering
Arizona State University [b]
California, San Diego; University of [b]
Illinois at Chicago, University of [b]
Pennsylvania, University of [b]
Syracuse University [bC]
Texas A & M University [bC]

Biomedical Engineering
Boston University [b]
Brown University [b]
Case Western Reserve University [bC]
Catholic University of America [b]
Duke University [b]
Iowa, University of [bC]
Johns Hopkins University, The [b]
Louisiana Technological University [b]
Marquette University [bC]
Milwaukee School of Engineering [b]
Northwestern University [bC]
Rensselaer Polytechnic Institute [bC]
Tulane University [b]
Vanderbilt University [b]
Wright State University [b]

CERAMIC GROUP (NICE)

(Programs in this group are accredited according to the program criteria for Ceramic and similarly named engineering programs.)

Ceramic Engineering
Alfred University [b]
Clemson University [bC]
Georgia Institute of Technology [bC]
Illinois at Urbana-Champaign, University of [bC]
Iowa State University [bC]
Missouri-Rolla, University of [b]
Ohio State University [b]
Rutgers, The State University of New Jersey [b]
Washington, University of [b]

Ceramic Engineering Science
Alfred University [b]

Ceramic Science & Engineering
Pennsylvania State University [b]

Glass Engineering Science
Alfred University [b]

CHEMICAL GROUP (AIChE)

(Programs in this group are accredited according to the program criteria for Chemical and similarly named engineering programs.)

Chemical & Petroleum-Refining Engineering
Colorado School of Mines [b]

Chemical Engineering
Akron, The University of [bC]
Alabama in Huntsville, University of [bC]
Alabama, Tuscaloosa, The University of [bC]
Arizona State University [b]
Arizona, University of [b]
Arkansas, University of [b]
Auburn University [bC]
Brigham Young University [b]
Brown University [b]
Bucknell University [b]
California Institute of Technology [b]
California State Polytechnic University, Pomona [b]
California State University, Long Beach [b]
California, Berkeley, University of [b]
California, Davis, University of [b]
California, Los Angeles, University of [b]
California, Riverside, University of [b]
California, San Diego, University of [b]
California, Santa Barbara, University of [b]
Carnegie-Mellon University [b]
Case Western Reserve University [bC]
Christian Brothers University [b]
Cincinnati, University of [bC]
Clarkson University [b]
Clemson University [bC]
Cleveland State University [bC]
Colorado at Boulder, University of [b]
Colorado State University [b]
Columbia University [b]
Connecticut, University of [b]
Cooper Union, The [b]
Cornell University [b]
Dayton, University of [b]
Delaware, University of [b]
Detroit Mercy, University of [bC]
Drexel University [bC]
Florida A & M University/Florida State University (FAMU/FSU) [b]
Florida Institute of Technology [b]
Florida, University of [bC]
Georgia Institute of Technology [bC]
Hampton University [b]
Houston, University of [bC]
Howard University [bC]
Idaho, University of [b]
Illinois at Chicago, University of [b]
Illinois at Urbana-Champaign, University of [bC]

Architectural Engineering (ASCE Lead Society with ASHRAE)

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LAWS AND RULES
CHAPTER 471
FLORIDA STATUES
and
RULES CHAPTER 61G15,
FLORIDA ADMINISTRATIVE CODE

FEBRUARY 1997

Lawton Chiles, Governor *Richard T. Farrell, Secretary*

CHAPTER 471 ENGINEERING

CHAPTER 471

ENGINEERING

471.001 Purpose.

471.001 Purpose.--The Legislature finds that, if incompetent engineers performed engineering services, physical and economic injury to the citizens of the state would result and, therefore, deems it necessary in the interest of public health and safety to regulate the practice of engineering in this state.

History.--ss. 1, 42, ch. 79-243; ss. 2, 3, ch. 81-318; ss. 14, 15, ch. 89-30; s. 4, ch. 91-429.

471.003 Qualifications for practice, exemptions.

471.003 Qualifications for practice, exemptions.--

(1) No person other than a duly registered engineer shall practice engineering or use the name or title of "registered engineer" or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active

registration as an engineer in this state.

(2) The following persons are not required to register under the provisions of ss. 471.001-471.037 as a registered engineer:

(a) Any person practicing engineering for the improvement of, or otherwise affecting, property legally owned by him, unless such practice involves a public utility or the public health, safety, or welfare or the safety or health of employees. This paragraph shall not be construed as authorizing the practice of engineering through an agent or employee who is not duly registered under the provisions of ss. 471.001-471.037.

(b)

1. A person acting as a public officer employed by any state, county, municipal, or other governmental unit of this state when working on any project the total estimated cost of which is $10,000 or less.

2. Persons who are employees of any state, county, municipal, or other governmental unit of this state and who are the subordinates of a person in responsible charge registered under ss. 471.001-471.037, to the extent that the supervision meets standards adopted by rule of the board.

(c) Regular full-time employees of a corporation not engaged in the practice of engineering as such, whose practice of engineering for such corporation is limited to the design or fabrication of manufactured products and servicing of such products.

(d) Regular full-time employees of a public utility or other entity subject to regulation by the Florida Public Service Commission, Federal Energy Regulatory Commission, or Federal Communications Commission.

(e) Employees of a firm, corporation, or partnership who are the subordinates of a person in responsible charge, registered under ss. 471.001-471.037.

(f) Any full-time faculty member teaching the principles and methods of engineering design in any college or university located in the state, as of July 1, 1979, and any such faculty member initially employed after July 1, 1979, for a period of 4 years from the date of employment.

(g) Any person as contractor in the execution of work designed by a professional engineer or in the supervision of the construction of work as a foreman or superintendent.

(h) A registered surveyor and mapper who takes, or contracts for, professional engineering services incidental to his practice of surveying and mapping and who delegates such engineering services to a registered professional engineer qualified within his firm or

contracts for such professional engineering services to be performed by others who are registered professional engineers under the provisions of ss. 471.001-471.037.

(i) Any electrical, plumbing, air-conditioning, or mechanical contractor whose practice includes the design and fabrication of electrical, plumbing, air-conditioning, or mechanical systems, respectively, which he installs by virtue of a license issued under chapter 489, under part I of chapter 553, or under any special act or ordinance when working on any construction project which:

1. Requires an electrical or plumbing or air-conditioning and refrigeration system with a value of $50,000 or less; and

2.

a. Requires an aggregate service capacity of 600 amperes (240 volts) or less on a residential electrical system or 800 amperes (240 volts) or less on a commercial or industrial electrical system;

b. Requires a plumbing system with fewer than 250 fixture units; or

c. Requires a heating, ventilation, and air-conditioning system not to exceed a 15-ton-per-system capacity, or if the project is designed to accommodate 100 or fewer persons.

(j) Any general contractor, certified or registered pursuant to the provisions of chapter 489, when negotiating or performing services under a design-build contract as long as the engineering services offered or rendered in connection with the contract are offered and rendered by an engineer licensed or registered in accordance with this chapter.

(3) Notwithstanding the provisions of ss. 471.001-471.037 or of any other law, no registered engineer whose principal practice is civil or structural engineering, or employee or subordinate under the responsible supervision or control of the engineer, is precluded from performing architectural services which are purely incidental to his engineering practice, nor is any registered architect, or employee or subordinate under the responsible supervision or control of the architect, precluded from performing engineering services which are purely incidental to his architectural practice. However, no engineer shall practice architecture or use the designation "architect" or any term derived therefrom, and no architect shall practice engineering or use the designation "engineer" or any term derived therefrom.

History.--ss. 10, 42, ch. 79-243; ss. 3, 10, ch. 81-302; ss. 2, 3, ch. 81-318; s. 5, ch. 82-179; s. 3, ch. 83-160; ss. 46, 119, ch. 83-329; s. 1, ch. 85-134; s. 57, ch. 87-225; s. 2, ch. 87-341; s. 2, ch. 87-349; ss. 1, 14, 15, ch. 89-30; s. 1, ch. 89-115; s. 67, ch. 89-162; s. 4, ch. 91-429; ss. 80, 118, ch. 94-119.

471.005 Definitions.

471.005 Definitions.--As used in ss. 471.001-471.037, the term:

(1) "Board" means the Board of Professional Engineers.

(2) "Certificate of authorization" means a license to practice engineering issued by the department to a corporation or partnership.

(3) "Department" means the Department of Business and Professional Regulation.

(4) "Engineer" includes the terms "professional engineer" and "registered engineer" and means a person who is registered to engage in the practice of engineering under ss. 471.001-471.037.

(5) "Engineer intern" means a person who has graduated from, or is in the final year of, an engineering curriculum approved by the board and has passed the fundamentals of engineering examination as provided by rules adopted by the board.

(6) "Engineering" includes the term "professional engineering" and means any service or creative work, the adequate performance of which requires engineering education, training, and experience in the application of special knowledge of the mathematical, physical, and engineering sciences to such services or creative work as consultation, investigation, evaluation, planning, and design of engineering works and systems, planning the use of land and water, teaching of the principles and methods of engineering design, engineering surveys, and the inspection of construction for the purpose of determining in general if the work is proceeding in compliance with drawings and specifications, any of which embraces such services or work, either public or private, in connection with any utilities, structures, buildings, machines, equipment, processes, work systems, projects, and industrial or consumer products or equipment of a mechanical, electrical, hydraulic, pneumatic, or thermal nature, insofar as they involve safeguarding life, health, or property; and includes such other professional services as may be necessary to the planning, progress, and completion of any engineering services. A person who practices any branch of engineering; who, by verbal claim, sign, advertisement, letterhead, or card, or in any other way, represents himself to be an engineer or, through the use of some other title, implies that he is an engineer or that he is registered under ss. 471.001-471.037; or who holds himself out as able to perform, or does perform, any engineering service or work or any other service designated by the practitioner which is recognized as engineering shall be construed to practice or offer to practice engineering within the meaning and intent of ss. 471.001-471.037.

(7) "License" means the registration of engineers or

certification of businesses to practice engineering in this state.

History.--ss. 2, 42, ch. 79-243; ss. 4, 10, ch. 81-302; ss. 2, 3, ch. 81-318; s. 4, ch. 83-160; s. 4, ch. 84-365; ss. 2, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 151, ch. 94-218.

471.007 Board of Professional Engineers.

471.007 Board of Professional Engineers.--There is created in the department the Board of Professional Engineers. The board shall consist of nine members, seven of whom shall be registered engineers and two of whom shall be laypersons who are not and have never been engineers or members of any closely related profession or occupation. Of the members who are registered engineers, three shall be civil engineers, one shall be either an electrical or electronic engineer, one shall be a mechanical engineer, one shall be an engineering educator, and one shall be from any discipline of engineering other than civil engineering. Members shall be appointed by the Governor for terms of 4 years each.

History.--ss. 3, 42, ch. 79-243; ss. 5, 9, 10, ch. 81-302; ss. 2, 3, ch. 81-318; ss. 3, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 152, ch. 94-218.

471.008 Rules of the board.

471.008 Rules of the board.--The board may adopt such rules not inconsistent with law as may be necessary to carry out the duties and authority conferred upon the board by this chapter or chapter 455.

History.--s. 1, ch. 87-341; s. 1, ch. 87-349; s. 1, ch. 88-303; ss. 4, 14, 15, ch. 89-30; s. 4, ch. 91-429.

471.009 Board headquarters.

471.009 Board headquarters.--The location of the Board of Professional Engineers shall be in Leon County.

History.--ss. 3, 42, ch. 79-243; ss. 6, 10, ch. 81-302; ss. 2, 3, ch. 81-318; ss. 5, 14, 15, ch. 89-30; s. 4, ch. 91-429.

471.011 Fees.

471.011 Fees.--

(1) The board by rule may establish fees to be paid for applications, examination, reexamination, licensing and renewal, inactive status application and reactivation of inactive licenses, and recordmaking and recordkeeping. The board may also establish by rule a delinquency fee. The board shall establish fees that are adequate to ensure the continued operation of the board. Fees shall be based on department estimates of the revenue required to implement ss.

471.001-471.037 and the provisions of law with respect to the regulation of engineers.

(2) The initial application and examination fee shall not exceed $125 plus the actual per applicant cost to the department to purchase the examination from the National Council of Engineering Examiners or a similar national organization. The examination fee shall be in an amount which covers the cost of obtaining and administering the examination and shall be refunded if the applicant is found ineligible to sit for the examination. The application fee shall be nonrefundable.

(3) The initial license fee shall not exceed $200.

(4) The fee for a certificate of authorization shall not exceed $125.

(5) The biennial renewal fee shall not exceed $150.

(6) The fee for a temporary registration or certificate to practice engineering shall not exceed $25 for an individual or $50 for a business firm.

(7) The fee for licensure by endorsement shall not exceed $150.

(8) The fee for application for inactive status or for reactivation of an inactive license shall not exceed $150.

History.--ss. 4, 42, ch. 79-243; ss. 2, 3, ch. 81-318; s. 20, ch. 88-205; ss. 6, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 212, ch. 94-119.

471.013 Examinations; prerequisites.

471.013 Examinations; prerequisites.--

(1)

(a) A person shall be entitled to take an examination for the purpose of determining whether he is qualified to practice in this state as an engineer if the person is of good moral character and:

1. Is a graduate from an approved engineering curriculum of 4 years or more in a school, college, or university which has been approved by the board and has a record of 4 years of active engineering experience of a character indicating competence to be in responsible charge of engineering;

2. Is a graduate of an approved engineering technology curriculum of 4 years or more in a school, college, or university within the State University System, having been enrolled or having graduated prior to July 1, 1979, and has a record of 4 years of active engineering experience of a character indicating competence to be in responsible charge of engineering; or

3. Has, in lieu of such education and experience requirements, 10

years or more of active engineering work of a character indicating that the applicant is competent to be placed in responsible charge of engineering. However, this subparagraph does not apply unless such person notifies the department before July 1, 1984, that he was engaged in such work on July 1, 1981.

The board shall adopt rules providing for the review and approval of schools or colleges and the courses of study in engineering in such schools and colleges. The rules shall be based on the educational requirements for engineering as defined in s. 471.005. The board may adopt rules providing for the acceptance of the approval and accreditation of schools and courses of study by a nationally accepted accreditation organization.

(b) A person shall be entitled to take an examination for the purpose of determining whether he is qualified to practice in this state as an engineer intern if he is in the final year of, or is a graduate of, an approved engineering curriculum in a school, college, or university approved by the board.

(c) A person shall not be entitled to take the principles and practice part of the examination until that person has successfully completed the fundamentals examination.

(d) On or after October 1, 1992, every applicant who is qualified to take any part of the examination shall be allowed to take any one part five times, notwithstanding the number of times that part has been previously failed. If an applicant fails any part of the examination taken after October 1, 1992, five times, the board shall require the applicant to complete additional college-level education courses in the areas of deficiency, as determined by the board, as a condition of future eligibility to take the examination.

(2)

(a) The board may refuse to certify an applicant for failure to satisfy the requirement of good moral character only if:

1. There is a substantial connection between the lack of good moral character of the applicant and the professional responsibilities of a registered engineer; and

2. The finding by the board of lack of good moral character is supported by clear and convincing evidence.

(b) When an applicant is found to be unqualified for a license because of a lack of good moral character, the board shall furnish the applicant a statement containing the findings of the board, a complete record of the evidence upon which the determination was based, and a notice of the rights of the applicant to a rehearing and appeal.

History.--ss. 5, 42, ch. 79-243; s. 340, ch. 81-259; ss. 7, 10, ch. 81-302; ss. 2, 3, ch. 81-318; ss. 14, 15, ch. 89-30; s. 4, ch.

91-429; s. 141, ch. 92-149.

471.015 Licensure.

471.015 Licensure.--

(1) The department shall license any applicant who the board certifies is qualified to practice engineering and who has passed the licensing examination.

(2) The board shall certify for licensure any applicant who satisfies the requirements of s. 471.013. The board may refuse to certify any applicant who has violated any of the provisions of s. 471.031.

(3) The board shall certify as qualified for a license by endorsement an applicant who:

(a) Qualifies to take the examination as set forth in s. 471.013, has passed a United States national, regional, state, or territorial or foreign national licensing examination that is substantially equivalent to the examination required by s. 471.013, and has satisfied the experience requirements set forth in s. 471.013; or

(b) Holds a valid license to practice engineering issued by another state or territory of the United States, if the criteria for issuance of the license were substantially the same as the licensure criteria that existed in this state at the time the license was issued.

(4) The department shall not issue a license by endorsement to any applicant who is under investigation in another state for any act that would constitute a violation of ss. 471.001-471.037 or of chapter 455 until such time as the investigation is complete and disciplinary proceedings have been terminated.

(5)

(a) The board shall deem that an applicant who seeks licensure by endorsement has passed an examination substantially equivalent to part I of the engineering examination when such applicant:

1. Has held a valid professional engineer's registration in another state for 15 years and has had 20 years of continuous professional-level engineering experience;

2. Has received a doctorate degree in engineering from a nationally accredited engineering degree program which is accredited by the Accreditation Board for Engineering Technology; or

3. Has received a doctorate degree in engineering and has taught engineering full time for at least 3 years, at the baccalaureate level or higher, after receiving that degree.

(b) The board shall deem that an applicant who seeks licensure by endorsement has passed an examination substantially equivalent to part

I and part II of the engineering examination when such applicant has held a valid professional engineer's registration in another state for 25 years and has had 30 years of continuous professional-level engineering experience.

(6) The board may require a personal appearance by any applicant for licensure under this chapter. Any applicant of whom a personal appearance is required must be given adequate notice of the time and place of the appearance and provided with a statement of the purpose of and reasons requiring the appearance.

History.--ss. 6, 42, ch. 79-243; ss. 2, 3, ch. 81-318; s. 2, ch. 85-134; ss. 14, 15, ch. 89-30; s. 4, ch. 91-429; ss. 82, 216, ch. 94-119; s. 32, ch. 95-392.

471.017 Renewal of license.

471.017 Renewal of license.--

(1) The department shall renew a license upon receipt of the renewal application and fee.

(2) The department shall adopt rules establishing a procedure for the biennial renewal of licenses.

History.--ss. 7, 42, ch. 79-243; ss. 2, 3, ch. 81-318; ss. 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 213, ch. 94-119.

471.019 Reactivation; continuing education.

471.019 Reactivation; continuing education.--The board shall prescribe by rule continuing education requirements for reactivating a license. The continuing education requirements for reactivating a license for a registered engineer may not exceed 12 classroom hours for each year the license was inactive.

History.--ss. 8, 42, ch. 79-243; s. 341, ch. 81-259; ss. 2, 3, ch. 81-318; s. 104, ch. 83-329; ss. 7, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 214, ch. 94-119.

471.021 Engineers and firms of other states; temporary certificates to practice in Florida.

471.021 Engineers and firms of other states; temporary certificates to practice in Florida.--

(1) Upon approval of the board and payment of the fee set in s. 471.011, the department shall grant a temporary registration for work on one specified project in this state for a period not to exceed 1 year to an engineer holding a certificate to practice in another state, provided Florida registrants are similarly permitted to engage in work in such state and provided that the engineer be qualified for

licensure by endorsement.

(2) Upon approval by the board and payment of the fee set in s. 471.011, the department shall grant a temporary certificate of authorization for work on one specified project in this state for a period not to exceed 1 year to an out-of-state corporation, partnership, or firm, provided one of the principal officers of the corporation, one of the partners of the partnership, or one of the principals in the fictitiously named firm has obtained a temporary certificate of registration in accordance with subsection (1).

(3) The application for a temporary license shall constitute appointment of the Department of State as an agent of the applicant for service of process in any action or proceeding against the applicant arising out of any transaction or operation connected with or incidental to the practice of engineering for which the temporary license was issued.

History.--ss. 9, 42, ch. 79-243; ss. 2, 3, ch. 81-318; ss. 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 142, ch. 92-149.

471.023 Certification of partnerships and corporations.

471.023 Certification of partnerships and corporations.--

(1) The practice of, or the offer to practice, engineering by registrants through a corporation or partnership offering engineering services to the public or by a corporation or partnership offering said services to the public through registrants under ss. 471.001-471.037 as agents, employees, officers, or partners is permitted only if the firm possesses a certification issued by the department pursuant to qualification by the board, subject to the provisions of ss. 471.001-471.037. One or more of the principal officers of the corporation or one or more partners of the partnership and all personnel of the corporation or partnership who act in its behalf as engineers in this state shall be registered as provided by ss. 471.001-471.037. All final drawings, specifications, plans, reports, or documents involving practices registered under ss. 471.001-471.037 which are prepared or approved for the use of the corporation or partnership or for public record within the state shall be dated and shall bear the signature and seal of the registrant who prepared or approved them. Nothing in this section shall be construed to mean that a certificate of registration to practice engineering shall be held by a corporation. Nothing herein prohibits corporations and partnerships from joining together to offer engineering services to the public, provided each corporation or partnership otherwise meets the requirements of this section. No corporation or partnership

shall be relieved of responsibility for the conduct or acts of its agents, employees, or officers by reason of its compliance with this section, nor shall any individual practicing engineering be relieved of responsibility for professional services performed by reason of his employment or relationship with a corporation or partnership.

(2) For the purposes of this section, a certificate of authorization shall be required for a corporation, partnership, association, or person practicing under a fictitious name, offering engineering services to the public. However, when an individual is practicing engineering in his own given name, he shall not be required to register under this section.

(3) The fact that a registered engineer practices through a corporation or partnership shall not relieve the registrant from personal liability for negligence, misconduct, or wrongful acts committed by him. Partnerships and all partners shall be jointly and severally liable for the negligence, misconduct, or wrongful acts committed by their agents, employees, or partners while acting in a professional capacity. Any officer, agent, or employee of a corporation shall be personally liable and accountable only for negligent acts, wrongful acts, or misconduct committed by him or committed by any person under his direct supervision and control, while rendering professional services on behalf of the corporation. The personal liability of a shareholder of a corporation, in his capacity as shareholder, shall be no greater than that of a shareholder-employee of a corporation incorporated under chapter 607. The corporation shall be liable up to the full value of its property for any negligent acts, wrongful acts, or misconduct committed by any of its officers, agents, or employees while they are engaged on behalf of the corporation in the rendering of professional services.

(4) Each certification of authorization shall be renewed every 2 years. Each partnership and corporation certified under this section shall notify the board within 1 month of any change in the information contained in the application upon which the certification is based.

(5) Disciplinary action against a corporation or partnership shall be administered in the same manner and on the same grounds as disciplinary action against a registered engineer.

History.--ss. 11, 42, ch. 79-243; s. 1, ch. 80-223; ss. 2, 3, ch. 81-318; ss. 8, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 143, ch. 92-149.

471.025 Seals.

471.025 Seals.--

(1) The board shall prescribe, by rule, a form of seal to be used

by registrants holding valid certificates of registration. Each registrant shall obtain an impression-type metal seal in the form aforesaid. All final drawings, specifications, plans, reports, or documents prepared or issued by the registrant and being filed for public record shall be signed by the registrant, dated, and stamped with said seal. Such signature, date, and seal shall be evidence of the authenticity of that to which they are affixed. It is unlawful for any person to stamp or seal any document with a seal after his certificate of registration has expired or been revoked or suspended, unless reinstated or reissued.

(2) When the certificate of registration of a registrant has been revoked or suspended by the board, it shall be mandatory that the registrant surrender his seal to the secretary of the board within a period of 30 days after the revocation or suspension has become effective. In the event the registrant's certificate has been suspended for a period of time, his seal shall be returned to him upon expiration of the suspension period.

(3) No registrant shall affix or permit to be affixed his seal or name to any plan, specification, drawing, or other document which depicts work which he is not licensed to perform or which is beyond his profession or specialty therein.

History.--ss. 12, 42, ch. 79-243; ss. 2, 3, ch. 81-318; ss. 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 144, ch. 92-149.

471.027 Engineers authorized to enter lands of third parties under certain conditions.

471.027 Engineers authorized to enter lands of third parties under certain conditions.--Engineers are hereby granted permission and authority to go on, over, and upon the lands of others when necessary to make engineering surveys and, in so doing, to carry with them their agents and employees necessary for that purpose. Entry under the right hereby granted shall not constitute trespass, and engineers and their duly authorized agents or employees so entering shall not be liable to arrest or a civil action by reason of such entry; however, nothing in this section shall be construed as giving authority to said registrants, agents, or employees to destroy, injure, damage, or move anything on lands of another without the written permission of the landowner.

History.--ss. 17, 42, ch. 79-243; ss. 2, 3, ch. 81-318; ss. 14, 15, ch. 89-30; s. 4, ch. 91-429.

471.031 Prohibitions; penalties.

471.031 Prohibitions; penalties.--

(1) A person may not knowingly:

(a) Practice engineering unless the person is registered under ss. 471.001-471.037;

(b) Use the name or title "registered engineer" or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active registration as an engineer when the person is not registered under ss. 471.001-471.037;

(c) Present as his own the registration of another;

(d) Give false or forged evidence to the board or a member thereof;

(e) Use or attempt to use a registration that has been suspended, revoked, or placed on inactive or delinquent status;

(f) Employ unlicensed persons to practice engineering; or

(g) Conceal information relative to violations of ss. 471.001-471.037.

(2) Any person who violates any provision of this section is guilty of a misdemeanor of the first degree, punishable as provided in s. 775.082 or s. 775.083.

History.--ss. 14, 42, ch. 79-243; ss. 2, 3, ch. 81-318; s. 47, ch. 83-329; ss. 9, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 215, ch. 94-119.

471.033 Disciplinary proceedings.

471.033 Disciplinary proceedings.--

(1) The following acts constitute grounds for which the disciplinary actions in subsection (3) may be taken:

(a) Violating any provision of s. 455.227(1), s. 471.025, or s. 471.031, or any other provision of this chapter or rule of the board or department.

(b) Attempting to procure a license to practice engineering by bribery or fraudulent misrepresentations.

(c) Having a license to practice engineering revoked, suspended, or otherwise acted against, including the denial of licensure, by the licensing authority of another state, territory, or country, for any act that would constitute a violation of this chapter or chapter 455.

(d) Being convicted or found guilty of, or entering a plea of nolo contendere to, regardless of adjudication, a crime in any jurisdiction which directly relates to the practice of engineering or the ability to practice engineering.

(e) Making or filing a report or record that the licensee knows to be false, willfully failing to file a report or record required by state or federal law, willfully impeding or obstructing such filing, or inducing another person to impede or obstruct such filing. Such

reports or records include only those that are signed in the capacity of a registered engineer.

(f) Advertising goods or services in a manner that is fraudulent, false, deceptive, or misleading in form or content.

(g) Engaging in fraud or deceit, negligence, incompetence, or misconduct, in the practice of engineering.

(h) Violating chapter 455.

(i) Practicing on a revoked, suspended, inactive, or delinquent license.

(j) Affixing or permitting to be affixed his seal or his name to any final drawings, specifications, plans, reports, or documents that were not prepared by him or under his responsible supervision, direction, or control.

(k) Violating any order of the board or department previously entered in a disciplinary hearing.

(2) The board shall specify, by rule, what acts or omissions constitute a violation of subsection (1).

(3) When the board finds any person guilty of any of the grounds set forth in subsection (1), it may enter an order imposing one or more of the following penalties:

(a) Denial of an application for licensure.

(b) Revocation or suspension of a license.

(c) Imposition of an administrative fine not to exceed $1,000 for each count or separate offense.

(d) Issuance of a reprimand.

(e) Placement of the licensee on probation for a period of time and subject to such conditions as the board may specify.

(f) Restriction of the authorized scope of practice by the licensee.

(4) The department shall reissue the license of a disciplined engineer or business upon certification by the board that the disciplined person has complied with all of the terms and conditions set forth in the final order.

History.--ss. 15, 42, ch. 79-243; ss. 8, 10, ch. 81-302; ss. 2, 3, ch. 81-318; s. 3, ch. 85-134; ss. 10, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 145, ch. 92-149; s. 217, ch. 94-119.

471.037 Effect of ss. 471.001-471.037 locally.

471.037 Effect of ss. 471.001-471.037 locally.--

(1) Nothing contained in ss. 471.001-471.037 shall be construed to repeal, amend, limit, or otherwise affect any local building code or zoning law or ordinance, now or hereafter enacted, which is more

restrictive with respect to the services of registered engineers than the provisions of ss. 471.001-471.037.

(2) In counties or municipalities that issue building permits, such permits may not be issued in any case in which it is apparent from the application for the building permit that the provisions of ss. 471.001-471.037 have been violated. However, this subsection does not authorize the withholding of building permits in cases involving the exceptions and exemptions set out in s. 471.003.

History.--ss. 13, 42, ch. 79-243; ss. 2, 3, ch. 81-318; ss. 12, 14, 15, ch. 89-30; s. 4, ch. 91-429; s. 81, ch. 94-119.

Department of Business and Professional Regulation

Division of Professions
Board of Professional Engineers

RULES CHAPTER 61G15,
FLORIDA ADMINISTRATIVE CODE

FEBRUARY 1997

Lawton Chiles, Governor *Richard T. Farrell, Secretary*

CHAPTER 61G15-18
ORGANIZATION AND PURPOSE

61G15-18.001 Purpose. The Florida Board of Professional Engineers has been established by the Legislature pursuant to 471.007, Florida Statutes, in order to protect health and safety of the people of the State of Florida through the regulation of the practice of engineering.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.001 FS. History—New 1-8-80. Formerly 21H-18.01, 21H-18.001. Amended 11-15-94.

61G15-18.002 Board of Organization and Officers.

(1) The Florida Board of Engineers, hereinafter referred to as the Board shall consist of nine (9) members, seven of whom shall be professional engineers and two of whom shall be lay persons who are not, and have not been a professional engineer or member of any closely related profession or occupation. Board members shall possess the requisite qualifications set forth in 471.007(1), Florida Statutes. Election of officers shall be held annually at the first regular meeting of each calendar year, at which time a Chairman and Vice-Chairman shall be nominated and elected by an affirmative vote of not less than five members of the Board. Newly elected officers shall assume office immediately after adjournment of the meeting at which they are elected.

(2) The Chairman shall be the Executive head of the Board, preside at meetings, appoint all committees, and direct all activities requiring authorization and direction by an officer of the Board while the Board is in recess.

(3) The Vice-Chairman shall perform all of the duties of the chairman in the event the chairman is incapacitated or otherwise not available.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 455.207, 471.007(1) FS. History—New 1-8-80. Formerly 21H-18.02, 21H-18.002.

61G15-18.003 Administrative Headquarters. The Board's administrative headquarters shall be maintained in Leon County, Florida, and shall house all records pertinent to the orderly administration of the Board's activities.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.007 FS. History—New 1-8-80, Formerly 21H-18.03, 21H-18.003.

61G15-18.004 Committees. The chairman of the Board shall appoint such committees as required to provide for the orderly conduct of the Board's business. These committees shall include, but not be limited to, the following:

(1) Legislative and Rules Committee. This committee serves as a liaison between the Board and the Department for purposes of providing suggestions and comments relative to the Department's legislative package. This committee further examines and makes suggestions regarding existing or proposed administrative rules.

(2) Responsibility Committee. This committee is charged with the continuing duty of reviewing and proposing amendments to the rules of responsibilities for professional engineers.

(3) Application Review Committee. This committee assists the Board and the Board staff in the review of any applications pursuant to Chapter 471, Florida Statutes, and reports to the full Board.

(4) Board Operations Committee. This committee reviews and makes suggestions to the Department relating to the staff and operations of the Board office.

(5) Joint Engineer/Land Surveyor Committee. This committee serves as a liaison between these two boards and examines and discusses issues of common interest.

(6) Joint Engineer/Landscape Architect Committee. This committee serves as a liaison between these two boards and examines and discusses issues of common interest.

(7) Joint Engineer/Geologist Committee. This committee serves as a liaison between these two boards and examines and discusses issues of common interest.

(8) Joint Engineer/Architecture Committee. This committee serves as a liaison between the Board of Professional Engineers and the Board of Architecture and Interior Design and examines and discusses issues of common interest.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1) FS. History—New 1-8-80, Formerly 21H-18.04, Amended 1-6-92, Formerly 21H-18.004, Amended 11-15-94.

61G15-18.005 Probable Cause Determination. Probable cause determination as to a violation of Chapter 471, or Chapter 455, F.S., and rules promulgated pursuant thereto shall be made by a probable cause panel of three (3) board members or two board members and one past board member. Said members shall be appointed as a standing probable cause committee at the first board meeting of each calendar year and shall serve for a period of one (1) year. All proceedings of the probable cause panel shall be conducted in accordance with Chapters 120 and 455, Florida Statutes.

Specific Authority 455.225 FS. Law Implemented 455.225 FS. History—New 1-8-80, Amended 4-5-81, Formerly 21H-18.05, 21H-18.005, Amended 11-15-94.

61G15-18.006 Official Seal of the Board. The official seal of the Board shall consist of the seal of the State of Florida surrounded by the words, "Florida Board of Engineers".

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.005 FS. History—New 1-8-80, Formerly 21H-18.06, 21H-18.006.

61G15-18.007 Board Meetings.

(1) Board meetings shall be held as are required to transact the Board's business throughout the year. Special meetings may be called by the Chairman or by no less than four members requesting such special meetings. All meetings shall be conducted in accordance with acceptable parliamentary procedure.

(2) The order of business for regular meetings shall normally be established by the chair.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1) FS. History—New 1-8-80, Formerly 21H-18.07, 21H-18.007, Amended 11-15-94.

61G15-18.008 Adoption of Model Rules of Procedure. Except as hereinafter provided all administrative proceedings of the Board shall be conducted in accordance with Chapter 120, Florida Statutes, and Chapter 28, Florida Administrative Code (Model Rules of Administrative Procedure).

Specific Authority 120.53(1) FS. Law Implemented 120.53(1) FS. History—New 1-8-80, Formerly 21H-18.08, 21H-18.008.

61G15-18.009 Official Records. The Board shall keep a book or books to contain in proper order the minutes of all the meetings of the Board. All of the records are maintained by the Department of Business and Professional Regulation and are to be found at its headquarters in Leon County, Florida.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.007, 455.229 FS. History—New 1-8-80, Formerly 21H-18.09, 21H-18.009.

61G15-18.010 Approved Schools and Colleges. A list of the approved degree programs of schools and colleges acceptable to the Board, both as education and as experience, for admittance to the examination shall be maintained by the Board as an official record of the Board with such additions or deletions as the Board may determine by official act from time to time.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.013 FS. History—New 1-8-80, Formerly 21H-18.10, 21H-18.010.

61G15-18.011 Definitions. As used in Chapter 471 and in these rules where the context will permit the following terms have the following meanings:

(1) "Responsible Charge" shall mean that degree of control an engineer is required to maintain over engineering decisions made personally or by others over which the engineer exercises supervisory direction and control authority.

(a) The degree of control necessary for an engineer to be in responsible charge shall be such that the engineer:

1. Personally makes engineering decisions or reviews and approves proposed decisions prior to their implementation, including the consideration of alternatives, whenever engineering decisions which could affect the health, safety and welfare of the public are made. In making said engineering decisions, the engineer shall be physically present or, through the use of communication devices, be available in a reasonable period of time.

2. Judges the validity and applicability of recommendations prior to their incorporation into the work, including the qualifications of those making the recommendations.

(b) Engineering decisions which must be made by and are the responsibility of the engineer in responsible charge are those decisions concerning permanent or temporary work which could create a danger to the health, safety, and welfare of the public, such as, but not limited to, the following:

1. The selection of engineering alternatives to be investigated and the comparison of alternatives for engineering works.

2. The selection or development of design standards or methods, and materials to be used.

3. The selection or development of techniques or methods of testing to be used in evaluating materials or completed works, either new or existing.

4. The development and control of operating and maintenance procedures.

(c) As a test to evaluate whether an engineer is in responsible charge, the following must be considered: An engineer who signs and seals engineering documents in responsible charge must be capable of answering questions relevant to the engineering decisions made during the engineer's work on the project, in sufficient detail as to leave little doubt as to the engineer's proficiency for the work performed. It is not necessary to defend decisions as in an adversary situation, but only to demonstrate that the engineer in responsible charge made them and possessed sufficient knowledge of the project to make them. Examples of questions to be answered by the engineer could relate to criteria for design, methods of analysis, selection of materials and systems, economics of alternate solutions, and environmental considerations. The individuals should be able to clearly define the span and degree of control and how it was exercised and to demonstrate that the engineer was answerable within said span and degree of control necessary for the engineering work done.

(d) The term "responsible charge" relates to engineering decisions within the purview of the Professional Engineers Act and does not refer to management control in a hierarchy of professional engineers except as each of the individuals in the hierarchy exercises independent engineering judgement and thus responsible charge. It does not refer to administrative and personnel management functions. While an engineer may also have such duties in this position, it should not enhance or

decrease one's status of being in responsible charge of the work. The phrase does not refer to the concept of financial liability.

(2) "Engineering Design" shall mean that the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. Central to the process are the essential and complementary roles of synthesis and analysis. This definition is intended to be interpreted in its broadest sense. In particular the words "system, component, or process" and "convert resources optimally" operate to indicate that sociological, economic, aesthetic, legal, ethical, etc., considerations can be included.

(3) The term "evaluation of engineering works and systems" as used in the definition in the practice of engineering set forth in Chapter 471.005(4)(a), F.S., includes but is not limited to services provided by testing laboratories involving the following:

(a) The planning and implementation of any investigation or testing program for the purpose of developing design criteria either by an engineering testing laboratory or other professional engineers.

(b) The planning or implementation of any investigation, inspection or testing program for the purpose of determining the causes of failures.

(c) The preparation of any report documenting soils or other construction materials test data.

(d) The preparation of any report offering any engineering evaluation, advice or test results, whenever such reports go beyond the tabulation of test data. Reports which document soils or other construction materials test data will be considered as engineering reports.

(e) Services performed by any entity or provided by a testing laboratory for any entity subject to regulation by a state or federal regulatory agency which enforces standards as to testing shall be exempt from this rule except where the services otherwise would require the participation of a professional engineer.

(4) "Certification" shall mean a statement signed and/or sealed by a professional engineer representing that the engineering services addressed therein, as defined in Section 471.005(6), Florida Statutes, have been performed by the professional engineer, and based upon the professional engineer's knowledge, information and belief, and in accordance with commonly accepted procedures consistent with applicable standards of practice, and is not a guaranty or warranty, either expressed or implied.

Specific Authority 471.008, 471.003(2)(f), 471.013(1)(a)1., 2. FS. Law Implemented 471.005(6), 471.025(3), 471.033(1)(g), 471.003(2)(f), 471.013(1)(a)1., 2. FS. History–New 6-23-80, Amended 12-19-82, 11-22-83, Formerly 21H-18.11, Amended 1-16-91, 4-4-93, Formerly 21H-18.011

61G15-18.012 Other Board Business for Which Compensation Is Allowed. The following are considered to be other business involving the Board as required by 455.207(4), F.S.:

(1) All joint Board or Committee meetings required by statutes, Board rule or Board action.

(2) Meetings of Board members with Department staff or contractors of the Department at the Department's or the Board's request. Any participation or meeting of members noticed or unnoticed will be on file in the Board office.

(3) Where a Board member has been requested by the Secretary of the Department to participate in a meeting.

(4) Probable Cause Panel Meeting.

(5) Any telephone conference calls.

(6) All activity of Board members, if authorized by the Board, when grading, proctoring or reviewing examinations given by the Department.

(7) All participation in Board authorized meetings with professional associates of which the Board is a member or invitee. This would include all meetings of national associations of registration Boards of which the Board is a member as well as Board authorized participation in meetings of national or professional associations or organizations involved in educating, regulating or reviewing the profession over which the Board has statutory authority.

(8) Any and all other activities which are Board approved and which are necessary for Board members to attend in order to further protect the public health, safety and welfare, through the regulation of which the Board has statutory authority.

Specific Authority 120.53(1) FS., Ch. 81-302, § 28, Laws of Florida. Law Implemented 120.53(1) FS., Ch. 81-302, § 28, Laws of Florida. History—New 11-2-81, Formerly 21H-18.12, 21H-18.012.

61G15-18.013 Criteria for Investigators and Consultants.

(1) Except for investigation of non-technical matters all investigators and consultants hired by the Department of Business and Professional Regulation who undertake the Investigation of Florida Professional Engineers shall be Professional Engineers with at least ten (10) years of current continuous practice in any state or territory or shall have the capability of discussing with and enlisting the cooperation of engineers, architects, attorneys, contractors, and state law enforcement officials dealing in engineering matters and, a degree from an accredited four-year college or university; and five years of professional regulation experience or three years of sworn law enforcement or investigative experience. (Accredited college courses in law, engineering, or related sciences may be substituted for the required college training.)

(2) Non-technical matters which do not encompass the professional proficiency of a licensee in the practice of Engineering may be investigated by any individual deemed suitable by the Department of Business and Professional Regulation.

Specific Authority 455.203(8) FS. Law Implemented 455.203(8) FS. History—New 1-25-82, Amended 5-18-82, Formerly 21H-18.13, 21H-18.013.

61G15-18.014 Joint Architecture and Engineering Committee Rule. The Board of Professional Engineers shall appoint three professional engineers to serve on a joint committee with the Board of Architecture as provided by Rule 61G15-18.004. The purpose of the Joint Architecture and Engineering Committee shall be to provide professional advice to interested parties throughout the state regarding the overlapping of Chapter 481, Part I and Chapter 471, Florida Statutes, as they relate to architecture and engineering relations. A Joint Architecture and Engineering Sub-Committee shall, when requested, supply expert advice to the Department of Business and Professional Regulation with regard to instances of alleged cross-professional complaints or allegations of either architects or professional engineers practicing architecture or engineering which is not incidental to their profession as that term is used in Section 471.003 or 481.229, Florida Statutes.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 481.229, 471.003 FS. History—New 8-29-83, Formerly 21H-18.14, 21H-18.014.

61G15-18.015 Education Advisory Committee. The Board shall appoint an Educational Advisory Committee which shall be composed of not less than one (1) member of the Board. The committee shall be advised by expert consultants retained by the Department of Business and Professional Regulation. Said consultants shall be individuals who have knowledge and experience of curricula of engineering schools and colleges and of national accreditation standards for professional degrees in engineering programs which shall have been gained either as a college faculty member or as a professional engineer. The Educational Advisory Committee shall examine and review applications for examination or licensure by endorsement made to the Board under the provisions of 61G15-20.006, to insure that the engineering curricula and applicants' degree programs meet required standards of accreditation. The Educational Advisory Committee shall make recommendations to the Board as to whether an applicant shall be approved for admittance to the examination or for licensure by endorsement.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.013 FS. History—New 8-18-87, Amended 2-18-88, Formerly 21H-18.015.

CHAPTER 61G15-19
GROUNDS FOR DISCIPLINARY PROCEEDINGS

61G15-19.001 Grounds for Disciplinary Proceedings.

(1) Pursuant to 471.033(2), Florida Statutes, the Board, to the extent not otherwise set forth in Florida Statutes, hereby specifies that the following acts or omissions are grounds for disciplinary proceedings pursuant to 471.033(1)(f), Florida Statutes.

(2) A professional engineer shall not advertise in a false, fraudulent, deceptive or misleading manner. As used in 471.033(1)(f), Florida Statutes, the term "advertising goods or services in a manner which is fraudulent, false, deceptive, or misleading in form or content" shall include without limitation a false, fraudulent, misleading, or deceptive statement or claim which:

(a) contains a material misrepresentation of facts;

(b) omits to state any material fact necessary to make the statement in the light of all circumstances not misleading;

(c) is intended or is likely to create an unjustified expectation;

(d) states or implies that an engineer is a certified specialist in any area outside of his field of expertise;

(e) contains a representation or implication that is likely to cause an ordinary prudent person to misunderstand or be deceived or fails to contain reasonable warnings or disclaimers necessary to make a representation or implication not deceptive;

(f) falsifies or misrepresents the extent of his education, training or experience to any person or to the public at large, tending to establish or imply qualification for selection for engineering employment, advancement, or professional engagement. A professional engineer shall not misrepresent or exaggerate his degree of responsibility in or for the subject matter of prior assignments;

(g) in any brochure or other presentation made to any person or to the public at large, incident to the solicitation of an engineering employment, misrepresents pertinent facts concerning a professional engineer's employer, employees, associates, joint ventures, or his or their past accomplishments with the intent and purpose of enhancing his qualifications and his works.

(3) A professional engineer, corporation or partnership shall not practice engineering under an assumed, fictitious or corporate name that is misleading as to the identity, responsibility or status of those practicing thereunder or is otherwise false, fraudulent, misleading or deceptive within the meaning of 61G15-19.001(2). When an individual is practicing engineering as a sole proprietor under a combination of his own given name, and terms such as "engineering," "and associates" or "and company," then said person is practicing engineering under a fictitious name, and must obtain a certificate of authorization pursuant to Section 471.023(2), F.S. The name of a corporation or partnership, if otherwise authorized, may include the name or names of one or more deceased or retired members of the firm, or of a predecessor firm in a continuing line of succession. An engineering firm may not offer services to the public under a firm name which contains only the name of an individual not licensed as a professional engineer, registered architect, land surveyor, landscape architect, or professional geologist, in any state.

(4) A professional engineer shall not be negligent in the practice of engineering. The term negligence set forth in 471.033(1)(g), Florida Statutes, is herein defined as the failure by a professional engineer to utilize due care in performing in an engineering capacity or failing to have due regard for acceptable standards of engineering principles. Professional engineers shall approve and seal only those documents that conform to acceptable engineering standards and safeguard the life, health, property and welfare of the public.

Failure to comply with the procedures set forth in the Responsibility Rules as adopted by the Board of Professional Engineers shall be considered as non-compliance with this section unless the deviation or departures therefrom are justified by the specific circumstances of the project in question and the sound professional judgment of the professional engineer.

(5) A professional engineer shall not be incompetent to practice engineering. Incompetence in the practice of engineering as set forth in 471.033(1)(g), Florida Statutes, shall mean the physical or mental incapacity or inability of a professional engineer to perform the duties normally required of the professional engineer.

(6) A professional engineer shall not commit misconduct in the practice of engineering. Misconduct in the practice of engineering as set forth in 471.033(1)(g), Florida Statutes, shall include, but not be limited to:

(a) expressing an opinion publicly on an engineering subject without being informed as to the facts relating thereto and being competent to form a sound opinion thereupon;

(b) being untruthful, deceptive, or misleading in any professional report, statement, or testimony whether or not under oath or omitting relevant and pertinent information from such report, statement or testimony when the result of such omission would or reasonably could lead to a fallacious conclusion on the part of the client, employer or the general public;

(c) performing an engineering assignment when not qualified by training or experience in the practice area involved;

1. All professional engineer asbestos consultants are subject to the provisions of Section 455.301-.309, F.S., Chapter 471, F.S., and Rule 61G15-19, F.A.C., and shall be disciplined as provided therein.

2. The approval of any professional engineer as a "special inspector" under the provisions of Chapter 553, Florida Statutes does not constitute acceptance by the Board that any such professional engineer is in fact qualified by training or experience to perform the duties of a "special inspector" by virtue of training or experience. Any such professional engineer must still be qualified by training or experience to perform such duties and failure to be so qualified could result in discipline under this chapter or Chapter 471;

(d) affixing a signature or seal to any engineering plan of document in a subject matter over which a professional engineer lacks competence because of inadequate training or experience;

(e) offering directly or indirectly any bribe or commission or tendering any gift to obtain selection or preferment for engineering employment with the exception of the payment of the usual commission for securing salaried positions through licensed employment agencies;

(f) becoming involved in a conflict of interest with an employer or client, without the knowledge and approval of the client or employer, but if unavoidable a professional engineer shall immediately take the following actions:

1. Disclose in writing to his employer or client the full circumstances as to a possible conflict of interest; and

2. Assure in writing that the conflict will in no manner influence the professional engineer's judgment or the quality of his services to his employer or client; and

3. Promptly inform his client or employer in writing of any business association, interest or circumstances which may be influencing his judgment or the quality of his services to his client or employer;

(g) soliciting or accepting financial or other valuable considerations from material or equipment suppliers for specifying their products without the written consent to the engineer's employer or client;

(h) soliciting or accepting gratuities directly or indirectly from contractors, their agents or other parties dealing with the professional engineer's client or employer in connection with work for which the professional engineer is responsible without the written consent of the engineer's employer or client;

(i) use by a professional engineer of his engineering expertise and/or his professional engineering statutes to commit a felony;

(j) affixing his seal and/or signature to plans, specifications, drawings, or other documents required to be sealed pursuant to 471.025(1), Florida Statutes, when such document has not been personally prepared by the engineer or prepared under his responsible supervision, direction and control;

(k) a professional engineer shall not knowingly associate with or permit the use of his name or firm name in a business venture by any person or firm which he knows or has reason to believe is engaging in business or professional practices of a fraudulent or dishonest nature;

(l) if his engineering judgment is overruled by an unqualified lay authority with the results that the public health and safety is threatened, failure by a professional engineer to inform his employer, responsible supervision and the responsible public authority of the possible circumstances;

(m) if a professional engineer has knowledge or reason to believe that any person or firm is guilty of violating any of the provisions of Chapter 471, Florida Statutes, or any of these rules of professional conduct, failure to immediately present this information to the Department of Business and Professional Regulation;

(n) violation of any law of the State of Florida directly regulating the practice of engineering;

(o) failure on the part of any professional engineer or certificate holder to obey the terms of a final order imposing discipline upon said professional engineer or certificate holder;

(p) making any statement, criticism or argument on engineering matters which is inspired or paid for by interested parties, unless the professional engineer specifically identifies the interested parties on whose behalf he is speaking, and reveals any interest he or the interested parties have in such matters;

(q) sealing and signing all documents for an entire engineering project, unless each design segment is signed and sealed by the professional engineer in responsible charge of the preparation of that design segment;

(r) revealing facts, data or information obtained in a professional capacity without the prior consent of the professional engineer's client or employer except as authorized or required by law.

Specific Authority 471.033(2) FS. Law Implemented 471.025(1), 471.033(1)(f), (g), (2) FS. History—New 1-8-80, Amended 6-23-80, 3-23-81, 6-4-85, Formerly 21H-19.01, Amended 5-14-86, 4-23-87, 11-8-88, 1-11-89, 7-3-90, 11-9-92, Formerly 21H-19.001, Amended 11-27-94.

61G15-19.002 Payments of Fine. All fines imposed by the Board for violations of Section 471.033, F.S., shall be paid within a period of thirty (30) days from the date of the final order entered by the Board. This time limit may be modified by the Board at its discretion in order to prevent undue hardship to the public.

Specific Authority 455.227(2) FS. Law Implemented 455.227(2), 471.033(3)(c) FS. History—New 8-19-8 Formerly 21H-19.02, 21H-19.002.

61G15-19.003 Purpose. To comply with the purpose of Chapter 471 which is to safeguard life, health, and property to promote the public welfare and to maintain a high standard of integrity and

practice, the Board of Professional Engineers has developed Grounds for Disciplinary Proceeding. These rules shall be binding on every person holding a license to offer or perform engineering services in this State. All persons registered under Chapter 471 are required to be familiar with Chapter 471 and the rules promulgated thereto. The Grounds for Disciplinary Proceedings delineate specific obligations which must be met by a professional engineer.

Specific Authority 471.033(2), 120.53(1) FS. Law Implemented 471.001, 471.033 FS. History—New 5-14-86, Formerly 21H-19.003.

61G15-19.004 Disciplinary Guidelines; Range of Penalties; Aggravating and Mitigating Circumstances.

(1) The Board sets forth below a range of disciplinary guidelines from which disciplinary penalties will be imposed upon practitioners (including holders of certificate of authorization) guilty of violating Chapter 471, F.S. The purpose of the disciplinary guidelines is to give notice to licensees of the range of penalties which will normally be imposed upon violations of particular provisions of Chapter 471, F.S. The disciplinary guidelines are based upon a single count violation of each provision listed. Multiple counts of violations of the same provision of Chapter 471, F.S., or the rules promulgated thereto, or other unrelated violations contained in the same administrative complaint will be grounds for enhancement of penalties. All penalties at the upper range of the sanctions set forth in the guidelines, i.e., suspension, revocation, etc., include lesser penalties, i.e., fine, probation or reprimand which may be included in the final penalty at the Board's discretion. All impositions of probation as a penalty shall include successful completion of the Engineering Law and Rules Study Guide, completion of a Board-approved course in Engineering Professionalism and Ethics, and an appearance before the Board at the option of the Board at the end of the probationary period. Other terms may be imposed by the Board at its discretion.

(2) The following disciplinary guidelines shall be followed by the Board in imposing disciplinary penalties upon licensees for violation of the below mentioned statutes and rules:

VIOLATION	PENALTY RANGE MINIMUM	MAXIMUM
(a) Failure to date plans (471.025(1), F.S.)	Guidance Letter	Reprimand and one (1) year probation
(b) Signing or sealing work not competent to perform (471.025(3), F.S.) (Rule 61G15-19.001(3)(c), (d))	Reprimand and $1,000 fine and one (1) year probation	Reprimand, $1,000 fine, one (1) year suspension and two (2) year probation
(c) "Plan stamping" (471.033(1)(j), F.S.) (Rule 61G15-19.001(3)(j), (q))	Reprimand & one (1) year probation & $1,000 fine	Reprimand, $1,000 fine, one (1) year suspension and two (2) year probation
(d) Violating a Final Order of the Board (471.033(1)(k), F.S.) (Rule 61G15-19.001(1)(o))	Revocation and $1,000 fine	
(e) Attempting to procure or procuring a license by bribery or fraudulent misrepresentation (471.033(1)(b), F.S.)	Revocation and $1,000 fine if licensed (denial of license and refer to State Attorney if not licensed)	
(f) License disciplined by another jurisdiction (471.033(1)(c), F.S.)	Same penalty as imposed in other jurisdiction or as closely as possible to penalties set forth in Florida Statutes	
(g) Criminal Conviction relating to engineering (471.033(1)(d), F.S.) (Rule 61G15-19.001(3)(i))	Misdemeanor: reprimand & one (1) year probation	Reprimand, $1,000 fine, one (1) year suspension and two (2) year probation

	Felony: Revocation and $1,000	
(h) Practice on suspended license (471.033(1)(i), F.S.)	Revocation and $1,000 fine	
(i) Practice on inactive license (471.033(1)(i), F.S.)	Fine based on length of time in practice while inactive; $100/month or $1,000 maximum (penalty will require licensee to renew license or cease practice)	
(j) Practice on revoked license (471.033(1)(i), F.S.)	Refer to State Attorney for criminal prosecution	
(k) Knowingly making or filing false report (471.033(1)(e), F.S.) (Rule 61G15-19.001(3)(b))	One (1) year suspension, two (2) year probation and $1,000 fine	Revocation and $1,000 fine
(l) Fraudulent, false, deceptive, or misleading advertising (471.033(1)(f), F.S.) (Rule 61G15-19.001(3)(c))	Letter of guidance	Reprimand, one (1) year probation and $1,000 fine
(m) Negligence (471.033(1)(g), F.S.)	Reprimand, two (2) year probation and $1,000 fine	Reprimand, $1,000 fine, five (5) year suspension and ten (10) year probation
(n) Fraud or deceit (471.033(1)(g), F.S.)	Reprimand, one (1) year suspension, two (2) year probation and $1,000 fine	$1,000 fine and revocation
(o) Misconduct		
1. (471.033(1)(i), F.S.) (Rule 61G15-19.001(3)(g), (h)) Soliciting or accepting gratuities without client knowledge:	Reprimand, one (1) year probation and $1,000 fine	Reprimand, one (1) year suspension, two (2) year probation and $1,000 fine
2. (Rule 61G15-19.001(3)(r)) Failure to preserve client's confidence:	Reprimand, one (1) year probation and $1,000 fine	Reprimand, one (1) year suspension and two (2) year probation (if pecuniary benefit accrues to engineer)
3. (Rule 61G15-19.001(3)(l)) Professional judgment is overruled by unqualified person:	Reprimand, one (1) year probation and $1,000 fine	Reprimand, one (1) year suspension, two (2) year probation and $1,000 fine

4. Rule 61G15-19.001(3)(k) Use of name/firm in fraudulent venture:	Reprimand one (1) year probation and $1,000 fine	Reprimand $1,000 fine, one (1) year suspension and two (2) year probation
(p) Incompetence (mental or physical impairment) (471.033(1)(i), F.S.)	Suspension until ability to practice proved followed by probation	
(q) Undisclosed conflict of interest (471.033(1)(i), F.S.) (61G15-19.001(3)(f), (p))	Reprimand, $1,000 fine, and two (2) year probation	Revocation and $1,000 fine
(r) Firm practicing without certificate of authorization (471.023, F.S.)	Guidance Letter to become certified or cease practice. If firm applies for certificate, Board will impose a fine of $100/month or a $1,000 maximum per month of uncertified practice.	

(3) The board shall be entitled to deviate from the above-mentioned guidelines upon a showing of aggravating or mitigating circumstances by clear and convincing evidence presented to the board prior to the imposition of a final penalty. The fact that a Hearing Officer of the Division of Administrative Hearings may or may not have been aware of the below mentioned aggravating or mitigating circumstances prior to a recommendation of penalty in a Recommended Order shall not obviate the duty of the board to consider aggravating and mitigating circumstances brought to its attention prior to the issuance of a Final Order.

(a) Aggravating circumstances; circumstances which may justify deviating from the above set forth disciplinary guidelines and cause the enhancement of a penalty beyond the maximum level of discipline in the guidelines shall include but not be limited to the following:

1. History of previous violations of the practice act and the rules promulgated thereto.

2. In the case of negligence; of the magnitude and scope of the project and the damage inflicted upon the general public by the licensee's misfeasance.

3. Evidence of violation of professional practice acts in other jurisdictions wherein the licensee has been disciplined by the appropriate regulatory authority.

4. Violation of the provision of the practice act wherein a letter of guidance as provided in F.S. 455.225(3) has previously been issued to the licensee.

(b) Mitigating circumstances; circumstances which may justify deviating from the above set forth disciplinary guidelines and cause the lessening of a penalty beyond the minimum level of discipline in the guidelines shall include but not be limited to the following:

1. In cases of negligence, the minor nature of the project in question and lack of danger to the public health, safety and welfare resulting from the licensee's misfeasance.

2. Lack of previous disciplinary history in this or any other jurisdiction wherein the licensee practices his profession.

3. Restitution of any damages suffered by the licensee's client.

4. The licensee's professional standing among his peers including continuing education.

5. Steps taken by the licensee or his firm to insure the non-occurrence of similar violations in the future.

Specific Authority 455.227, 471.008, 471.031, 471.033 FS. Law Implemented 455.227, 471.031, 471.033 FS. History—New 1-7-87, Formerly 21H-19.004, Amended 11-27-94.

61G15-19.005 Citations.

(1) As used in this rule, "citation" means an instrument which meets the requirements set forth in Section 455.224, FS., and which is served upon a licensee or certificateholder for the purpose of assessing a penalty in an amount established by this rule.

(2) In lieu of the disciplinary procedures contained in Section 455.225, FS., the Department is hereby authorized to dispose of any violation designated herein by issuing a citation to the subject within six months after the filing of the complaint that is the basis for the citation. If a violation for which a citation may be issued is discovered during the course of an investigation for an unrelated violation, the citation must be issued within 6 months from the discovery of the violation and filing of the uniform complaint form by the investigator.

(3) The following violations with accompanying fines may be disposed of by citation:

(a) Practice or offer to practice engineering through a corporation, partnership, or fictitious name which has not been duly certified. The fine shall be $100 for each month or fraction thereof of

said activity, up to a maximum of $1,000. (See Section 471.033(1)(a), F.S.)

(b) Failure to date documents when affixing signature and seal. The fine shall be $200. (See Section 471.033(1)(a), F.S.)

(c) Practice with an inactive license less than six months. The fine shall be $100 for each month or fraction thereof. (See Section 471.033(1)(i), F.S.)

(4) If the subject does not dispute the matter in the citation in writing within 30 days after the citation is served by personal service or within 30 days after receipt by certified mail, the citation shall become a final order of the Board of Professional Engineers. The subject has 30 days from the date the citation becomes a final order to pay the fine and costs. Failure to pay the fine and costs within the prescribed time period constitutes a violation of Section 471.033(1)(k), FS., which will result in further disciplinary action. All fines and costs are to be made payable to "Department of Business and Professional Regulation — Citation."

(5) Prior to issuance of the citation, the investigator must confirm that the violation has been corrected or is in the process of being corrected. If the violation is a substantial threat to the public health, safety and welfare, such potential for harm must be removed prior to issuance of the citation.

(6) Once the citation becomes a final order, the citation and complaint become a public record pursuant to Chapter 119, FS., unless otherwise exempt from the provisions of Chapter 119, FS. The citation and complaint may be considered as aggravating circumstances in future disciplinary actions pursuant to Rule 61G15-19.004, F.A.C.

(7) The procedures described herein apply only for an initial offense of the alleged violation. Subsequent violation(s) of the same rule or statute shall require the procedure of Section 455.225, FS., to be followed. In addition, should an initial offense for which a citation could be issued occur in conjunction with violations not described herein, then the procedures of Section 455.225, FS., shall apply.

Specific Authority 455.224, 455.225 FS. Law Implemented 455.224 FS. History—New 2-2-92, Amended 8-31-92, Formerly 21H-19.005.

61G15-19.006 Mediation. Pursuant to § 455.2235, the Board designates the following areas as appropriate for mediation;

(1) Practice or offer to practice engineering through a corporation, partnership, or fictitious name which has not been duly certified. The fine shall be $100 for each month or fraction thereof of said activity, up to a maximum of $1000.00.

(2) Failure to date documents when affixing signature and seal. The fine shall be $200.00.

(3) Practice with an inactive license less than six months. The fine shall be $100 for each month or fraction thereof.

Specific Authority 455.2235 FS. Law Implemented 455.2235 FS. History—New 2-20-95.

61G15-19.007 Notice of Noncompliance.

(1) As an alternative to investigation and prosecution, when a complaint is received, the department shall provide a licensee with a notice on noncompliance for an initial offense for the following violations:

(a) Failure to date documents when affixing signature and seal. The fine shall be $200.00 (see section 471.033(1)(a), F.S.)

(b) Practice with an inactive license less than six months. The fine shall be $100 for each month or fraction thereof. (See Section 471.033(1)(l), F.S.)

(2) A second offense shall result in issuance of a citation pursuant to 61G15-19.003. Subsequent violations of the same provisions listed herein shall result in prosecution pursuant to Chapter 471 and the disciplinary rules of the Board of Engineers.

Specific Authority 455.225 FS. Law Implemented 455.224 FS. History—New 2-5-96.

CHAPTER 61G15-20
EXPERIENCE AND EDUCATION

61G15-20.001 Definitions. As used hereinafter in this chapter the following words or phrases shall be defined as follows:

(1) "Year" shall mean 12 months of full-time employment or a full-time academic year of graduate or undergraduate college education.

(2) "Board approved engineering programs" shall mean:

(a) engineering curricula accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET), approved by ABET, approved by the Board of Professional Engineers as equivalent to ABET, or

(b) non-ABET-approved engineering programs for a post-baccalaureate degree in engineering from a school or college in the United States which has an accredited engineering curriculum in a related discipline at the baccalaureate level, provided the applicant can articulate a baccalaureate in engineering, or

(c) programs which have been approved by the Board of Professional Engineers under the provisions of F.S. 455.11(3).

Specific Authority 471.013(1)(a) FS. Law Implemented 471.013(1)(a) FS. History—New 1-8-80, Amended 4-15-80, 7-7-83, 9-13-83, Formerly 21H-20.01, Amended 4-20-86, 8-3-86, 5-20-92, 2-2-93, Formerly 21H-20.001.

61G15-20.002 Experience.

(1)(a) In order to meet the prerequisites for entry into the engineering examination, an applicant is required to have four years of acceptable experience in engineering at the time of application and four years of acceptable educational qualifications. In determining whether an applicant's experience background is sufficient to meet the requirements set forth in subsection 471.013(1)(a)1. and 2., Florida Statutes, the Board has determined that an individual must have the requisite number of years of acceptable engineering experience gained through education and through the requisite amount of full-time employment in engineering. The type of employment which shall be acceptable must principally involve activities in the field of engineering as defined in subsection 471.005(4)(a) and shall include at least one year of engineering design experience. The Board may accept engineering experience in foreign countries if such experience is properly verified by the Board from evidence supplied by the applicant to be equivalent to that accepted as experience by the Board as to any state or territory.

(b) Because the evaluation of experience is a complex and subjective matter, the Board establishes the following guidelines which shall be generally applicable absent extraordinary evidence and documentation supporting a departure therefrom:

1. The acquisition of acceptable engineering experience should logically follow and constitute an application of the engineering education previously obtained.

2. Engineering experience obtained prior to the completion of the engineering degree is usually of a subprofessional nature. Such experience, if deemed acceptable and properly verified, may be awarded experience credit at 25% of the actual time. If the experience is obtained after the completion of a substantial number of engineering design courses, and involves matters of average or above average complexity, experience credit may be awarded at up to 50% of actual time. In any event, the total engineering experience credit allowable for pregraduation experience shall not exceed 12 months.

3. Experience credit is based on a 40 hour per week full-time basis. No additional credit is allowable for overtime work, or for part-time work experience obtained while pursuing engineering education on a full-time basis, or for the part-time pursuit of a masters or doctorate degree while obtaining full-time work experience.

(2) In order to verify an applicant's experience record, the Board will require evidence of employment from employers or supervisors who are employed in the engineering profession or are professional engineers, who shall set forth the quality and character of the applicant's duties and responsibilities. In addition to the employer verification, an applicant must list five personal references. Two of the personal references must be professional engineers, the other three shall be employed in the engineering profession. Should the Board find the information submitted by the applicant is insufficient or incomplete, the Board may require the applicant to supply additional references or evidence regarding the applicant's experience and background or both so that an intelligent decision may be made on whether admittance to the examination is allowable.

The Board will accept as equivalent to one year's experience a masters degree in engineering from a college or university approved pursuant to section 471.013, Florida Statutes. The Board will also accept as equivalent to one year's experience a doctorate in engineering from a college or university approved pursuant to section 471.013, Florida Statutes.

Specific Authority 471.013(1)(a) FS. Law Implemented 471.005(6), 471.013(1)(a) FS. History—New 1-8-80, Amended 3-11-80, 6-23-80, 7-7-83, 9-13-84, Formerly 21H-20.01, Amended 8-18-87, 12-4-91, Formerly 21H-20.002, Amended 12-26-94.

61G15-20.004 Notification of Intention to Qualify for Examination Under 10 Year Engineering Cycle Pursuant to Section 471.013(3), Florida Statutes. All persons presently seeking to fulfill qualifications for examination by evidencing 10 years of engineering experience must submit the following information to the Board office on or before July 1, 1984.

(1) Notarized statement signed by present employer which states, that as of July 1, 1981, said individual was engaged in active engineering work of a character leading to competency to be placed in responsible charge of engineering and that said work was or is under the supervision of a professional engineer or practicing professional engineer.

(2) Upon making application at completion of the 10 year cycle, a copy of the notice originally filed with the Board must accompany the application.

(3) Compliance with the above does not indicate automatic acceptance for examination, nor does it exempt said applicant from meeting the criteria set forth in Sections 471.001 through 471.039, Florida Statutes and Title 61G15, Florida Administrative Code. Each application filed will be reviewed and acted upon by the Board of Engineers on an individual basis.

Specific Authority 471.013(3) FS. Law Implemented 471.013(3) FS. History—New 1-25-82, Formerly 21H-20.04, 21H-20.004.

61G15-20.005 Rules Governing Candidates Qualifying Under the Provisions of 471.013(3), Florida Statutes. The rules governing approval of candidates qualifying under Section 471.013(3) (1983) shall be those rules of the Board of Professional Engineers in effect as of April 1, 1984.

Specific Authority 471.013(3) FS. Law Implemented 471.013(1)(a)3. FS. History—New 10-25-84, Formerly 21H-20.05, 21H-20.005.

61G15-20.006 Educational Requirements.

(1) The evaluation of curricula and standards of accreditation for approval of degree programs required by Section 471.013, F.S., shall be based upon:

(a) An overview of engineering programs within the United States accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc., (ABET), and

(b) An evaluation of such programs and schools, following the definition of the practice of engineering set forth in Section 471.005(6), F.S.

(2) This rule shall not apply to Board approved engineering programs or where ABET accreditation is available to a school or college of engineering.

(3) Acceptable curricula requirements and degree programs shall conform to the criteria for accrediting engineering programs set forth by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc., (ABET) and found in the applicable Annual Report of ABET.

(4) The evaluation of the applicant's transcript and degree program shall include a determination of whether such a transcript and degree program is comparable to the above-mentioned model by the Education Advisory Committee as defined in Rule 61G15-18.015.

(5) In order to verify the applicant's curriculum and engineering program the Board may require evidence from the applicant's institution(s) at the cost of the applicant as to the areas mentioned in 61G15-20.006(3), including when the information necessary for the evaluation set forth in (4) above is not available, a site visit by Educational Advisory Committee of the Board at the expense of the applicant.

Specific Authority 471.013(1)(a)3. FS. Law Implemented 471.013(1)(a)3., 471.005(6) FS. History—New 8-18-87, Formerly 21H-20.006, Amended 12-26-94.

61G15-20.007 Foreign Degrees.

(1) Applicants having degrees from foreign institutions shall be required to document "substantial equivalency" to the Accreditation Board for Engineering and Technology (ABET) engineering criteria, as found in the 1996 annual report. This document is hereby incorporated by reference.

(2) The FBPE Educational Advisory Committee shall make the final decision regarding equivalency of programs and shall make recommendations to the Board as to whether an applicant shall be approved for admittance to the examination or for licensure by endorsement.

(3) The Educational Advisory Committee in making its evaluation will consider the following elements: faculty, curricula, students, administration and commitment.

(a) Institutional factors including but not limited to, recognition by appropriate governmental authority, standing within the profession, accreditation status, and recognition by other evaluation agencies, shall be considered.

(b) ABET minimum curricular content requirements in mathematics and basic sciences, humanities and social sciences, and engineering sciences, humanities and social sciences, and engineering design must be met as continued in the 1996 annual report. This document is hereby incorporated by reference.

(c) In addition, evidence of attainment of appropriate laboratory experience, computer based skills with engineering applications, competency in English, knowledge of probability and statistics, and understanding of the ethical, social, economic and safety considerations of engineering practice must be presented. Transcripts of coursework completed, course content syllabi, notarized testimonials from employers, college level, advanced placement tests, Test of English as a Foreign Language (TOEFL) scores of at least 550, will be accepted as satisfactory evidence.

(4) Translation and/or evaluation of university credentials and secondary certificates, where applicable, shall be provided by the applicant at

their expense, utilizing evaluation agencies approved by the FBPE. Where insufficient information is provided by such evaluations, the Board shall require copies of syllabi or other supporting documents, in order to adequately assess course level and content.

(5) Where available, the applicant may request independent review by university registrars and/or faculty in U.S. universities which shall be sought through ABET.

(6) The Educational Advisory Committee shall utilize evaluations provided by recognized independent agencies including, the National Council of Examiners for Engineers and Engineering Surveying, when submitted by the applicant.

Specific Authority 471.003 FS. Law Implemented 471.003 FS. History—New 7-20-95, Amended 6-5-96.

CHAPTER 61G15-21
EXAMINATIONS

61G15-21.001 Written Examination Designated; General Requirements.

(1) The Florida Board of Engineers hereby determines that a written examination shall be given and passed prior to any applicant receiving a license to practice as a professional engineer, or as an engineer intern in the State of Florida except as provided in 471.015, Florida Statutes. The examination shall be provided by the National Council of Examiners for Engineers and Surveyors (NCEES). The examination consists of two parts, each of eight hours. Candidates are permitted to bring certain reference materials, slide rules and certain calculators. A list of approved reference materials and calculators will be provided to all candidates prior to each examination. All materials including pens and pencils are to be furnished by the applicant. National examination security requirements as set forth by the NCEES shall be followed throughout the administration of the examination.

(2) Applicants for licensure by examination must be graduates of a Board-approved engineering program as defined in Rule 61G15-20.001, F.A.C. Acceptance into the engineering intern examination, either in Florida or elsewhere, does not indicate automatic acceptance for the professional engineers examination, nor does it exempt said applicant from meeting the criteria set forth in Chapter 471, F.S., and Chapter 61G15, F.A.C.

Specific Authority 455.217(1) FS. Law Implemented 471.015, 455.217(1) FS. History—New 1-8-80, Formerly 21H-21.01, Amended 10-5-92, Formerly 21H-21.001, Amended 11-15-94.

61G15-21.002 Areas of Competency and Grading Criteria.

(1) The Engineering Fundamentals Examination shall include all questions and problems on subjects normally connected with the basic fundamentals of engineering education. The topics which will usually be treated in this section are as follows: mathematics, mathematical modeling of engineering systems, nucleonics and wave phenomena, chemistry, statistics, dynamics, mechanics of materials, fluid mechanics, thermodynamics/heat transfer, computer programming, electrical circuits, statics, structure of matter, engineering mechanics, electronics and electrical machinery.

(2) Part two of the examination shall be based on Professional Practice and Principles and shall be devoted primarily to the field of the applicant finding solutions to problems designed to test the applicant's ability to apply acceptable engineering practice to problems which are representative of his discipline. Applicants for registration must select one of the listed specializations in which to be examined. The Board may also authorize examinations in other engineering disciplines when the Board determines that such disciplines warrant the giving of a separate examination in terms of cost effectiveness and acceptability in the profession of engineering.

(3) In Part Two of the examination the applicant will usually be required to solve from seven to ten problems which the applicant may choose from approximately twenty problems drawn from a test pattern generally set forth as follows:

(a) Chemical — Thermodynamics, Process Design, Mass Transfer, Heat Transfer, Chemical Kinetics, Fluids and Economics.

(b) Civil/Sanitary — Highway, Structural, Sanitary Planning, Fluids, Soils, Economics, Water Control and Resources, Treatment Facility Design, Fluid Flow Hydraulics, Planning Analysis, System Design, Chemical-Bio Problems, Materials Sections, and Economics.

(c) Electrical — Power and Systems, Machines, Electronics, Communications, Circuits, Controls, Economics, Instrumentation, Digital Circuits, Computers.

(d) Mechanical — Thermodynamics, Machine Design, Power and Systems, Heat Transfer, HVAC/R, Fluids and Compressible Flow and Economics.

(e) Industrial — Methods Design and Work Management, Production, Inventory and Distribution Systems, Facilities, Planning and Design, Economics, Operations Research, Quality Control and Industrial Statistics.

(f) Agricultural — Irrigation and Drainage, Soil and Water Conservation, Power, Controls and Systems, Machine Design, Structures, Environmental Systems, Crop Handling and Processing, Food Engineering and Economics.

(g) Nuclear — Thermal-Hydraulics, Kinetics and Reactor Safety, Reactor Engineering, Nuclear Fuel Cycle Analysis, Health-Physics and Instrumentation, Neutronics, Economics, Ex-Reactor Criticality and Shielding.

(h) Structural — Structural Concrete, Structural Steel and Light Metal, Bridges or Bridge Elements, Wood, Masonry, and Lateral Forces.

(i) Aeronautical/Aerospace — Structures, Aerodynamics, Flight Dynamics, Propulsion and Economics.

(j) Mining/Mineral — Exploration Geology, Mine Planning, Mine Operations, Ground Control, Mineral Processing, Environmental and Governmental Regulations and Economics.

(k) Metallurgical Engineering — Fabrication and Processing, Metallurgical Thermodynamics

and Corrosion, Selection of Materials, Thermal Treatments and Solid State Processing, Structure/Property Relationships, Failure Analysis, Mineral Processing, Extractive Metallurgy, and Engineering Economics.

(l) Petroleum Engineering — Production and Drilling Operations, Reservoir and Logging, Secondary Recovery and Evaluation and Engineering Economics.

(m) Control Systems Engineering — Measurements and Data Transmission, Final Elements and Actuators, Digital Control Systems and Devices, Safety Systems, Relief Valves, Alarms, Codes and Standards, Control Rooms, Interfaces and Auxiliary Equipment, Central System Analysis and Design, Applications-Continuous Batch and Discrete.

(n) Manufacturing Engineering — Assembly Casting, Molding and Metallurgical Processing, Engineering Materials, Finishing and Coating, Inspection and Quality Control, Manufacturing Management Council, Manufacturing/Numerical Control Systems, Material Forming, Material Removal, Tool Engineering and Engineering Economics.

(o) Fire Protection Engineering — Hydraulics, Suppression Systems, Fire Behavior, Fire Communications, Hazards.

(p) Environmental — Project implementation, operations and monitoring for health safety and environmental protection, emergency response, risk analysis, radiation protection, noise toxicology, industrial hygiene.

Specific Authority 455.217(1)(c), 471.013 FS. Law Implemented 455.217(1)(c), 471.03 FS. History—New 1-8-80, Amended 2-23-81, 8-25-81, 8-16-82, 4-30-85, 8-20-85, Formerly 21H-21.02, Amended 10-27-92, 1-10-93, Formerly 21H-21.002, Amended 2-14-95, 6-28-95

61G15-21.003 Grading Criteria for the Essay Portion of Examination.

(1) Insofar as the essay portion of the examination is not machine graded the Board deems it necessary to set forth the following guidelines upon which grades for the essay portion shall be based. Grades on the essay portion of the examination will be based upon the application of good engineering judgment, the selection and evaluation of pertinent information and the demonstration of the ability to make reasonable assumptions when necessary. Answers may vary due to assumptions made. Partial credit will normally be given if correct fundamental engineering principles are used, even though the answer may be incorrect. All grading will be done by an expert committee provided by the national testing service supplying the examination.

(2) An applicant must follow all pertinent instructions on the examination booklet and the solution pamphlet. The applicant shall indicate which problems he has solved and is submitting for credit in the designated boxes on the front cover of the solution pamphlet. If an applicant fails to indicate which problems he is submitting for credit in the designated boxes, only the first four problems worked in said pamphlet shall be graded.

Specific Authority 455.217(1) FS. Law Implemented 455.217(1) FS. History—New 1-8-80, Formerly 21H-21.03, Amended 1-6-92, Formerly 21H-21.003.

61G15-21.004 Passing Grade.

(1) The criteria for determining the minimum score necessary for passing the Engineering Fundamentals Examination shall be developed through the collective judgment of qualified experts appointed by NCEES to set the raw score that represents the minimum amount of knowledge necessary to pass the examination. The judges shall use a Modified Angoff Method in determining the minimally acceptable raw score necessary to pass the Fundamentals of Engineering Examination. Using the above mentioned Modified Angoff Method, the judges will indicate the probability that a minimally knowledgeable Fundamentals of Engineering examinee would answer any specific questions correctly. The probability of a correct response is then assigned to each question. Each judge will then make an estimate of the percentage of minimally knowledgeable examinees who would know the answer to each question. The totals of each of the judges is added together and divided by the number of judges to determine the overall estimate of the minimum standards necessary. The minimum number of correct answers required to achieve a passing score will take into account the relative difficulty of each examination through scaling and equating each examination to the base examination. The raw score necessary to show competence shall be deemed to be a 70 on a scale of 100.

(2) A passing grade on Part Two of the examination is defined as a grade of 70 or better. The grades are determined by a group of knowledgeable professional engineers, who are familiar with engineering practice and with what is required for an applicable engineering practice and with what is required for an applicable engineering task. These professional engineers will establish a minimum passing score on each individual test item (i.e., examination problem). An Item Specific Scoring Plan (ISSP) will be prepared for each examination item based upon the NCEES standard scoring plan outline form. An ISSP will be developed by persons who are familiar with each discipline including the item author, the item scorer, and other NCEES experts. On a scale of 0 — 10, six (6) will be a minimum passing standard and scores between six (6) and ten (10) will be considered to be passing scores for each examination item. A score of five (5) or lower will be considered an unsatisfactory score for that item and the examinee will be considered to have failed that item. To pass, an examinee must average six (6) or greater on his/her choice of eight (8) exam items, that is, the raw score must be forty-eight (48) or greater based on a scale of eighty (80). This raw score is then converted to a base 100 on which, as is noted above, a passing grade will be seventy (70).

Specific Authority 455.217(1)(c), 471.013 FS. Law Implemented 455.217(1)(c), 471.03 FS. History—New 1-8-80, Amended 3-23-81, 8-25-81, 2-21-84, 1-20-85, Formerly 21H-21.04, 21H-21.004.

61G15-21.005 Engineer Intern Examination. The engineer intern examination is defined to be Part One of the written examination provided by 61G15-21.002(1), and graded pursuant to Rule 61G15-21.004(1).

Specific Authority 455.217(1) FS. Law Implemented 455.217(1) FS. History—New 1-8-80, Formerly 21H-21.05, 21H-21.005.

61G15-21.006 Grade Review Procedure. Any applicant who takes the examination may, upon payment of $75 to the Department, and at a mutually convenient time, examine his answers, questions, papers, grades and grading key upon such terms and conditions as are set forth by the Department of Business and Professional Regulation. All such reviews shall be subject to national testing security requirements in order to insure the integrity of the examination.

Specific Authority 455.217(2) FS. Law Implemented 455.217(2) FS. History—New 1-8-80, Formerly 21H-21.06, Amended 12-24-89, Formerly 21H-21.006.

61G15-21.007 Re-examination.

(1) An individual who fails to pass or take Part One or Part Two of the Engineer Examination or the Engineer Intern Examination may take the applicable examination upon payment of the proper re-examination fee at a regularly scheduled examination date. An individual who has passed one of the two parts of the Engineering Examination shall be given credit for the part passed. If an applicant fails to take or appear for an examination he shall be required to pay a re-examination fee for any part of the examination not taken or appeared for. If an applicant fails to take an examination for two consecutive examination dates he shall be required to submit a new application and pay the required fee.

(2) In order to meet the statutory requirement that persons failing the examination five times beginning with October of 1992, must take additional education courses in order to reapply for examination after failing the examination, the Board of Engineers requires a person to evidence enrollment and completion of at least twelve (12) college credit hours of engineering courses related to their area of deficiency by submission of transcripts.

Specific Authority 455.217(2) FS. Law Implemented 455.217(2), 471.011 FS. History—New 1-8-80, Amended 8-25-81, Formerly 21H-21.07, 21H-21.007, Amended 2-14-95.

61G15-21.008 State of Florida, Security Policies, Procedures and Guidelines. Security procedures for the Professional Engineers Examination given in the State of Florida shall be those contained in the State of Florida, Security Policies, Procedures, and Guidelines booklet incorporated herein by reference.

Specific Authority 455.217, 120.54(8) FS. Law Implemented 455.217 FS. History—New [illegible], Formerly 21H-21.08, 21H-21.008.

CHAPTER 61G15-22
CONTINUING EDUCATION REQUIREMENTS FOR REACTIVATION OF INACTIVE LICENSE

61G15-22.001 Continuing Education Requirements for Reactivation of Inactive License.

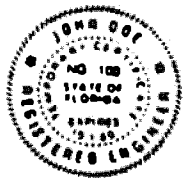
61G15-22.001 Continuing Education Requirements for Reactivation of Inactive License. A license which has been inactive for more than one year may be reactivated upon application to the Department and demonstration to the Board by the licensee of having attended twelve hours of engineering related education per inactive year. The education shall be related to the licensee's field of practice. Of the first twelve hours of such education, at least eight shall be contact hours involving engineering professionalism and ethics and the law and rules governing the practice of engineering in a course approved by the Board. Verification of the above-mentioned education shall be in the form of tuition or registration receipts, records, or letters of verification from the institutions or entities providing the training in question.

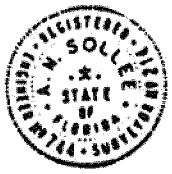
Specific Authority 471.019(2) FS. Law Implemented 471.019(2) FS. History—New 8-19-80, Formerly 21H-22.01, Amended 5-14-86, Formerly 21H-22.001.

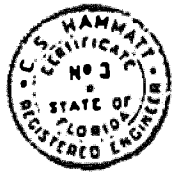
CHAPTER 61G15-23
SEALS

61G15-23.001 Seals Acceptable to the Board.

(1) Pursuant to 471.025, F.S., the Board hereby establishes as indicated below the of metal-type impression seals which are a ble to the Board:







(2) The type of seal on the left may be used only by registrants who are registrants in good standing under both Chapter 471 and Chapter 472, F.S.

Specific Authority 471.025 FS. Law Implemented 471.025 FS. History—New 1-8-80, Amended 6-23-80, Formerly 21H-23.01, 21H-23.001.

61G15-23.002 Seal, Signature and Date Shall Be Affixed.

(1) A professional engineer shall sign his name and affix his seal to all plans, specifications, reports, or other documents prepared or issued by said registrant and being filed for public record. The date that the signature and seal is affixed as provided herein shall be entered on said plans, specifications, reports, or other documents immediately under the signature of the professional engineer.

(2) Each sheet of plans and prints which must be sealed under the provisions of Chapter 471 shall be sealed, signed and dated by the professional engineer in responsible charge. A cover or index sheet for engineering specifications may be used and that sheet must be signed, sealed and dated by those professional engineers in responsible charge of the production and preparation of each section of the engineering specification or other engineering document with sufficient information on the cover sheet or index so that the user will be aware of each portion of the specifications for which each professional engineer is responsible. Engineering reports must be signed, sealed and dated on a signature page or cover letter by each professional engineer who is in responsible charge of any portion of the report. A professional engineer may only seal an engineering report, plan, print or specification if that professional engineer was in responsible charge of the preparation and production of the engineering document and the professional engineer has the expertise in the engineering discipline used in producing the engineering document in question.

(3) A professional engineer should . seal original documents made of mylar, linen, sepia or other materials which can be changed by the entity with whom such document(s) are filed unless the professional engineer accompanies such document(s) with a signed and sealed letter making the receiver aware that copies of the original document as designed by the professional engineer have been retained by the professional engineer and that the professional engineer will not be responsible for any subsequent changes to the reproducible original documents.

Specific Authority 471.025 FS. Law Implemented 471.025 FS. History—New 1-8-80, Amended 1-20-85, Formerly 21H-23.02, Amended 5-14-86, Formerly 21H-23.002, Amended 11-15-94.

CHAPTER 61G15-24
FEES

61G15-24.001 Schedule of Fees Adopted by Board.

(1) Pursuant to Sections 471.011, 471.019, Florida Statutes, the Board hereby establishes the following fees for applications, examination, reexamination, licensing and renewal, temporary registration, late renewal, registration by endorsement, reactivation fee, and replacement of certificate.

(2) Engineering fees (individuals and firms):

(a) Initial application for examination —

1. Graduate of Board-approved engineering program as defined in Rule 61G15-20.001(1)(b) or qualified under Section 471.013(1), F.S. — $100.00

2. Graduate of an engineering program approved by the Board pursuant to Rule 61G15-20.006 — $125.00

(b) Initial examination fee — $100.00 (both parts)

(c) Application fee for licensure by endorsement — $125.00

(d) Initial registration and licensure — $100.00

(e) Renewal — $125.00 per biennium

(f) Late renewal penalty — $20.00

(g) Temporary registration (individual) — $25.00

(h) Temporary Certificate of Authorization (firm) — $25.00

(i) Registration for a Certificate of Authorization (firm) — $125.00

(j) Biennial Renewal of Certificate of Authorization (firm) — $125.00

(k) Re-examination — $100.00 per part

(l) Inactive Status fee — $75.00

(m) Reactivation fee — $50.00

(n) Duplicate Certificate — $5.00

(3) Engineer Intern Fees:

(a) Examination — $60.00

(b) Re-examination — $60.00 per re-examined part or additional examination

Specific Authority 455.213, 455.219, 471.011, 471.019 FS. Law Implemented 119.07(1)(a), 471.011, 471.019 FS. History—New 1-8-80, Amended 8-26-81, 12-19-82, 6-2-83, 2-28-84, Formerly 21H-24.01, Amended 3-10-86, 12-11-86, 3-10-87, 4-12-88, 12-21-88, 1-10-90, 8-15-90, 1-6-93, Formerly 21H-24.001, Amended 11-15-94.

61G15-24.002 Unlicensed Activity Fee. From each fee for initial licensure or licensure renewal, $5.00 shall be earmarked for the purpose of combating unlicensed activity.

Specific Authority 455.2281 FS. Law Implemented 455.2281 FS. History—New 8-29-93.

CHAPTER 61G15-26
SUPERVISION STANDARDS

61G15-26.001 Standards for Supervision of Governmental Employees by Professional Engineers.

(1) As required by F.S. 471.003(2)(b)2. employees of governmental entities must act under the responsible charge of professional engineers as defined in Rule 61G15-18.011(1) whenever they are performing engineering as that term is defined in F.S. 471.005(6). The supervision exercised over such employees by the professional engineer in responsible charge must be of such a quality as to be equivalent to that required of private firms. Further, all documents or reports which would be equivalent to those requiring a professional engineer's seal when filed for public record in the private sector will require the seal, signature and date of the supervising professional engineer when such documents or reports are filed or promulgated on behalf of a governmental entity. This rule shall not prohibit non-professional employees governed by this rule from overriding, or approving, accepting or rejecting, or modifying engineering documents prepared by professional engineers unless such actions are concurred in by a professional engineer in responsible charge of the employee and that said professional engineer takes full responsibility for such a decision.

(2) No individual may be entitled or act in the capacity of "municipal", "city" or "county engineer" unless that individual is licensed as a professional engineer in this State.

Specific Authority 471.003(2)(b)2. FS. Law Implemented 471.003(1), (2)(b)2., (e), 471.005(6), 471.025(1), 471.023(1), 471.031(1)(b) FS. History—New 4-2-87, Formerly 21H-26.001.

CHAPTER 61G15-27
PROCEDURES FOR THE ADOPTION OF ANOTHER'S WORK

61G15-27.001 Procedures for a Successor Professional Engineer Adopting As His Own the Work of Another Engineer.

(1) A successor professional engineer seeking to reuse already sealed contract documents under the successor professional engineer's seal must be able to document and produce upon request evidence that he has in fact recreated all the work done by the original professional engineer. In other words, calculations, site visits, research and the like must be documented and produceable upon demand. Further, the successor professional engineer must take all professional and legal responsibility for the documents which he sealed and signed and can in no way exempt himself from such full responsibility. Plans need not be redrawn by the successor professional engineer; however, justification for such action must be available through well kept and complete documentation on the part of the successor professional engineer as to his having rethought and reworked the entire design process. A successor professional engineer must use his own title block, seal and signature and must remove the title block, seal and signature of the original professional engineer before reusing any sealed contract documents.

(2) Prior to sealing and signing work a successor professional engineer shall be required to notify the original professional engineer, his successors, or assigns by certified letter to the last known address of the original professional engineer of the successor's intention to use or reuse the original professional engineer's work. The successor professional engineer will take full responsibility for the drawing as though they were the successor professional engineer's original product.

Specific Authority 471.033(2) FS. Law Implemented 471.033(1)(j), 471.005(6) FS. History—New 8-25-87, Amended 4-21-88, 8-3-88, Formerly 21H-27.001.

CHAPTER 61G15-28
ASBESTOS CONSULTANTS

61G15-28.001 Asbestos Consultants; Licensure Requirements; Fees.

(1) The Board of Professional Engineers shall certify for licensure as an asbestos consultant, as set forth in Section 455.303(1), F.S., any professional engineer licensed in this state who meets the following requirements:

(a) Successful completion of the abatement project training courses outlined in Section 455.305, F.S., and approved by the Asbestos Oversight Program Team. "Successful completion" for renewal purposes shall mean: passing of the examination required of each training course for the consultant as outlined in Section 455.305 and his subordinates as outlined in Section 455.309, F.S.

(b) Compliance with the provisions of Section 455.303(1)(a)3., F.S., by submitting evidence of "basic asbestos consultant responsibility" in the performance of satisfactory work on ten asbestos abatement projects within the last five years.

1. "Basic asbestos consultant responsibility" shall be defined to include performance of the following:

a. Surveys.

b. Operation and maintenance plans.

c. Asbestos abatement project management and supervision, including air monitoring.

d. Design of plans and specifications for asbestos abatement project.

2. Evidence of "basic asbestos consultant responsibility" shall be presented in a certified statement from the owner or entity for whom service was rendered, and shall include the following:

a. A description of the project.

b. The level of responsibility which the applicant had on the project.

c. Dates of involvement on the project by the applicant.

d. A statement that no claim of unsatisfactory performance relating to any professional activity of the applicant has been sustained against the applicant.

3. The ten projects shall be distributed as follows:

a. Two projects from Rule 61G15-28.001(1)(b)1.a.

b. Two projects from Rule 61G15-28.001(1)(b)1.b.

c. Two projects from Rule 61G15-28.001(1)(b)1.c.

d. Two projects from Rule 61G15-28.001(1)(b)1.d.

e. Two additional projects from any of the categories set forth in the preceding paragraphs a. through d.

(c) Evidence of financial stability, as requi Section 455.303 (1)(a)4., F.S., in the form of a notarized statement from the applicant stating that the applicant has not been professionally engaged in any asbestos project which has not been satisfactorily completed, and that no claims have been brought against the applicant as a result of the professional performance of the applicant as an asbestos consultant on any project.

(d) Evidence that the applicant has paid the required fee and has passed an examination as required by Section 455.303(1)(a)5., F.S., and administered by the Department of Business and Professional Regulation as set forth in Chapter 21-25, F.A.C.

(2) The following fee schedule relating to the licensure of asbestos consultants is adopted by the Board, pursuant to Section 455.304, F.S.:

(a) Application fee	$200.00
(b) Examination fee	$200.00
(c) Initial licensure fee	$100.00
(d) Biennial renewal fee	$200.00
(e) Late renewal fee	$20.00

Specific Authority 455.307 FS. Law Implemented 455.303, 455.304 FS. History—New 11-8-88, Amended 2-8-89, 1-10-90, 7-4-90, Formerly 21H-28.001.

61G15-28.002 Asbestos Consultant: Continuing Education Requirements, for Renewal of I Which Expire Each Even Year on October 31

(1) The Department of Business and Professional Regulation will accept as meeting the requirements for biennial renewal of an Asbestos Consultant license any person who has completed 2 days of refresher courses for each calendar year related to any of the courses as outlined in 455.305(1), a, b, c, and d, which have been approved by the Environmental Protection Agency and/or the Asbestos Oversight Program Team created by statute 255.565; and

(a) Attest that each asbestos surveyor, management planner, and project monitor has completed a ½ day or 1 day refresher course each calendar year for each biennial renewal period. The refresher courses shall relate to those outlined in 455.309 and as required in 455.305(1)(a), (b) and (c), which have been approved by the Environmental Protection Agency and/or the Asbestos Oversight Program Team, and

(b) Passed the examinations that may be required of any person taking the refresher courses.

(2) The Department of Business and Professional Regulation shall mail with the biennial renewal notice to each licensee the sworn affidavit form required for submission in order to renew an asbestos contractor or consultants license.

(3) Asbestos Consultants who are i licensed in the even year of renewal will e required to satisfy any of the continuing education required of all others until the subsequent renewal cycle.

Specific Authority 455.307 FS. Law Implemented 455.303 FS. History—New 9-12-90. Formerly 21H-28.002.

CHAPTER 61G15-29 CERTIFICATION

61G15-29.001 Certification Definition, Procedures, Prohibitions.

(1) The term "Certification" as used herein shall be as set forth in Rule 61G15-18.011(4).

(2) When an engineer is presented with a certification to be signed and/or sealed, he or she should carefully evaluate that certification to determine if any of the circumstances set forth in subsection (3) would apply. If any of these circumstances would apply, that engineer shall either: (a) modify such certification to limit its scope to those matters which the engineer can properly sign and/or seal, or (b) decline to sign such certification.

(3) Engineers who sign and/or seal certifications which: (a) relate to matters which are beyond the engineer's technical competence, or (b) involve matters which are beyond the engineer's scope of services actually provided, or (c) relate to matters which were not prepared under engineer's responsible supervision, direction, or control; would be subject to discipline pursuant to Rule 61G15-19.001(6).

Specific Authority 471.008 FS. Law Implemented 471.025(3), 471.033(1)(j) FS. History—New 1-16-91, Formerly 21H-29.001.

CHAPTER 61G15-30
RESPONSIBILITY RULES COMMON TO ALL ENGINEERS

61G15-30.001 Purpose. The Board has adopted these responsibility rules pursuant to Section 471.033(2), F.S., to safeguard the life, health, property and welfare of the public by promoting proper conduct in the practice of engineering and due care and regard for acceptable engineering principles and standards. The Board considers that professional engineers may avoid disciplinary actions by observing the procedures set forth herein. Failure to comply with these rules may be considered as noncompliance with Rule 61G15-19.001(4), F.A.C., unless the deviation or departure therefrom is justified by the specific circumstances of the project in question and the sound professional judgment of the engineer. Furthermore, these rules are intended to apply as general guidelines where no contractual relationship exists between the parties addressed herein. These rules are not intended to take precedence over contractual relationships developed between the parties addressed herein, so long as those contractual relationships do not violate Chapter 471, F.S., or any other rule promulgated pursuant thereto. These responsibility rules shall apply to every person holding a certificate of registration as a professional engineer, every certified engineer intern, and every holder of a certificate of authorization, as appropriate. A professional engineer's practices, education, training, experience, qualifications, technical competence, conduct, and responsibilities in connection with his authorized engineering practice, services, and creative work are subject to regulation solely by the Board of professional engineers and the courts.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1) FS. History—New 1-26-93, Formerly 21H-30.001.

61G15-30.002 Definitions Common to All Engineer's Responsibility Rules.

(1) Engineer of Record. A Florida professional engineer who is in responsible charge for the preparation, signing, dating, sealing and issuing of any engineering document(s) for any engineering service or creative work.

(2) Prime Professional. A Florida professional engineer, or a duly qualified engineering corporation or partnership, who is engaged by the client to provide any planning, design, coordination, arrangement and permitting for the project and for construction observations in connection with any engineering project, service or creative work. The prime professional engineer may also be an engineer of record on the same project.

(3) Delegated Engineer. A Florida professional engineer who undertakes a specialty service and provides services or creative work (delegated engineering document) regarding a portion of the engineering project. The delegated engineer is the engineer of record for that portion of the engineering project. A delegated engineer usually falls into one of the following categories:

(a) An independent consultant.

(b) An employee or officer of an entity supplying components to a fabricator or contractor, so long as the engineer acts as an independent consultant or through a duly qualified engineering corporation.

(c) An employee or officer of a fabricator or contractor, so long as the engineer acts as an independent consultant or through a duly qualified engineering corporation.

(4) Engineering Documents. Engineering documents are designs, plans, specifications, drawings, prints, reports, or similar instruments of service in connection with engineering services or creative work that have been prepared and issued by the professional engineer or under his responsible supervision, direction or control.

(5) Delegated Engineering Documents. Delegated engineering documents are those engineering documents that are prepared by a delegated engineer.

(6) Public Record. An engineering document is "filed for public record" when said document is presented with the engineer of record's knowledge and consent to any federal, state, county, district, authority, municipal or other governmental agency in connection with the transaction of official business with said agency.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1), 471.023, 471.025 FS. History—New 1-26-93, Formerly 21H-30.002.

61G15-30.003 Engineering Document Classification. Engineers shall legibly indicate their name and business address, on engineering documents. Engineering documents which are issued for preliminary or conceptual use, shall clearly note the intended purpose of such documents. When elements of the project are shown on an engineering document only for information or clarification and the Engineer does not intend to accept responsibility for the elements, the engineer shall clearly note on the documents the extent of his responsibility.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g), 471.025(3) FS. History—New 1-26-93, Formerly 21H-30.003

61G15-30.004 Engineering Document Submittal to Public Agencies. Engineers shall clearly note on any preliminary engineering documents that such documents are not in final form, but are being transmitted to the public agency to receive agency reviews, comments and interpretations. The documents may subsequently be revised by the engineer to reflect resolution of issues with the public agency prior to final action by the agency. Changes, revisions and modifications to a project may prompt additional document submittal for agency approval action on the same project.
Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g), 471.025 FS. History—New 1-26-93, Formerly 21H-30.004.

61G15-30.005 Request for and Review of Delegated Engineering Documents.

(1) An engineer of record who delegates a portion of his responsibility to a delegated engineer is obligated to communicate in writing his engineering requirements to the delegated engineer.

(2) An engineer of record who delegates a portion of his design responsibility to a delegated engineer shall require submission of delegated engineering documents prepared by the delegated engineer and shall review those documents for compliance with his written engineering requirements and to confirm the following:

(a) That the delegated engineering documents have been prepared by an engineer.

(b) That the delegated engineering documents of the delegated engineer conform with the intent of the engineer of record and meet the written criteria.

(c) That the effect of the delegated engineer's work on the overall project generally conforms with the intent of the engineer of record.
Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-30.005.

61G15-30.006 Delegated Engineer's Responsibility.

(1) It is the delegated engineer's responsibility to review the Engineer of Record's written engineering requirements and authorization for the delegated engineering document to determine the appropriate scope of engineering.

(2) The delegated engineering document shall comply with the written engineering requirements received from the engineer of record. They shall include the project identification and the criteria used as a basis for its preparation. If a delegated engineer determines there are details, features or unanticipated project limits which conflict with the written engineering requirements provided by the engineer of record, the delegated engineer shall timely contact the engineer of record for resolution of conflicts.

(3) The delegated engineer shall forward the delegated engineering document to the engineer of record for review. All final delegated engineering documents require the impressed seal and signature of the delegated engineer and include:

(a) Drawings introducing engineering input such as defining the configuration and structural capacity of structural components and/or their assembly into structural systems.

(b) Calculations.

(c) Computer printouts which are an acceptable substitute for manual calculations provided they are accompanied by sufficient design assumptions and identified input and output information to permit their proper evaluation. Such information shall bear the impressed seal and signature of the delegated engineer as an indication that said engineer has accepted responsibility for the results.
Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-30.006.

61G15-30.007 Prime Professional's Responsibility. It is the responsibility of the prime professional engineer to retain and coordinate the services of such other professionals as needed to complete the services contracted for the project.
Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-30.007.

61G15-30.008 Use of Computer Software and Hardware. The engineer shall be responsible for the results generated by any computer software and hardware that he or she uses in providing engineering services.
Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-30.008.

CHAPTER 61G15-31
RESPONSIBILITY RULES OF PROFESSIONAL ENGINEERS CONCERNING THE DESIGN OF STRUCTURES

61G15-31.001 General Responsibility. The engineer of record for a structure is responsible for all structural aspects of the design of the structure including the design of all of the structure's systems and components. As noted herein the engineer of record for a structure may delegate responsibility for the design of a system or component part of the structure to a qualified delegated engineer. In either case the structural documents shall address, as a minimum, the items noted in the following subsections covering specific structural systems or components. Both the engineer of record for the structure and the delegated engineer, if utilized, shall comply with the requirements of the general responsibility rules, and with the requirements of the more specific structural responsibility rules contained herein.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.001.

61G15-31.002 Definitions.

(1) Engineer of Record for the Structure. The Florida registered professional engineer who develops the structural design criteria and structural framing concept for the structure, performs the analysis and is responsible for the preparation of the structural construction documents.

(2) Structural Component. An individual structural member designed to be part of a structural system.

(3) Structure. The entity to be built.

(4) Structural System. A portion of a structure comprising an assembly of structural components.

(5) Structural Engineering Documents. The structural drawings, specifications and other documents setting forth the overall design and requirements for the construction, alteration, modernization, repair, removal, demolition, arrangement and/or use of the structure, prepared by and signed and sealed by the engineer of record for the structure. Structural engineering documents shall identify the project and specify design criteria both for the overall structure and for structural components and structural systems. The drawings shall identify the nature, magnitude and location of all design loads to be imposed on the structure. The structural engineering documents shall provide construction requirements to indicate the nature and character of the work and to describe, detail, label and define the structure's components, systems, materials, assemblies, and equipment.

(6) Structural Submittals. Submittals required by the structural engineering documents which do not require the seal of a professional engineer, such as:

(a) Drawings prepared solely to serve as a guide for fabrication and installation and requiring no engineering input such as reinforcing steel shop drawings or structural steel erection drawings.

(b) Catalog information on standard products not fabricated for a specific project.

(7) Structural Delegated Engineering Documents. Documents prepared by a delegated engineer to whom the engineer of record for the structure has delegated responsibility for the design of a structural component or system.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g), (j) FS. History—New 1-26-93, Formerly 21H-31.002.

61G15-31.003 Design of Structures Utilizing Prefabricated Wood Components.

(1) Structural engineering documents shall indicate provisions for support, bearing, cross and lateral bracing, and for all bracing and anchorage required to resist uplift, gravity and lateral forces.

(2) Structural delegated engineering documents shall include component details and system layout drawings. Such submittals shall identify the project and list loading and other criteria. Drawings shall identify and locate all components and shall specify member sizes, bracing, anchorage, connections and all other necessary fabrication and erection information.

(3) The effect of the delegated components or systems design on other parts of the structure is the responsibility of the engineer of record for the structure.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93. Formerly 21H-31.003.

61G15-31.004 Design of Cast-in-Place Post-Tensioned Concrete Structural Systems.

(1) Structural engineering documents shall show the magnitude and location of all prestressing forces and all design assumptions.

(2) If the engineer of record for the structure elects to delegate the responsibility for preparation of calculations and installation drawings to a delegated engineer for the post-tensioning system(s), he shall require the submission of installation drawings for review by the engineer of record for the structure. Calculations shall also be submitted which show sufficient information to confirm that the number and size of tendons

provided are adequate to provide the prestressing forces shown on the structural engineering documents. Installation drawings shall provide full details of materials to be used including necessary accessories and instructions for construction and shall identify the specific project. The installation drawings and calculations shall bear the impressed seal and signature of the delegated engineer who prepared them.

(3) It is the responsibility of the engineer of record for the structure to review the post-tensioning system installation drawings so that the drawings are coordinated with reinforcing steel shop drawings.

(4) The effect of post-tensioning on other parts of the building is the responsibility of the engineer of record for the structure.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.004.

61G15-31.005 Design of Structures Utilizing Precast and Prestressed Concrete Components.

(1) Structural engineering documents shall indicate the configuration of precast and prestressed components and shall include details of supports, anchors and connections for those components.

(2) The engineer of record for the structure may delegate responsibility for the design of precast or prestressed concrete components, or systems utilizing those components, to a delegated engineer. In that case the engineer of record for the structure shall require structural delegated engineering documents for his review as an indication that his intent has been understood and that the specified criteria have been used. Structural delegated engineering documents shall bear the impressed seal and signature of the delegated engineer.

(3) Structural delegated engineering documents shall include component details, calculations, and fabrications and erection drawings. All such submittals shall identify the specific project. The effect of precast and prestressed concrete members on other parts of the building is the responsibility of the engineer of record for the structure.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.005.

61G15-31.006 Design of Structural Systems Utilizing Open Web Steel Joists.

(1) Structural engineering documents shall designate the standards for joist design and shall indicate layout, end supports, anchorage, bridging requirements, etc., including connections to walls. These documents shall indicate special requirements for concentrated loads, openings, extended ends, and resistance to uplift.

(2) The engineer of record for the structure may delegate design responsibility for the preparation, fabrication and erection drawings to a delegated engineer requiring submittal of structural delegated engineering documents. The submittal shall identify the specific project, shall list the design criteria and shall show all joist location information and details necessary for proper installation. Structural delegated engineering documents, unless catalog submittals, shall bear the impressed seal and signature of the delegated engineer.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.006.

61G15-31.007 Design of Pre-Engineered Structures.

(1) Structural engineering documents for pre-engineered structures shall indicate the necessary measures for adapting the structures to the specific site. They shall indicate all openings, concentrated loads and other special requirements. Foundation conditions assumed in the design shall be indicated as well as the location and magnitude of building reactions on that foundation under all design conditions.

(2) The engineer of record for the structure may delegate responsibility of the design of pre-engineered structures to a delegated engineer requiring submittal of structural delegated engineering documents.

(3) Structural delegated engineering documents shall identify the project and list loading other design criteria. Structural delegated engineering documents shall include fabrication and erection drawings which indicate in detail the construction of the standard structure used or as modified to comply with the requirements of the particular project. They shall indicate all connection details, openings and other special details. They shall show the magnitude and location of building reactions on the foundation under all design conditions. Calculations supporting the design shall be submitted not only for the standard structure but for modifications and for related components requiring structural design.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.007.

61G15-31.008 Design of Foundations.

(1) The structural engineering documents shall designate the foundation capacity and shall include data indicating the nature of the foundation material anticipated.

(2) Site preparation requirements, necessary to provide the foundation capacity, shall be specified in the structural engineering document(s).

(3) The foundation capacity shall be determined on the basis of scientific analysis utilizing investigations, tests or studies conducted or provided by the engineer of record for the structure or by a delegated engineer.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.008.

61G15-31.009 Design of Structural Steel Systems.

(1) The engineer of record for the structure is responsible for all aspects of the structure's design including the design of components and connections.

(2) The engineer of record for the structure may detail all structural connections on the structural engineering documents and require fabrication and erection in accordance with these details.

(3) Alternately, the engineer of record for the structure may specify criteria for the design of the structural connections and identify the nature, magnitude, and location of all design loads to be supported by the connections in his structural engineering documents. The engineer of record for the structure may then delegate design responsibility for the selection or modification of the structural connections to a delegated engineer and require delegated engineering submittal.

(4) The structural engineering documents may assign to the fabricator responsibility for implementing the design as specified and for maintaining fabrication and erection tolerances and for ensuring the fit and erectability of the structure.

(5) The fabricator shall forward fabrication and erection drawings for review by the engineer of record for the structure.

Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g) FS. History—New 1-26-93, Formerly 21H-31.009.

CHAPTER 61G15-32
RESPONSIBILITY RULES OF PROFESSIONAL ENGINEERS CONCERNING THE DESIGN OF FIRE PROTECTION SYSTEMS

61G15-32.001 General Responsibility. Fire protection engineering documents shall be prepared in accordance with applicable technology and the requirements of the authority having jurisdiction. The documents shall identify the Engineer of Record for the project. Both the engineer of record for the fire protection system and the delegated engineer, if utilized, shall comply with the requirements of the general responsibility rules, 61G15-30, F.A.C., and with the requirements of the more specific rules contained herein.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.001.

61G15-32.002 Definitions

(1) Engineer of Record for the Fire Protection System(s): The Florida Registered Professional Engineer who develops the Fire Protection System(s) design criteria; performs analysis as required; and is responsible for the preparation of the Fire Protection Construction Documents.

(2) Fire Protection Component: Any individual part, subsystem or device to be incorporated in a Fire Protection System.

(3) Fire Protection System: Any assembly of Fire Protection components, materials, equipment, which require design to form a fully functional fire protection system.

(4) Listed: A fire protection component tested by a nationally recognized fire protection equipment testing organization. Recognized organizations include, but are not limited to Underwriters Laboratories, Inc. and Factory Mutual Research Corporation.

(5) Fire Protection Engineering Documents: the fire protection engineering drawings, specifications and other materials or representations that set forth the overall design requirements for the construction, alteration, demolition, renovation, repair, modification, permitting and such, for any public or private fire protection system(s), which are prepared, signed, dated and sealed by the Engineer of Record for the Fire Protection System(s).

(6) Fire Protection Submittals: Sub[illegible]s, catalog information on standard produ[illegible]r drawings prepared solely to serve as a guide for fabrication and installation and requiring no engineering input. These submittals do not require the seal of a Florida registered engineer.

(7) Codes and Standards: Those nationally recognized codes and standards adopted directly or by reference in Chapter 633, Florida Statutes. Applicable codes and standards also include those promulgated by the State Fire Marshal as well as by State and local authorities having jurisdiction. In the event the codes and standards fail to cover or address a specific protection requirement, alternative research, test results, and engineering data may be utilized, relying on the Engineer of Record for Fire Protection to make an informed engineering decision. This definition is not intended to preclude the use of new technologies when said technology has been demonstrated to provide equivalent or improved protection above that of published National Fire Protection standards.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.002.

61G15-32.003 Common Requirements to All Fire Protection Engineering Documents.

(1) The Fire Protection Engineering Documents shall provide the construction requirem[illegible]o indicate the nature and scope of the work, [illegible] describe, detail, dimension, label and defin[illegible]ne Fire Protection Components, System(s), materials, assemblies, equipment and its structural and utility support system(s), insofar as they involve the safeguarding of life, health or property.

(2) The Fire Protection Engineering Design Documents shall specify the applicable requirements for the acceptance testing of the fire protection system and components.

(3) The Occupancy of the area or description of a specific hazard being protected by the Fire Protection System(s) shall be shown on the Fire Protection Engineering Design Documents.

(4) The applicable code and standard used in the preparation of the Fire Protection shall be shown on the Fire Protection Engineering Design Documents. When said documents are based on engineering judgment, which constitutes a deviation from applicable codes and standards, any reasons and assumptions made to develop the fire protection concept shall be identified on the documents.

(5) The documents shall provide construction details of the structure, when applicable, that supports the Fire Protection System and Fire Protection Components. Such structural support details are not required to be shown on [illegible]e Protection Engineering Design Do[illegible]ts provided that the construction documents are submitted to the permitting agency for review as a common submittal. The construction documents shall acknowledge the structural loading capacity of the structure.

(6) When submittals require additional engineering work consisting of design or recalculation from the Engineer of Record's Fire Protection Engineering Design Document, such documents shall be made and sealed by the Engineer of Record for the Fire Protection System.

(7) Requirements for activation and control systems, sequence, operating parameters, interlocks, safety related devices, indicators and alarms shall be shown on the Fire Protection Engineering Documents, unless shown on other related documents.

(8) Any information deemed appropriate by the Engineer of Record to assist the Authority Having Jurisdiction, the installation contractor or other interested parties, shall be included in the Fire Protection Submittal.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.003.

61G15-32.004 Design of Water Based Fire Protection Systems.

(1) Water Based Fire Protection Systems include, but are not limited to, automatic sprinkler systems of wet, dry, manual, and deluge valve controlled types, pumping systems, standpipes, fire water mains and dedicated fire protection water sources.

(2) To ensure minimum design quality in Fire Protection Engineering Documents, said documents shall include as a minimum the following information when applicable:

(a) The design criteria and documents shall be based on applicable NFPA standards when such applicable standards are published, or on alternate sources as provided in the definition of codes and standards.

(b) The Point of Service for the fire protection water supply as defined by Florida Statute 633.021(16), F.S.

(c) In storage occupancies the Engineer of Record shall determine the commodity classification as determined by applicable standards or on alternate sources as provided in the definition of codes and standards. The NFPA commodity classification shall be provided on the Fire Protection Engineering Documents for all storage occupancies.

(d) All hydraulic calculations conducted for the system(s) shall be completed in accordance with the minimum standards for detail and information as required by NFPA 13. The source and location of water supply test results shall be indicated on the documents.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.004.

61G15-32.005 Design of Gas Agent Fire Suppression Systems.

(1) Gas Agent Fire Suppression Systems include, but are not limited to, CO_2, Halon, inerting and purge gases, and all other gaseous formulations and multi-phase agents released for the purpose of fire control or extinguishment.

(2) The Fire Protection System(s) design specifications shall be based on applicable NFPA standards when available, or alternative engineering sources and good engineering practice when required.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.005.

61G15-32.006 Design of Foam and Foam Water Fire Suppression Systems.

(1) Foam and Foam Water Fire Suppression Systems include local application, total flooding, high and low expansion foams, and foam-water sprinkler systems.

(2) The Fire Protection System design specifications shall be based on applicable NFPA standards, when available, or alternative engineering sources and good engineering practice when required.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.006.

61G15-32.007 Design of Dry Chemical and Miscellaneous Fire Suppression or Control Systems.

(1) Dry chemical and miscellaneous systems include, but are not limited to, dry chemical systems, explosion control systems, and fire control structures.

(2) The Fire Protection System design specifications shall be based on applicable NFPA standards, when available, or alternative engineering sources and good engineering practice when required.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.007.

61G15-32.008 Design of Fire Alarms, Signaling Systems and Control System.

(1) Fire alarms, signaling, and control systems include, but are not limited to, fire protection supervision and alarm circuits, activation controls, and remote signaling.

(2) The Fire Protection System design specifications shall be based on applicable NFPA standards, when available, or alternative engineering sources and good engineering practice when required, and shall comply with the provisions of Rule 61G15-33.006, F.A.C.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-32.008.

CHAPTER 61G15-33
RESPONSIBILITY RULES OF PROFESSIONAL ENGINEERS CONCERNING THE DESIGN OF ELECTRICAL SYSTEMS

61G15-33.001 General Responsibility. Electrical Engineering documents shall be prepared in accordance with applicable technology and with the requirements of the authority having jurisdiction. The documents shall identify the Engineer of record for the electrical systems project. Electrical Engineering documents shall be prepared in accordance with the requirements of the applicable codes and standards as defined herein. The engineer or record is responsible for determining the applicability of appropriate codes and standards to a given project. In the event the codes and standards fail to cover or address a specific requirement or situation, alternative research, test results, engineering data, and engineering calculations shall be utilized. New technology may be utilized when said technology has been demonstrated to provide equivalent or improved performance. Construction documents shall indicate the nature and character of the electrical work and shall describe, label and define the required electrical systems components, processes, equipment and material and its structural utility support systems. Both the engineer of record for the electrical system and the delegated engineer if utilized, shall comply with the requirements of the general responsibility rules, 61G15-30, F.A.C., and with the requirements of the more specific rules contained herein.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.001.

61G15-33.002 Definitions.

(1) Engineer of Record for the Electrical Systems. The Florida Registered Professional Engineer who develops the electrical system design criteria or performs the analysis and is responsible for the preparation of the Electrical documents for the project.

(2) Electrical Component. An individual electrical device to be part of an electrical system.

(3) Electrical. Any device or mechanism that operates due to the action of electricity.

(4) Electrical System. Any system, assembly of electrical components, materials, utilities, equipment, work system, machines, products or devices which require electrical energy in order to perform its intended function.

(5) Electrical Engineering Documents. The electrical drawings, specifications, reports and other documents setting forth the overall design and requirements for the construction, addition, modernization, repair, demolition, arrangement, and/or use of the electrical system, or analysis or recommendations, as prepared by the Engineer of Record for the Electrical System.

(6) Electrical Submittals. Submittals, catalog information on standard products, or drawings prepared solely to serve as a guide for fabrication and installation and requiring no engineering input. These submittals do not require the seal of a Florida registered engineer.

(7) Codes and Standards. Those nationally recognized Codes and Standards adopted directly or by reference in Part II, Chapter 553, Florida Statutes. Applicable codes and standards also include those published by the National Fire Protection Association (NFPA), the Institute of Electrical and Electronic Engineers (IEEE), the Illuminating Engineering Society of North America (IESNA), as well as those promulgated by the state fire marshal and other state and local authorities having jurisdiction.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.002.

61G15-33.003 Design of Power Systems.

(1) Power systems convey or distribute electrical energy. Items to be included in the design and analysis of these systems are: steady state and transient loads, short circuit protection (design and analysis), load flow, voltage drop, harmonics, and protective device coordination.

(2) Electrical engineering documents applicable to power systems shall at a minimum indicate the following:

(a) System Riser Diagram.

(b) Conductor Ampacities (sizes) and insulation type.

(c) Protection devices and interrupting capability.

(d) Main and distribution panelboard locations and sizes.

(e) Circuitry of all outlets and devices.

(f) Short circuit analysis.

(g) Load computations.

(h) Electrical legend.

(i) Grounding and bonding.

(j) Instrumentation control.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.003.

61G15-33.004 Design of Lighting Systems.

(1) Lighting systems convert electrical energy into light. Items to be included in the lighting design and analysis are: Average illuminance, Equivalent spherical illuminance, Uniformity rations, Visual comfort probability, special purpose lighting, and the requirements of the Florida Energy Efficiency Code, part IX, Chapter 553, Florida Statutes.

(2) Electrical engineering documents for lighting systems shall, at a minimum, indicate the following:

(a) Lighting fixture performance specifications and arrangements.

(b) Emergency Lighting.

(c) Exit Lighting.

(d) Lighting Control and circuiting.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.004.

61G15-33.005 Design of Communications Systems.

(1) Communications systems are utilized to convey messages or data. Items to be included in the design or analysis of these systems are: Human factors engineering, cabling requirements, installation requirements, performance requirements, backup power requirements, the interrelationship of the various systems, and applicable regulatory requirements.

(2) Electrical engineering documents for communications systems shall, at a minimum, indicate the following:

(a) System riser diagram.

(b) Equipment legend.

(c) Conductor type and installation requirements.

(d) Device type and locations.

(e) Backup power sources where applicable.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.005.

61G15-33.006 Design of Alarm Systems.

(1) Alarm systems are used to monitor and alarm a fire or other emergency condition. Items to be included in the design or analysis of these systems are: structure alarm requirements, location and audibility, types of alarms and initiation devices, notification requirements, installation requirements, backup power requirements, applicable regulatory requirements, and the provisions of rule 61G15-32.007, F.A.C.

(2) Design documents for alarm systems shall, at a minimum, indicate the following:

(a) System riser diagram.

(b) Device types and locations.

(c) Type of conductors and installation requirements including rating identification and listing requirements.

(d) Notification requirements.

(e) Backup power requirements.

(f) Where applicable, backup power sources and inter-ties to other systems/components.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.006

61G15-33.007 Design of Lightning Protection Systems.

(1) Lightning Protection Systems are passive systems used to protect building and structures from damage caused by lightning and static discharges. Items to be considered in the design or analysis of this system include the requirements of NFPA-78.

(2) Electrical engineering documents for lightning protection systems shall indicate:

(a) Air terminals height and spacing.

(b) Arrangement of Main and Down conductors.

(c) Grounding points and spacing.

(d) Legend.

(e) Testing requirements of grounds.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.007.

61G15-33.008 Design of Grounding Systems.

(1) Grounding Systems are passive systems used to establish an electrical potential reference point in an electrical system for the proper dissipation of energy in case of abnormal or transient conditions.

(2) Design documents for grounding systems shall indicate at a minimum the following:

(a) type and location of grounding electrodes.

(b) bonding requirements.

(c) testing requirements.

(d) conductor material type, size and protection requirements.

(e) separate grounding systems, properly bonded, per code and use requirements.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.008.

61G15-33.009 Design of Instrumentation and Control Systems.

(1) Instrumentation and control systems are used to automate processes. Items to be included in the design and analysis of these systems are: reliability of control of critical processes, safety of personnel, and suitability of instruments and control devices in the environment in which they are installed.

(2) Electrical engineering documents for instrumentation and control systems shall indicate, at a minimum, the following:

(a) A description of the control system functions, or a functional diagram.

(b) Specifications of control instruments and their location.

(c) Type of conductors and cables, and requirements for their installation.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 5-19-93, Formerly 21H-33.009.

CHAPTER 61G15-34
MECHANICAL SYSTEMS

61G15-34.001 General Responsibility. Mechanical Engineering Documents shall be prepared in accordance with the applicable technology and with the requirements of the authority having jurisdiction. The documents shall identify the Engineer of Record for the mechanical systems project. Mechanical Engineering documents shall be prepared in accordance with the requirements of the applicable codes and standards as defined herein. The Engineer of Record is responsible for determining the applicability of appropriate codes and standards for a given project. In the event the codes and standards fail to cover or address a specific requirement or situation, alternative research, test results, engineering data, and engineering calculations shall be utilized. New technology may be utilized when said technology has been demonstrated to provide equivalent or improved performance. Construction documents shall indicate the nature and character of mechanical work and shall describe, label and define the required mechanical systems components, processes, equipment and material and its structural utility support systems. Both the Engineer of Record for the Mechanical System and the Delegated Engineer if utilized, shall comply with the requirements of the general responsibility rules, 61G15-30, F.A.C., and with the requirements of the specific rules contained herein.
Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.002 Definitions.

(1) Engineer of Record for the Mechanical Systems. The Florida Registered Professional Engineer who develops the mechanical systems design criteria or performs the analysis and is responsible for the preparation of the mechanical documents for the project.

(2) Mechanical Component. Any individual device to be part of a mechanical system.

(3) Mechanical. Any device or mechanism that operates due to the action of the material forces in nature acting on bodies or masses.

(4) Mechanical System. Any assembly of mechanical components, materials, equipment, work systems, machines, products, or devices which require design in accordance with mechanical engineering standards in order to perform its intended function.

(5) Mechanical Engineering Documents mechanical drawings, specifications, reports, other documents setting forth the overall design and requirements for the construction, alteration, modernization, repair, demolition, arrangement, and/or use of the mechanical system(s), or analysis or recommendations, as prepared by the Engineer of Record for the mechanical system.

(6) Mechanical Submittals. Submittals, catalog information on standard products, or drawings prepared solely to serve as a guide for fabrication and installation and requiring no engineering input. These submittals do not require the seal of a Florida Registered Professional Engineer.

(7) Codes and Standards. Those nationally recognized Codes and Standards adopted directly or by reference in Part II, Chapter 553, Florida Statutes. Applicable codes and standards are those promulgated by the State Fire Marshal and those required by the state and local authorities having jurisdiction. These codes and standards include those published by the National Fire Protection Association (NFPA), The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), The American Society for Testing Materials (ASTM), American Society for Mechanical Engineers (ASME), National Electrical Manufacturers Association (NEMA) American National Standards Institute (AN Underwriters' Laboratories (UL), Amer. Society of Plumbing Engineers (ASPE), Sheet Metal and Air Conditioning Contractor's Association (SMACNA), American Movement and Control Association (AMCA), Air Conditioning and Refrigeration Institute (ARI), SBCCA Mechanical and Plumbing Codes, Florida Energy Code, State Building Codes.
Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.030 FS. History—New 11-16-94, Amended 2-5-96.

61G15-34.003 Design of Heating Ventilation and Air Conditioning Systems.

(1) Heating, Ventilating, and Air Conditioning (HVAC) Systems are those systems that control the temperature and/or humidity of a particular space or building. Items to be considered in the design and analysis of these systems are ambient dry and wet bulb temperatures, inside dry and wet bulb temperatures, inside design humidity, fresh air makeup, internal heat gains from any sources. Ventilation systems shall be designed to remove foul odors from a space or building, or to remove space heat from equipment rooms. All HVAC systems shall be designed in accordance with the ASHRAE Standards and Building Code as adopted by the authority having jurisdiction. T HVAC systems shall be designed and oper such that the entire building is under positive neutral pressure when all primary HVAC systems are operating.

(2) Mechanical Engineering documents applicable to HVAC systems shall, where

applicable, include but are not limited to the following:

(a) Equipment selection schedule for each piece of mechanical equipment. All equipment shall have capacities listed including efficiencies, electrical or fuel requirements, static pressure and fan air quantities as applicable to the system, fluid flow and pressure head quantities as applicable to the system, and heat transfer capacities.

(b) Floor plans; site plans; and building and mechanical system elevations as appropriate.

(c) Outside (fresh) air make-up conditions.

(d) Cooling coil requirements based on sensible heat, latent heat and total heat gains.

(e) Heating equipment requirements.

(f) Outside and inside design dry and wet bulb conditions.

(g) Exhaust riser diagrams.

(h) Outside air riser diagrams.

(i) Process flow diagrams with pipe sizes and fluid flow quantities.

(j) Condensate discharge piping with pipe sizes.

(k) Instrumentation and Control System diagrams and sequence of operation.

(l) Ductwork layout and sizing; insulation, supply, return, and exhaust inlet and outlet sizes; and outside air intake sizes. Air quantities shall be specified for inlets and outlets.

(m) Florida Energy Code calculations as applicable.

(n) NFPA Standards and all required fire protection devices and systems.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.004 Design of Process and Fluid Flow Systems.

(1) Process and Fluid Flow Systems are those systems that are designed to move fluids either by pumps, fans, or gravity as part of an industrial, commercial, or cogeneration process. Items to be included in the design of these systems are fluid type and characteristics, fluid flow quantities, fluid pressure head, pump type, fan type, piping specifications, ductwork, specifications and process type.

(2) Mechanical documents applicable to fluid flow systems shall at a minimum include the following:

(a) Equipment schedule for each piece of mechanical equipment including fluid type and characteristics, system pressure head and flow requirements, and electrical or fuel requirements.

(b) Floor plans, site plans, and building and system elevations.

(c) Process flow diagrams with pipe or ductwork layout.

(d) System piping or ductwork layout.

(e) Specific system design requirements to allow for independent project review.

(f) List of NFPA, ASHRAE, ASME, ANSI or other applicable design standards and requirements.

(g) Instrumentation and Control Diagrams and sequence of operation.

(h) Required fire protection systems and devices.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.005 Design of Heat and Energy Transfer Systems.

(1) Heat and Energy Transfer Systems are those systems that are designed to transfer heat or energy from one fluid to another, as part of an industrial, commercial, or cogeneration process. Items to be included in the design of these systems are fluid type and characteristics, fluid flow quantities, fluid pressure head, pump type, fan type, heat exchanger type, piping specification, ductwork specification, and process type.

(2) Mechanical documents applicable to heat and energy transfer systems shall at a minimum include the following:

(a) Equipment schedule for each piece of mechanical equipment including fluid type and characteristics, system pressure head and flow requirements, and electrical or fuel requirements.

(b) Floor plans, site plans, and building and systems elevations.

(c) Process flow diagrams with pipe or ductwork sizes.

(d) System piping or ductwork layout.

(e) Specific system design requirements to allow independent project review.

(f) List of NFPA, ASHRAE, ASME, ANSI or other applicable design standards and requirements.

(g) Instrumentation and Control Diagrams and sequence of operation.

(h) Required fire protection systems and devices.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.006 Design of Material and Human Transfer Systems.

(1) Material and Human Transfer Systems are those systems that are designed to move materials or humans from one place to another as a part of an industrial or commercial process.

(2) Mechanical documents applicable to material and human transfer systems shall at a minimum include the following:

(a) Equipment schedule items to be included in the design of these systems are material type and characteristics, material flow quantities, material or human weight, conveyor types, elevator types, electrical and hydraulic requirements, and ventilation requirements.

(b) Floor plans, site plans, and building and system elevations.

(c) Process flow diagrams with appropriate system sizing information.

(d) System conveyor and/or elevator layout.

(e) Specific system design requirements to allow for independent project review.

(f) List of NFPA, ASHRAE, ASME or other applicable design codes, standards, and requirements.

(g) Instrumentation and Control Diagrams and sequence of operation.

(h) Required fire protection systems and devices.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.007 Design of Plumbing Systems.

(1) Plumbing systems are those systems within a building that convey fluids, and gases generally as required by building codes.

(2) Mechanical Engineering Documents applicable to Plumbing Systems shall when applicable, include but are not limited to the following:

(a) Equipment schedules for all plumbing fixtures, water heaters, boilers, pumps, grease traps, septic tanks, storage tanks, expansion tanks, compression tanks and roof and floor drains.

(b) Floor plans, site plans, and building and plumbing system elevations are appropriate.

(c) Isometric diagrams with pipe sizes and total water fixture units.

(d) Sanitary riser diagrams with pipe sizes and total sanitary waste fixture units.

(e) Storm riser diagrams with pipe sizes and cumulative drain area square footages.

(f) Cold water, hot water, sanitary, and storm drainage piping layouts.

(g) System isometrics and flow diagrams of other fluids and gases.

(h) Design data for septic tank, grease trap(s), drain field sizing, when applicable.

(i) List of ASHRAE, ASME, ASPE, ANSI and other applicable codes, design standards, and requirements.

(j) Design shall be in accordance with handicap requirements adopted by the authority having jurisdiction.

(k) Instrumentation and Control Diagrams and sequence of operation.

(l) All plumbing fixtures, valves, pumps, tanks, accessories, specialties, enclosures, and such equipment shall be described and located on the drawings.

(m) Materials for all plumbing systems shall be specified.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.008 Design of Mechanical Machines and Motion Systems.

(1) Mechanical Machines and Motion Systems include any and all mechanical systems, devices, machines and equipment used by the public for conveyance, amusement, transportation, or facilitation of any process. These systems would include elevators, escalators, moveable walkways, amusement park rides, etc. Items to be included in the design of these systems include Building Code and permitting requirements, electrical requirements, hydraulic requirements, gear and drive sizes and materials, instrumentation and controls, handicap requirements, structural requirements, operating dynamics requirements.

(2) Mechanical documents applicable to mechanical machines and motion systems shall at a minimum include the following:

(a) Equipment schedule for each piece of mechanical equipment including material type and characteristics, systems weight loading requirements and electrical and hydraulic requirements.

(b) Floor plans, site plans, and building and system elevations.

(c) System diagrams and schematics with appropriate system sizing information.

(d) System layout and design requirements.

(e) Specific system design requirements to allow for independent project review.

(f) List of NFPA, ASHRAE, ASME, ANSI or other applicable design codes, standards, and requirements.

(g) Instrumentation and Control Diagrams and sequence of operation.

(h) Required fire protection systems and devices.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

61G15-34.009 Design of Instrumentation and Control Systems.

(1) Instrumentation and Control Systems are used to automate processes, control and monitor HVAC systems, and monitor fire protection systems where applicable. Items to be included in the design of control systems are reliability of control of critical processes, design parameters of systems being controlled, safety of personnel, suitability of instruments and control devices in the environment in which they are to be installed, Building Code requirements, NFPA requirements, ASHRAE design standards for HVAC systems.

(2) Mechanical Engineering documents for instrumentation and controls shall indicate, at a minimum, the following:

(a) A description of the control systems functions, or a functional diagram.

(b) Specification of control instruments and their location.

(c) Floor plans showing the location of major control components.

(d) Control and Process System Diagrams.

(e) Electrical requirements including conductors and cables (may be on electrical drawings).

(f) Sequence of operation for each system.

Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History—New 11-16-94.

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ENGINEERING

operation of engineered projects, but exclude the surveying of real property for the establishment of land boundaries, rights-of-way, easements, and the dependent or independent surveys or resurveys of the public land survey system.

Requirements for Licensure[8]

Note: The following are recommended requirements of the NCEES *Model Law*. Actual requirements in state law may vary from the NCEES recommendation.

Education - Graduate of an engineering curriculum of four years or more approved by the state licensing board as being of satisfactory standing. Degree program shall be accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering & Technology (EAC/ABET) or determined by the state licensing board as being equal to those curricula which are accredited.

Experience - Four years or more of progressive experience on engineering projects of a grade and character which indicates to the board that the applicant may be competent to practice engineering. Experience should be gained under the supervision of a licensed professional engineer.

ARCHITECTURE

Requirements for Licensure[16]

Note: The following are recommended requirements of the NCARB *Model Law*. Actual requirements in state law may vary from the NCARB recommendation.

Education - Graduate of a five-year bachelor's degree program in architecture. Degree program shall be accredited by the National Architectural Accrediting Board or determined by the state licensing board as being equal to those curricula which are accredited.

Experience - Three years of training credits.

Credits can be earned as follows:

1) Combination of experience in architecture as an employee of a registered architect; experience in architecture as an employee in a non-architectural organization under the direct supervision of a registered architect; experience directly related to architecture under the direct supervision of a licensed engineer practicing in the field of building construction or a licensed landscape architect; experience directly related to on-site building construction operations or experience involving physical analyses of existing buildings; post professional degree in architecture or teaching or research.

2) Intern Development Program (IDP), requiring the earning of 700 Value Units (VUs), or 5600 hours, of acceptable activity across the training categories of design and construction documents, construction administration, management, and related activities.

ENGINEERING

Examination - Two examinations required:

1) Engineering Fundamentals (FE): eight-hour test on the fundamentals of engineering.

2) Principles and Practice of Engineering (PE): eight-hour test on applied engineering. licensing board.

ARCHITECTURE

Examination - One examination required:

Architectural Registration Examination (A.R.E.): 32.5 hour test of professional and technical subjects.

ENGINEERING

Scope Of the Practice Of Engineering[7]

Any service or creative work, the adequate performance of which requires engineering education, training, and experience in the application of special knowledge of the mathematical, physical, and engineering sciences to such services or creative work as consultation, investigation, evaluation, planning, design and design coordination of engineering works and systems, planning the use of the land and water, teaching of advanced engineering subjects, performing engineering surveys and studies, and review of construction for the purpose of monitoring compliance with drawings and specifications; any of which embraces such services or work, either public or private, in connection with any utilities, structures, buildings, machines, equipment, processes, work systems, projects, and industrial or consumer products or equipment of mechanical, electrical, hydraulic, pneumatic, or thermal nature, insofar as they involve safeguarding life, health, or property, and including such other professional services as may be necessary to the planning, progress, and completion of any engineering services.

Design coordination includes the review and coordination of those technical submissions prepared by others, including as appropriate and without limitation, consulting engineers, architects, landscape architects, land surveyors, and other professionals working under direction of the engineer.

Engineering surveys include all survey activities required to support the sound conception, planning, design, construction, maintenance, and

ARCHITECTURE

Business Practice and Management: concepts, ethical principles, procedures and techniques related to the different forms of organization for architectural practice;

Laws and Regulations: understanding the body of common law, legislation, and regulation.

Scope Of the Practice Of Architecture[15]

Rendering or offering to render those services, hereinafter described, in connection with the design and construction, enlargement or alteration of a building or group of buildings and the space within and surrounding such buildings, which have as their principal purpose human occupancy or habitation; the services referred to include planning, providing preliminary studies, designs, drawings, specifications and other technical submissions, the administration of construction contracts, and the coordination of any elements of technical submissions prepared by others including, as appropriate and without limitation, consulting engineers and landscape architects; provided that the practice of architecture shall not include the practice of engineering as defined in **[Statute Reference]**, but a registered architect may perform such engineering work as is incidental to the practice of architecture.

SUMMARY OF BUILDING DESIGN PROVISIONS IN STATE LAW

		NCEES	NCARB	Alabama	Alaska[1]	Arizona[1]	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii[1]	Idaho	Illinois PE[9]	Illinois SE[9]	Indiana	Iowa	Kansas[1]	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan[1]	Minnesota[1]	Mississippi	Missouri[1]	Montana	Nebraska[1]	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota[1]	Tennessee[1]	Texas	Utah	Vermont	Virginia[1]	Washington	West Virginia	Wisconsin[1]	Wyoming
PROFESSIONAL ENGINEER (PE) LICENSING STATUTE																																																							
1	Includes "design of buildings" in scope	Y		Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y[10]	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A[12]	N	Y	Y	N	Y	Y	Y	Y
2	Includes "design of structures" in scope	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A[12]	N	Y	Y	Y	Y	Y	Y	Y
3	Lists building types that only a PE may design solely[2]	N		N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4	Limits building types that a PE may design solely[3]	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5	Exempts building types[4]	N		Y	Y	Y	N	Y	N	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	Y	Y	N	N	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N
6	Exempts architects (including "engineering incidental to practice of architecture")	N		Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	Y	N	N	N	N
7	Exempts licensed "trades/professions"	Y		Y	N	N	Y	Y	Y	N	N	Y	N	N	Y	N	N	N	Y	N	N	Y	Y	N	Y	N	Y	N	N	Y	N	N	N	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	N	N	N	Y	Y	N	N
8	Permits PE practice of "architecture incidental to practice of engineering"	N		Y	Y	Y	Y	N	N	N	N	Y	Y	N	N	N	N	N	N	N	Y	N	N	N	Y	Y	N	N	Y	N	N	N	Y	N	N	N	N	N	Y	N	Y	N	N	N	Y	N	Y	N	N	N	N	N	N
9	PE as "coordinating" or "prime" professional	Y		N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
10	Others as "coordinating" or "prime" professional	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
REGISTERED ARCHITECT (RA) LICENSING STATUTE																																																						
11	Restricts scope to buildings for "human habitation or occupancy"		Y	N	Y	N	Y	N	N	N	Y	Y	N	N	Y	N	N	N	Y	N	Y	N	N	N	N	N	N	N	N	Y	N	Y	N	Y	Y	N	N	N	N/A[11]	N	N	Y	N	N	Y	N/A[12]	N	N	Y	N	N	Y	N	N
12	Lists building types that only an RA may design solely[5]		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
13	Exempts building types[6]		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14	Exempts engineers (including "architecture incidental to practice of engineering"		Y	Y	N	Y	Y	Y[8]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	Y
15	Exempts licensed "trades/professions"		N	N	N	N	Y	Y	Y	N	N	Y	N	N	Y	N	Y	N	N	N	N	N	N	N	Y	N	Y	Y	N	N	N	N	N	N	Y	Y	N	N	Y	N	N	N	Y	N	Y	Y	N	Y	N	N	Y	Y	N	Y
16	Permits RA practice of "engineering incidental to practice of architecture"		Y	Y	Y	Y	Y	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	Y	N	N	N	N
17	RA as "coordinating" or "prime" professional		Y	Y	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y	N	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N
18	Others as "coordinating" or "prime" professional		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
MISCELLANEOUS																																																					
19	Board Joint Agreement/Disciplinary Procedure[7]			Y	N	N	Y	N	N	N	N	Y	Y	N	N	Y	Y	N	N	N	N	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	N	Y	N	N
20	Statewide Building Code			N	N	N	Y	Y	N	Y	N	Y	Y	Y	N	N	N	N	Y	N	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N
21a	Code Official Handbook Issued by Board/Boards			N	N	Y/J	Y/J	N	N	N	Y/J	N	Y/RA	N	N	N	Y/J	Y/J	N	N	N	N	N	N	Y/J	Y/J	N	Y/J	N	N	N	Y/J	Y/J	N	N	N	N	N	N	N	N	N	Y/J	Y/J	N	Y/J	N	N	N	Y/J	N	N	N
21b	Code Official Handbook Proposed by Board/Boards			N	Y/J			N	N		Y/J		N	N	N			N	N	N	Y/J	N	N			N	Y/J	Y/RA			N	Y/J	Y/J	N	N	N	N	N		N	N	Y/J			Y/RA		N	N	Y	Y/J	N	N
22a	Code Official Handbook Issued by Society/Societies			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y/J	N	N	N	N	N	Y/RA	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N/J	N	N	N	N	N	N
22b	Code Official Handbook Proposed by Society/Societies			N	N	N	N	N	N	N	N	N	N		N	N	N	N	N	N	N	N	N	Y/PE	N	N	N	N	N	N	N	Y/J	N		N	N	N	N	N	N	N	N	N	Y/RA	N	N	N	N	N	N	N	N	N
23	PE/RA Society Joint Agreement			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N

1 Professional engineers and registered architects regulated under the same licensing statute
2 See Supplement for detailed responses of states responding "Yes"
3 See Supplement for detailed responses of states responding "Yes"
4 See Supplement for detailed responses of states responding "Yes"
5 See Supplement for detailed responses of states responding "Yes"
6 See Supplement for detailed responses of states responding "Yes"
7 See Supplement for detailed responses of states responding "Yes"
8 Exempts structural engineers only
9 Illinois licenses structural engineers separately from professional engineers
10 Definition states "certain buildings" and "building systems"
11 Architectural statute does not contain a definition of practice of architecture
12 Licensing statute does not contain definitions of practice of architecture or of engineering

SUPPLEMENT TO CHART OF BUILDING DESIGN PROVISIONS IN STATE LAWS

SURVEY ITEM 3: ENGINEERING STATUTE LISTS BUILDING TYPES THAT ONLY A PE MAY DESIGN SOLELY

Illinois (Structural Engineering statute) - structures or the structural part of edifices designed solely for the generation of electricity; or for the hoisting, cleaning, sizing or storing of coal, cement, sand, grain, gravel or similar materials; elevators; manufacturing plants; docks; bridges; blast furnaces; rolling mills; gas producers and reservoirs; smelters; dams; reservoirs; waterworks; sanitary works as applied to the purification of water; plants for waste and sewage disposal; round houses for locomotives; railroad shops; pumping or power stations for drainage districts; or power houses, even though such structures may come within the definition of "buildings" as defined in any Act in the state relating to the regulation of the practice of architecture.

New Jersey (Building Design Services statute) - drainage facilities for sites of ten acres or more or involving storm water detention facilities or traversed by a water course; sewage or water treatment plant; power plant; transportation system.

SURVEY ITEM 4: ENGINEERING STATUTE LIMITS BUILDING TYPES THAT A PE MAY DESIGN SOLELY

New Jersey (Building Design Services statute) - limits engineers from the design of buildings in the following BOCA use group classifications: Assembly, except for outdoor assembly or as an incidental use; Business, except for car wash facilities, materials testing laboratories, and telephone exchanges and data processing relay or equipment facilities, or as an incidental use; Educational except as an incidental use; Institutional, except as an incidental use; Mercantile, except as an incidental use; Residential, except as an incidental use; transportation terminals, railroad stations or administration buildings where public access is a primary consideration.

SURVEY ITEM 5: ENGINEERING STATUTE EXEMPTS BUILDING TYPES

Alabama - public works whose cost does not exceed $20,000.

Alaska - single family residences; farm or ranch buildings, unless the public health, safety, or welfare is involved; residences for not more than four families and not more than two stories; garages, workshops, or similar buildings of less than 2,000 sq. ft. of floor space and to be used for private-noncommercial purposes; alterations or repairs that do not change or affect structural safety or the public health, safety, or welfare.

Arizona - detached single family dwellings; one or two story buildings or structures in which the square footage of floor area measured to the outside surface of the exterior walls does not exceed 3,000 sq. ft., and not intended for occupancy by more than 20 persons on a continuous basis, and in which the maximum span of any structural member does not exceed 20 feet unless a greater span is achieved by the use of wood or steel roof or floor trusses or lintels approved by an engineer registered by the board; additions or alterations to a one or two story building or structure subject to the preceding limitations, with permission to exceed the 3,000 sq. ft. limitation for a one-time single addition not exceeding 1,500 sq. ft. as measured to the outside surface of the exterior walls, designed for the purpose of storage of chattels; buildings or structures to be erected on property owned or leased by a person, firm or corporation, including a utility, telephone, mining or railroad company, which employs a non-registrant on a full-time basis, if the buildings or structures are intended solely for the use of the owner or lessee of the property, and are not ordinarily occupied by more than 20 people, and are not for sale to, rental to or use by the public and conform to the building code adopted by the city, town, or county in which the building is to be erected or altered.

California - single family dwellings of wood-frame construction not more than two stories and basement in height; multiple dwellings containing no more than four units of wood-frame construction and not more than two stories and basement, but not multiple clusters of up to four dwelling units each to form apartment or condominium complexes where the total exceeds four units on any lawfully divided lot; garages or other structures of wood-frame construction not more than two stories and basement; agricultural and ranch buildings of wood-frame construction, unless the public health, safety, and welfare is involved.

Georgia - any construction, including alterations less than $100,000; buildings exclusively for private or noncommercial purposes; private residences; noncommercial farm buildings; residential buildings not exceeding two stories, excluding basements.

Hawaii - public works that do not exceed $15,000; privately owned or controlled one story buildings that do not exceed $40,000 or privately owned or controlled two story buildings that do no exceed $35,000, so long as their principal structural members consist of reinforced concrete or structural steel having riveted, bolted, or welded connections; privately owned or controlled one story residences that do not exceed $50,000 and privately owned or controlled two story residences that do not exceed $45,000.

Indiana - buildings exempt under 22-15-3-3(a).

Kansas - buildings on owner's own premises for personal use; one or two family dwellings; agricultural buildings.

Kentucky - public works that do not exceed $2,000.

Louisiana - private homes or dwellings; domestic structures or works for own use; farm buildings.

Maine - public works that do not exceed $5,000.

Michigan - residence buildings not exceeding 3,500 sq. ft. in calculated floor area; public works less than $15,000.

Minnesota - buildings for own occupancy or use, unless such occupancy involves the public health or safety or the health and safety of employees; single family dwellings and accessory buildings; two family dwellings; farm buildings; temporary buildings or sheds used for construction, not exceeding two stories, and not used for living quarters.

Nebraska - buildings for own use; residential or farm buildings, or accessory buildings, outside of the corporate or zoning limits of any city or village; privately-owned potato cellars or residential one story commercial or industrial buildings or structures inside or outside corporate or zoning limits of any city or village unless such buildings provides for the employment, housing or assembly of 20 or more persons or is larger than 5,000 sq. ft. or the walls of such buildings or structures exceed 30 feet.

New Jersey - one family residences designed by owner.

New Mexico - (By statute) public works that do not exceed $100,000; (by board rule) one family dwellings not more than two stories; multiple dwellings not more than two stories containing not more than four units of wood frame construction; garages or other structures not more than two stories in height connected with one family and multiple dwellings; nonresidential buildings with an occupant load of ten or less and not more than two stories, not including day care, hazardous, or institutional occupancies; alterations which present non-unusual circumstances, hazards, or changes of occupancy.

New York - public works that do not exceed $5,000; farm buildings; residence buildings with a gross area of 1,500 sq. ft. or less; alterations costing $10,000 or less in New York City; alterations costing $20,000 or less outside New York City.

North Dakota - public works that do not exceed $50,000.

Ohio - public works that do not exceed $5,000.

South Carolina - farm buildings not designed or used for human occupancy; buildings and structures less than three stories and less than 5,000 sq. ft in area, except buildings of assembly, institutional, education or hazardous occupancies; alterations to the above building types.

South Dakota - single family dwellings and accessory buildings; two, three, or four family dwellings; five to sixteen family dwellings in governmental subdivisions of state that provide a detailed building code review by a building inspection department; farm or ranch buildings; temporary buildings or sheds used exclusively for construction, not exceeding two stories and not used for living quarters; portions of a hospital occupied by patients on a 24 hour basis or jails if the gross square footage of the new construction, alteration, or enlargement is 3,000 sq. ft. or less; hospitals, hotels, motels, restaurants, libraries, medical offices, nursing homes, retirement homes, mortuaries, or hospital areas if the gross square footage of the new construction, alteration, or enlargement is 4,000 sq. ft. or less; auditoriums, banks, churches, fire stations, schools, one-story offices, theaters, or public buildings if the gross square footage of the new construction, alteration, or enlargement is 5,000 sq. ft. or less; service stations if the gross square footage of the new construction, alteration, or enlargement is 6,000 sq. ft. or less; bowling alleys, multi-story offices, shopping centers or stores if the gross square footage of the new construction, alteration, or enlargement is 7,000 sq. ft. or less; industrial plants or public garages if the gross square footage of the new construction, alteration, or enlargement is 11,000 sq. ft. or less; warehouses if the gross square footage of the new construction, alteration, or enlargement is 20,000 sq. ft. or less; any other building if the gross square footage of the new construction, alteration, or enlargement is 1,000 sq. ft or less.

Tennessee - business, factory-industrial, hazardous, mercantile, residential, and storage buildings less than three stories and less than 5,000 sq. ft. in total gross area; one and two family dwellings and accessory buildings; farm buildings not intended for human occupancy.

Texas - private dwellings or apartments not exceeding eight units per building for one story buildings, or apartments not exceeding four units per building and having a maximum height of two stories, and garages or other structures associated therewith; farm buildings; other buildings having no more than one story and containing no clear span between supporting structures greater than 24 feet on the narrow side and having a total floor area not in excess of 5,000 sq. ft., provided that on unsupported spans greater than 24 feet on such buildings only the trusses, beams, or other roof supporting members need to be engineered or pre-engineered provided that no representation is made or implied that engineering services have been or will be offered to the public; public works that do not exceed $8,000.

Utah - buildings that are B-2 occupancy as defined by the Uniform Building Code, except factories, workshops, storage rooms, and paint stores; N-2 occupancy buildings as defined by the Uniform Building Code; buildings less than 1,000 sq. ft.

Vermont - buildings not defined as "public buildings" in Title 18 of the Vermont statute.

Virginia - one and two family homes, townhouses, and multi-family dwellings, excluding electrical and mechanical systems, not exceeding three stories; farm buildings; business and mercantile buildings and churches with an occupant load of 100 or less, excluding electrical and mechanical systems, where such building does not exceed 5,000 sq. ft in total net floor area, or three stories; factory, industrial, and storage buildings, excluding electrical and mechanical systems, where such building does not exceed 15,000 sq. ft in total net floor area, or three stories; additions, remodeling, or interior design without a change in occupancy or occupancy load and without modification to the structural system or a change in access or exit patterns or increase in fire hazard.

Wisconsin - single family dwellings; apartment buildings of not more than two units; farm buildings; temporary buildings used exclusively for construction purposes, not exceeding two stories, and not used for living quarters; buildings of less than 50,000 cubic feet total volume.

SURVEY ITEM 12: ARCHITECTURAL STATUTE LISTS BUILDING TYPES THAT ONLY AN RA MAY DESIGN SOLELY

New Jersey (Building Design Services statute) - buildings in BOCA use groups: Assembly, except outdoor assembly or as an incidental use; Business, except car wash facilities, materials testing laboratories, or telephone exchange and data processing relay or equipment facilities or as an incidental use; Educational except as an incidental use; Institutional, except as an incidental use; Mercantile, except as an incidental use; Residential except as incidental use; transportation terminals, railroad stations, or administration buildings.

Oklahoma - buildings to be used as an armory, auditorium, assembly hall, convention hall, church, education building, convent, dormitory, gymnasium, hospital, library, bonded warehouse, passenger station, power house, municipal building, county building, state building, federal building, radio or television station, stadium or theater exceeding $40,000.

SURVEY ITEM 13: ARCHITECTURAL STATUTE EXEMPTS BUILDING TYPES

Alabama - farm buildings; single family residences; utility works, structures or buildings designed by an employee of the utility; buildings less than 2,500 sq. ft. and not intended for occupancy, except schools, churches, auditoriums, or other buildings intended for assembly or occupancy.

Alaska - single family residences; farm or ranch buildings, unless the public health, safety, or welfare is involved; residences for not more than four families and not more than two stories; garages, workshops, or similar buildings of less than 2,000 sq. ft. of floor space and to be used for private-noncommercial purposes; alterations or repairs that do not change or affect structural safety or the public health, safety, or welfare.

Arizona - detached single family dwellings; one or two story buildings or structures in which the square footage of floor area measured to the outside surface of the exterior walls does not exceed 3,000 sq. ft., and not intended for occupancy by more than 20 persons on a continuous basis and in which the maximum span of any structural member does not exceed 20 feet unless a greater span is achieved by the use of wood or steel roof or floor trusses or lintels approved by an engineer registered by the board; additions or alterations to a one or two story building or structure subject to the preceding limitations, with permission to exceed the 3,000 sq. ft. limitation for a one-time one addition not exceeding 1,500 sq. ft. as measured to the outside surface of the exterior walls designed for the purpose of storage of chattels; buildings or structures to be erected on property owned or leased by a person, firm or corporation, including a utility, telephone, mining or railroad company, which employs a non-registrant on a full-time basis, if the buildings or structures are intended solely for the use of the owner or lessee of the property, and are not ordinarily occupied by more than 20 people, and are not for sale to, rental to or use by the public and conform to the building code adopted by the city, town, or county in which the building is to be erected or altered.

Arkansas - buildings for personal use if such buildings are not intended or adaptable for public employment, assembly, or any other use under which they will be open to the public; single family detached, duplex, triplex, or quadplex dwellings; buildings constructed at a cost that does not exceed $75,000.

California - single family dwellings of wood-frame construction not more than two stories and basement; multiple dwellings containing no more than four units of wood-frame construction and not more than two stories and basement, but not multiple clusters of up to four units each to form apartment or condominium complexes where the total exceeds four units on any lawfully divided lot; garages or other structures of wood-frame construction not more than two stories and basement; agricultural and ranch buildings of wood-frame construction, unless the public health, safety, and welfare is involved.

Colorado - one, two, three, and four family dwellings including accessory buildings; garages, industrial buildings, offices, farm buildings, and warehouses which do not exceed one story in height, and which are not designed for occupancy by more than ten persons; additions, alterations or repairs to above buildings so long as the addition, alteration, or repair does not cause the building to exceed applicable limitations; nonstructural alterations of any nature so long as they do not affect life safety.

Connecticut - residential dwellings for not more than two families including accessory buildings; farm buildings; buildings less than 5,000 sq. ft. total area; building additions or alterations of less than 5,000 sq. ft.

Delaware - one and two family dwellings and accessory buildings; farm buildings, provided they are designed for occupancy by no more than ten persons; alterations, remodeling, or renovation not affecting structural safety and when work does not require the issuance of a building permit.

Florida - farm buildings; one family and two family residence buildings, townhouses, or accessory buildings; buildings costing less than $25,000 except a school, auditorium, or other building intended for public use.

Georgia - farm buildings; one family and two family residence buildings or accessory buildings; buildings costing less than $100,000 except schools, auditoriums, or other buildings intended for mass assemblage of people or group housing projects.

Hawaii - public works that do not exceed $15,000; privately owned or controlled one story buildings that do not exceed $40,000 or privately owned or controlled two story buildings that do no exceed $35,000, so long as their principal structural members consist of reinforced concrete or structural steel having riveted, bolted, or welded connections; privately owned or controlled one story residences that do not exceed $50,000 and privately owned or controlled two story residences that do not exceed $45,000.

Idaho - single or multiple family residences not exceeding two stories; farm buildings; accessory buildings in connection therewith.

Illinois - residential or farm buildings outside corporate limits of a city or village; detached single family residences; two family residences of wood frame construction not more than two stories and basement; interior design services which do not involve life safety or structural changes.

Indiana - buildings exempt from the rules of the fire prevention and building safety commission.

Iowa - detached residential buildings containing 12 or fewer units or not more than three stories and accessory buildings; farm buildings; non-structural alterations which do not change use of building; warehouses and commercial buildings not more than one story in height, and not exceeding 10,000 sq. ft. in gross floor area; commercial buildings not more than two stories and not exceeding 6,000 sq. ft. in gross floor area; light industrial buildings; factory-built buildings not more than two stories and not exceeding 20,000 sq. ft. in gross floor area or which are certified by a professional engineer; churches and accessory buildings not more than two stories and not exceeding 2,000 sq. ft.

Kansas - one and two family dwellings; farm buildings; alterations or additions not affecting structural safety.

Kentucky - farm buildings; church buildings having an occupancy of 400 persons or less of 6,000 sq. ft. or less; buildings in the following use groups: Assembly having an occupancy of less than 100; Business having a capacity or less than 100; Mercantile having a capacity of less than 100; Residential of 12 or less units or a capacity of less than 50; Factory-Industrial having a capacity of less than 100; Storage having a capacity of less than 100; Utility and Miscellaneous having a capacity of less than 100.

Louisiana - single family residences; buildings for personal use, provided they are not intended for public employment, assembly, or other occupancy; renovations and alterations that do not affect the structural integrity or life safety or which have been pre-approved by the state fire marshall; new construction or additions that do not cause the gross floor areas to exceed the following sq. ft. in the following use groups: Storage (6250), Factory-Industrial (5000), Mercantile, Business and Multi-family Residen-

tial (4000), Educational and Institutional (2500), Hazardous (1500), Assembly-concentrated use (2650), Assembly-less concentrated use (4000).

Maine - detached one and two family dwellings and accessory buildings; farm buildings; alterations, renovations, remodeling when cost of the work does not exceed 15% of the assessed value of the building or $50,000, whichever is lesser or does not require the issuance of a permit under applicable building codes; buildings that do not have as their principal purpose human occupancy or habitation; one-story, above-grade buildings of less than 1,000 sq. ft. and to be occupied by no more than 10 persons; pre-engineered manufactured buildings.

Maryland - one and two family dwellings and farm buildings designed by a developer, builder or contractor for own construction.

Massachusetts - buildings less than 30,000 cubic feet; one and two family residences and accessory buildings; farm buildings; non-structural alterations.

Michigan - residence buildings not exceeding 3,500 sq. feet in calculated floor area; public works less than $15,000.

Minnesota - buildings for own occupancy or use, unless such occupancy involves the public health or safety or the health and safety of employees; one family dwellings and accessory buildings; two family dwellings; farm buildings; temporary buildings or sheds used for construction, not exceeding two stories, and not used for living quarters.

Mississippi - buildings less than 10,000 sq. ft. and not exceeding two stories; privately owned buildings.

Missouri - dwelling houses; multiple family dwelling houses containing not more than two families; commercial and industrial buildings which provide for the employment, assembly, housing, sleeping, or eating of not more than nine persons; structures less than 20,000 cubic feet; farm buildings.

Montana - alterations not affecting structural safety; residential dwellings of less than eight units regardless of size or cost; farm buildings not intended for use as a public building; privately owned buildings not intended for use as a public building.

Nebraska - buildings for own use; residential or farm buildings, or accessory buildings, outside of the corporate or zoning limits of any city or village; privately-owned potato cellars or residential one story commercial or industrial buildings or structures inside or outside corporate or zoning limits of any city or village unless such buildings provide for the employment, housing or assembly of 20 or more persons or is larger than 5,000 sq. ft. or the walls of such buildings or structure exceed 30 feet.

Nevada - buildings for private residential use; farm buildings.

New Hampshire - one and two family residences; farm buildings; alterations not involving structural changes.

New Jersey - single family residences for own use.

New Mexico - public works that do not exceed $100,000; school district buildings that do not exceed $100,000 or are portable classroom units; single family dwellings not more than two stories; multiple dwellings not more than two stories containing not more than four units of wood-frame construction; accessory buildings to dwelling units; nonresidential buildings unless the building code official determines that a seal is required.

New York - farm buildings; residence buildings of gross area 1,500 sq. ft. or less; alterations costing $10,000 or less in New York City; alterations costing $20,000 or less outside New York City.

North Carolina - residential buildings of up to eight units with a grade level exit; farm buildings; institutional or commercial buildings not exceeding $90,000 or not exceeding 2,500 sq. ft; alterations, remodeling or renovations not affecting structural safety.

North Dakota - buildings for personal use; one room or two room school buildings not exceeding $5,000.

Ohio - buildings for personal use.

Oklahoma - single family dwellings; duplexes or apartments not exceeding two stories; warehouses, maintenance buildings, garages, or storage buildings not exceeding two stories; hotels, lodges, or fraternal buildings not exceeding two stories; farm, industrial, or commercial buildings not exceeding two stories; school buildings that do not exceed $40,000.

Oregon - one family dwellings; farm buildings; buildings of 4,000 sq. ft. or less and not more than 20 feet high.

Pennsylvania - single family residences for own use; farm buildings; building alterations.

Rhode Island - buildings for personal use as a privately-owned structure, provided they meet building code requirements; one-family and two-family dwellings; farm buildings.

South Carolina - farm buildings; buildings less than three stories high and less than 5,000 sq. ft., except buildings of assembly, institutional, educational, and hazardous occupancies; detached one and two family dwellings having a grade level exit and accessory buildings; building alterations that do not increase area or occupancy, or affect structural safety.

South Dakota - single family dwellings and accessory buildings; two, three, or four family dwellings; five to sixteen family dwellings in governmental subdivisions of state that provide a detailed building code review by a building inspection department; farm or ranch buildings; temporary buildings or sheds used exclusively for construction, not exceeding two stories, and not used for living quarters; portions of a hospital occupied by patients on a 24 hour basis or jails if the gross square footage of the new construction, alteration, or enlargement is 3,000 sq. ft. or less; hospitals, hotels, motels, restaurants, libraries, medical offices, nursing homes, retirement homes, mortuaries, or hospital areas if the gross square footage of the new construction, alteration, or enlargement is 4,000 sq. ft. or less; auditoriums, banks, churches, fire stations, schools, one-story offices, theaters, or public buildings if the gross square footage of the new construction, alteration, or enlargement is 5,000 sq. ft. or less; service stations if the gross square footage of the new construction, alteration, or enlargement is 6,000 sq. ft. or less; bowling alleys, multi-story offices, shopping centers or stores if the gross square footage of the new construction, alteration, or enlargement is 7,000 sq. ft. or less; industrial plants or public garages if the gross square footage of the new construction, alteration, or enlargement is 11,000 sq. ft. or less; warehouses if the gross square footage of the new construction, alteration, or enlargement is 20,000 sq. ft. or less; any other buildings if the gross square footage of the new construction, alteration, or enlargement is 1,000 sq. ft or less.

Tennessee - business, factory-industrial, hazardous, mercantile, residential, and storage buildings less than three stories and less than 5,000 sq. ft. in total gross area; one and two family dwellings and accessory buildings; farm buildings not intended for human occupancy.

Texas - alterations not affecting structural or exitway changes; farm buildings; one and two family dwellings and accessory buildings; multi-family dwellings that do not exceed two stories or 16 units; buildings that do not exceed two stories; buildings that do not exceed 20,000 sq. ft; public works under $100,000; alterations to public works under $50,000.

Utah - one, two, three or four family residences not exceeding two stories; farm buildings not for public use; generating plants, factories, mine buildings, mill processing plants, and refineries not for public use; alterations or repairs to buildings effecting an area not exceeding 3,000 sq. ft. when structural elements are not changed; non-residential buildings for personal use where total floor area does not exceed 2,000 sq. ft.

Vermont - detached one, two, three or four family dwellings and accessory buildings; farm buildings; pre-engineered buildings whose plans have been approved by a licensed professional.

Virginia - one and two family homes, townhouses, and multi-family dwellings, excluding electrical and mechanical systems, not exceeding three stories; farm buildings; business and mercantile buildings and churches with an occupant load of 100 or less, excluding electrical and mechanical systems, where such building does not exceed 5,000 sq. ft in total net floor area, or three stories; factory, industrial, and storage buildings, excluding electrical and mechanical systems, where such building does not exceed 15,000 sq. ft in total net floor area, or three stories; additions, remodeling, or interior design without a change in occupancy or occupancy load and without modification to the structural system or a change in access or exit patterns or increase in fire hazard.

Washington - residential buildings not exceeding four units; farm buildings; accessory building to the above; buildings of any occupancy up to 4,000 sq. ft.

West Virginia - detached single family dwellings and accessory buildings; multi-family dwellings not exceeding three stories; farm buildings; alterations or renovations not affecting structural or other safety features; pre-engineered buildings; commercial structures not more than 7,600 sq. ft. and not exceeding one story.

Wisconsin - single family dwellings; apartment buildings of not more than two units; farm buildings; temporary buildings used exclusively for construction purposes, not exceeding two stories, and not used for living quarters; buildings of less than 50,000 cubic feet total volume.

Wyoming - private residences; garages, commercial or industrial buildings, office buildings, pre-engineered metal buildings and buildings for marketing, storing, and processing of farm products which do not exceed two stories or exceed ten occupants; farm buildings; non-structural alterations to any building if it does not affect the safety of occupants.

NCARB Model Law - detached single-or-two family dwelling and any sheds, storage buildings, and garages incidental thereto; or Farm buildings, barns, silos, sheds or housing for farm equipment and machinery, livestock, poultry or storage, if such structures are designed to be occupied by no more than 10 persons; or any alteration, renovation, or remodeling of a building, if such alteration, renovation, or remodeling does not affect structural or other safety features of the building and if the work contemplated by the design does not require the issuance of a permit under any applicable building code.

SURVEY ITEM 19: SUMMARY OF ENGINEERING LICENSING BOARD - ARCHITECTURAL LICENSING BOARD FORMAL JOINT AGREEMENTS OR JOINT COMMITTEES

Arkansas - Joint Resolution sets forth statements of principles of professional practice applicable to both professions. The Joint Resolution is adopted by both boards as rules of conduct which form an ethical guide in the professions' dealings with the public and their relationship with the members of both professions. The resolution: states that it is incumbent upon the two professions to prevent confusion in the layman's mind in those similar or overlapping fields of professional practice; prohibits engineers and architects from calling or setting themselves forward as a member of the other profession unless so licensed; prohibits professionals from signing plans, specifications, and drawings which were not prepared under their immediate supervision; prohibits professionals from competing for commissions outside their field of registration and competency; requires professionals to assume compliance with all state, federal, and local laws, rules, and ordinances pertaining to the practice of engineering and/or architecture, relating to the projects with which each is engaged; requires the boards to continually study the existing licensing laws in order to integrate more closely the qualifications and practice under those laws.

Florida - Agreement signed August 9, 1993. The agreement establishes a "practice review panel" as a subcommittee of the Joint Architect/Engineer Committee. The panel, which consists of one architect board member and one engineer board member, will function in an advisory capacity and supply expert advice to the Department of Business and Professional Regulation and the probable cause panels of the architectural and engineering licensing boards with regard to instances of alleged cross-professional negligence or allegations of either architects or engineers performing unauthorized practice, which means performing architecture or engineering which is not incidental to their practice. The panel will review complaints of the type of instances referenced above and make a recommendation to the probable cause panel of the respective board as to whether action should be taken against the architect or engineer involved. The panel will report to the Joint A/E Committee the general nature of the complaints which they have reviewed in order to provide outlines of general policy as they are being established. The panel will answer inquiries from building departments and the general public regarding the issuance of building permits. The panel responses to such inquiries are expected to form a body of jurisprudence that will assist board offices in responding to future inquiries.

Michigan - The design professional licensing statute requires that the architectural licensing board include a professional engineer who is a member of the engineering licensing board and that the engineering licensing board include a licensed architect who is a member of the architectural licensing board. The statute also requires the boards to hold a joint meeting at least annually.

Montana - Letter issued April 15, 1987. Letter from the engineering licensing board to licensees practicing in Montana reminds licensees to perform services only in areas of competence. The letter reminds PEs that they are not permitted to practice architecture unless licensed as an architect. The letter establishes that PEs are permitted to sign a sheet of a set of architectural plans when that sheet pertains to engineering. The letter states that the engineering and architectural licensing boards will jointly review drawings by architects that appear to be engineering in nature and drawings by engineers that appear to be architectural in nature. The letter states that remedial action will be taken by the appropriate board.

New Jersey - Building Design Services Act (P.L. 1989, Chap. 277) approved January 8, 1990. The law establishes a Joint Committee of Architects and Engineers to receive referrals from the engineering and architectural licensing boards; conduct investigations and hearings; notify the boards of its findings; and, issue declaratory rulings on use group classifications. The committee consists of five members, two PEs who are members of the PE licensing board, two architects who are members of the RA licensing board, and one appointee of the Governor. The law also designates projects by use groups and sets forth those which may be designed, prepared, signed, and sealed by licensed architects and professional engineers or both. The law defines a portion of a building to be of "incidental use" if it constitutes not more than ten percent of the building's total floor area or 2000 sq. feet, whichever is greater. The law establishes the conditions under which sole proprietors or business associations may provide architectural and engineering services. The law prohibits engineers and architects from setting themselves forward as members of the other profession unless so licensed. The law specifies that licensed engineers and architects who violate this law will be subject to discipline by the board that issued their license.

New Mexico - New Mexico's design professional licensing statutes require the boards to establish a joint practice committee to resolve disputes concerning the design professions.

Engineering board - Architectural board agreement signed March 2, 1992. Under the agreement the engineering board and the architectural board adopted identical board rules. The rules define the incidental practice of architecture or engineering as those services performed on buildings with a construction valuation of no more than $250,000 or an occupant load of no more than 50. One professional seal would meet the requirement on building plans being submitted for permit within these limits. The rules also establish identical lists of building types exempt from seal requirements. The agreement states that the owner, user, or using agency shall select the prime professional for any project based on the requirements and nature of the project.

North Carolina - Agreement adopted in 1984. The agreement recognizes that the practices of architecture and engineering overlap. The agreement states that an architect does not have a right to call himself an engineer or to practice engineering and that an engineer does not have the right to call himself an architect or to practice architecture. Under the agreement, if the engineering board receives a complaint that a registered architect is practicing engineering, the board's Review Committee will investigate the complaint, make a determination as to the adequacy of the engineering design in question and will make a recommendation to the board. The engineering board will then refer the matter to the architectural board for investigation and appropriate action. If the engineering board receives a case from the architectural board alleging that a licensed engineer is unlawfully practicing architecture, the engineering board will investigate the complaint, take action if appropriate, and inform the architectural board of its action. The agreement establishes an identical procedure in architectural rules.

Ohio - Agreement became effective June 1, 1993. The engineering and architectural licensing boards adopted identical rules for handling interprofessional practice complaints. Under the rule, the engineering licensing board, upon determination that complaints or allegations in question affect the incidental practice of architecture or involves a registered architect, the engineering board shall notify the architectural board of the complaint and provide information to that board. The architectural board will render an opinion as to whether the action constitutes action incidental to the practice of architecture. The engineering board may take an enforcement action against the architect after receiving an opinion from the architectural board or, if it receives no opinion from the architectural board, 90 days after requesting such an opinion. The agreement establishes a joint subcommittee of the two licensing boards for addressing questions regarding incidental practice. The subcommittee consists of two architects and two engineers. The joint subcommittee will attempt to determine whether the action in question constitutes the practice of architecture, practice of engineering, or incidental practice and report its findings to both boards for further consideration, action, or referral. Neither board is required to take action based on the recommendation of the joint subcommittee.

South Carolina - Agreement adopted July 25, 1962. The agreement states that no registered engineer shall undertake a project which is primarily architectural and no registered architect shall undertake a project which is primarily engineering. The agreement recognizes that either profession may engage in the practice of the other profession if it is incidental to the practice of their own profession. The agreement recognizes that the boards shall have the discretion to interpret the definitions contained in their respective registration laws.

Texas - Joint Policy Statement signed February 15, 1991. The 1991 agreement states that it is the policy of both boards that clients shall have the option to choose a member of either profession as the prime professional. The 1991 agreement states that each profession shall practice only in their area of expertise and shall obtain the services of other professionals if the project requires such services. The 1991 agreement requires the boards, upon receiving allegations that a member of the profession outside of the one which they regulate is practicing outside the area of his or her expertise, to report such allegation to the board regulating the offending member. It is the responsibility of that board to appropriately discipline the offender.

Agreement signed August 3, 1993. The 1993 agreement reaffirms the boards' joint policy statement of 1991. The Agreement establishes a joint committee to resolve questions concerning professional practice that cannot be resolved by the Executive Directors of the boards. The subcommittee consists of one member of each board, one former member of each board, the executive director or each board, and one member of the Texas Society of Architects and the Texas Society of Professional Engineers. Findings of the joint committee will be reported to the respective boards.

Disciplinary actions taken by the board

The board has taken disciplinary action against the following licensees. Before making any decisions based upon this information, check with the board office to ensure accuracy. The listing may not reflect changes occuring near or following the newsletter publication date. Because it is possible that some licensees may have the same name, check the home town to verify identification. The listing of disciplinary actions does not reflect pending appeals or requests for rehearings.

Louis J. Aguirre - PE0011642 - Case Number 90-10591 - Coral Gables
471.033(1)(k) F.S.: Violating previous order of the Board. The following discipline was imposed: $500 fine and complete a professionalism & ethics course. Suspension if terms are not met.

Gerardo Marquez - PE0032012 - Case Number 91-11411 - Gainesville
471.033(1)(e) F.S.: Making a report which he knew was false. The following discipline was imposed: $1,000 fine, reprimand, probation, further discipline if submitted plans are inadequate, complete the Board's study guide and a course on professionalism & ethics.

Stephen E. Mitchell - PE0039579 - Case Number 90-12725 - Tallahassee
471.033(1)(g) F.S.: Negligence.
471.033(1)(g): Falsely and deceptively misleading client. The following discipline was imposed: Revocation.

Bronislaw M. Wasilowski - PE0013903 - Case Number 91-03470 -Lilburn, GA
471.033(1)(c) F.S.: Having license to practice engineering revoked, suspended or otherwise acted against by the licensing authority of another state for an act which would constitute a violation of Chapter 471, F.S. The following discipline was imposed: $1,000 fine, probation, complete the Board's study guide and a course on professionalism & ethics.

Charles Wunder - PE0016670 - Case Number 90-09126 - Ft. Myers
471.033(1)(g) F.S.: Negligence in the practice of engineering. The following discipline was imposed: Reprimand, three year probation to commence at the end of the suspension imposed in Case #s 69033 and 0073012 and to run concurrent with the probation imposed in those cases. The terms of probation are the same as imposed in previous cases.

James J. Meehan - PE0022322 - Case Number 90-04818 - Gainesville
471.033(1)(g) F.S.: Negligence in the practice of engineering. The following discipline was imposed: $2,000 fine, reprimand, two year probation that includes a peer review, two projects per year, complete the Board's study guide and a course on professionalism & ethics.

Luis A. Costa - PE0040930 - Case Number 90-03162 - Jupiter
471.033(1)(a) F.S.: Not dating the seal and signature on the plans and violating the rule of responsibility concerning wood trusses in revised plans. The following discipline was imposed: $1,500 fine, reprimand, one year probation, complete the Board's study guide, and a course on professionalism & ethics.

William J. Hannigan - PE0032898 - Case Number 90-16052 - Garden City, NY
471.033(1)(c) F.S.: Having license revoked, suspended, or otherwise acted against by the licensing authority of another state. The following action was taken: Voluntary Relinquishment of license.

Frank Arthur Adamek - PE0017534 - Case Number 91-10593 - New Port Richey
471.033(1)(k) F.S.: Violating an order of the Board previously entered in a disciplinary proceeding. The following action was taken: Suspension until he petitions the Board for suspension to be lifted.

Richard Fricke - PE0021046 - Case Number 91-00833 - Zephryhills
471.033(1)(g) F.S.: Making misleading, deceptive, untrue, or fraudulent representations in the practice of engineering.
471.033(1)(a) F.S. along with 21H-19.001(6)(f) F.A.C.: Becoming involved in a conflict of interest with his employer, without the knowledge and approval of his employer, and without making the written disclosure required by the rule.
471.033(1)(a) F.S.: Offering engineering services to the public and practicing engineering through a corporation that had not obtained a certificate of authorization. The following discipline was imposed: $3,000 fine, reprimand, one year probation, complete the Board's study guide, and a course on professionalism & ethics.

Negendra Khanel - PE0016515 - Case Number 91-07982 - West Palm Beach
471.033(1)(j) F.S.: Sealing plans not prepared by licensee or under his direct supervision and control. The following discipline was imposed: $1,000 fine, reprimand, complete the Board's study guide, and a course on professionalism & ethics.

Byron R. Larsen - PE0013985 - Case Number 91-11208 - Ft. Pierce
471.033(1)(g) F.S.: Negligent in his analysis of electrical drawings.
471.033(1)(a) F.S.: Practicing out of the scope of his expertise. The following discipline was imposed: Reprimand, $1,000 fine, restricted from practicing electrical engineering, complete the Board's study guide, and a course professionalism & ethics.

James Titzel - PE0007898 - Case Number 90-16718 - North Palm Beach
471.033(1)(k) F.S.: Violating final orders issued by the Board of Professional Engineers. The following discipline was imposed: $1,000 fine, three year probation, review of two projects per year during probationary period, complete the Board's study guide, a course on professionalism & ethics every year of the probationary period, any other continuing education designated by the Board, and comply with terms of previous orders, stayed suspension during probationary period. The stay shall be lifted if any violation of the final order occurs.

Disciplinary Corrections

The June 1992 edition of the Board's newsletter misquoted three disciplinary cases. They were:

Michael V. Carr - PE0026675
Mr. Carr was fined $750 and required to complete a course on plan review. There was no requirement for a Professionalism and Ethics course, completion of the Board's Study Guide, or a Peer review.

Robert Monsour - PE0011955
Mr. Monsour was only charged with offering service to the public without a certification of authorization for a brief period of time.

William M. Ungerer - PE0024709
Mr. Ungerer enter a settlement stipulation that called for a fine of $500, instead of $1,500.

DISCIPLINARY ACTION REPORTED

At the October, 1996 Board meeting disciplinary action was taken against the following licensees. This listing may not reflect a change occurring near or following the publication date. Before making any decisions based upon this information, check with the Board office to ensure accuracy. Further, the listing does not reflect pending appeals or request for a hearing. The list contains the name, license number and the violation.

David L. Bryant (PE 0038154); Walter H. Quintyn (PE 0020358); Ralph M. Hansen, Jr. (PE 0009280); Abbas J. Borujerdi (PE 0038553); Allen A. Davis (PE 0008986); Fred F. Radfar (PE 0031860); Juan J. Rodriguez (PE 0035218); Nicholas Jammal (PE 0041946); Robert H. Burton (PE 0012590); Ray G. Bussman (PE 0020185); Carl Eugene Cool (PE 0016921); Darrell E. McQueen (PE 0021497); Alex J. Panik (PE 0021939); Rajendra Patel (PE 0034134); Lee Alan Weberman (PE 0041258); Eugenio Erquiaga (PE 0015387); William J. Chomic (PE 0048617); Morris A. Shashoua (PE 0019554); Orlando Martinez-Fortun (PE 0022249); Bob Everett Hallman (PE 0020761); Nicholas Lagos (PE 0043333); William Stuhrke (PE 0022150).

Disciplinary actions taken by the board

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Carlos J. Cardoso - PE 0013611 - Case #90-14823 - Coral Gables
Violated 471.033(1)(g), F.S.: By violating by fraud or deceit, negligence, incompetence, or misconduct, in the practice of engineering. The following discipline was imposed: $1,500 fine, reprimand, 1 year probation, list of projects each year of probationary period to the Board.

Thomas Joseph D'Arcy - PE0038106 - Case # 91-14865 - Miami
Violated 471.023(2), F.S.: A certificate of authorization shall be required for a corporation, partnership, association, or person practicing under a fictitious name, offering engineering services to the public. The following discipline was imposed: $1,000 fine.

Henri M. Hage - PE0039495 - Case # 93-02969 - Coconut Creek
Violated 471.023(2), F.S.: A certificate of authorization shall be required for a corporation, partnership, association, or person practicing under a fictitious name, offering engineering services to the public. The following discipline was imposed: $500.00 fine.

Yekta A. Kavasoglu - PE 0041310 - Case #92-02802 - Ft. Lauderdale
Violated 471.033(1)(a), F.S.: By offering engineering services to the public under a fictitious name without obtaining certificate of authorization. The following discipline was imposed: $1,000 fine.

Culbreath Whitehead, Jr. - PE0004592 - Case #92-06362 - Sarasota
Violated 471.003(1)(k), F.S.: By violating any order of the Board or department previously entered in a disciplinary hearing. The following discipline was imposed: $1,000 fine, license revoked.

11/13/96

By Arthur Schwartz, NSPE General Counsel

A recent article prepared by representatives of the National Council of Architectural Registration Boards (NCARB) and published in the September/October, 1996 issue of Southern Building, was an apparent attempt to distract attention from the significant substantive issues involved in the continuing conflict that exists between the professions of engineering and architecture in the field of building design. Among the core issue in this
continuing dispute is that many architects believe that the *design of buildings* is, inalienably, exclusively and without exception, *architecture*. The engineering profession rejects this notion, responding that in the design of buildings there is significant overlap between the practice of engineering and architecture. Engineers view *architecture* as an *aspect of* rather than the same as or identical to *building design.* The engineering profession's view is amply supported by state engineering licensure statutes, court decisions, state attorney general opinions, code enforcement officials and by the increasing number of engineering firms that lawfully perform building design services demanded by their clients.

Regrettably, in an apparent attempt to advance its arguments, the NCARB article contained a series of inaccuracies and misrepresentations, including a mischaracterization a 1989 NSPE Board of Ethical Review opinion. NCARB incorrectly alleges that the NSPE Board of Ethical decided that "it was unethical for an engineer to design a building for habitation or occupancy when no registered architect was part of the design team."

Contrary to NCARB's assertion, nowhere in the 1989 Board of Ethical Review opinion do the words "design a building for human habitation or occupancy" even appear! The facts: In 1989, the Board of Ethical Review was requested to consider a case involving a professional engineer who sought to provide (1) prime design professional and (2) architectural services in connection with the design of an office building complex. After carefully reviewing the facts, the NSPE Board of Ethical Review concluded that (1) it was ethical for the engineer to serve as the prime professional contract holder for the design of an office building; and (2) it was unethical for an engineer to provide architectural services beyond those which are incidental for the design of an office building. Nowhere in its opinion does the Board of Ethical Review state or imply that all buildings designed for human habitation or occupancy must be designed by an architect. Nor does the opinion define *building design* as falling within the scope of practice of one profession to the exclusion of the other. The Board of Review's opinion evaluated a specific

series of unique and detailed facts and addressed the need for an architect to be involved in providing "architectural services". NCARB's mischaracterization of the BER opinion can only be rationalized through the earlier point raised in this article -- architects believe that "the design of buildings" is, inalienably, exclusively and without exception, "architecture".

It is simply a fact of life that there will continue to be significant substantive disagreement on the role of the engineers and architects in the field of buildings design. Notably, a California Court of Appeals decision earlier this year reaffirmed the view that architectural and engineering services frequently overlap and attempts to precisely define and delineate the practice of architecture and the practice of engineering would be of "doubtful assistance." A recent article by the President of the AIA-Missouri (who is both a Registered Architect and an Attorney) in the August/September, 1996 issue of Missouri Engineer acknowledges that engineers and architects are "equally qualified to serve as the prime design professional on projects." The California decision as well as recent events in Delaware, Florida, Missouri and elsewhere serve to demonstrate that attempts by individuals or groups to mischaracterize the engineering profession's position as "extreme" are simply at odds with reality.

(FES.ART)

The Practice of Engineering and the Legal Authority of Engineers in Building Design

by Clyde R. Tipton, Jr., P.E.
and
Arthur E. Schwartz, Esq.

Introduction

Courts, state legislatures and other bodies have long recognized the right of competent, licensed engineers to serve as the prime professional in the design of buildings and other structures, and to design such buildings as the "practice of engineering." Engineers who are competent to perform these services should not be denied this right, either by a state licensing authority, building code official or other entity. Clients who seek such services should be permitted to engage the design professional of their choice. Code enforcement officials should carefully review their state laws and regulations and, where necessary, seek guidance from counsel in fully understanding the legal authority of design professionals to (1) engage in the design of buildings of various types and (2) serve as the overall prime design professional in the design of buildings.

Definitions and "Engineering"

In any discussion involving a profession such as engineering, definitions are important because the operation of laws and regulations governing professional practice hinge on those very definitions. For example, in all states, the definition of a "professional engineer" is codified into law. As a general rule, someone may not be referred to as a "professional engineer" unless he or she meets the statutory requirements defining "professional engineer."

"Engineering" is defined by *Black's Law Dictionary* as the "art and science by which mechanical properties of matter are made useful to man in *structures* and machines" (emphasis added) (West 1968). It is a modest, unadorned definition, but it amply describes the critical role played by engineering. A key component to this definition is the word "structure." Again, definitions are key. What is a "structure"? *Black's Law Dictionary* defines a structure as "any construction or any production or piece of work artificially built up or composed of parts joined together in some definite manner. That which is built or constructed; an edifice or *building* of any kind" (emphasis added).

A building is defined as "a structure designed for habitation, shelter, storage, trade, manufacture, religion, business, education, and the like. A structure or edifice enclosing a space within its walls, and usually, but not necessarily, covered with a roof."

From these definitions come three basic conclusions:

1. "Engineering," among other things, involves the design and construction of "structures."
2. "Structures" include "edifices" and "buildings."
3. "Buildings" embrace a wide range of projects intended for various activities and pursuits.

With these principles in mind, it is important to explore the environment in which professional engineers practice today, especially with regard to their right (1) to serve as the prime coordinat-

ing design professional in the design of buildings and (2) to design structures, edifices and buildings for which the engineer possesses the competence.

Licensing Laws

As a general proposition, a license is an official permit to do what one is trained to do—to become a professional engineer, registered architect, lawyer, physician, etc. In each instance a legislative enactment has placed restrictions on what might otherwise be done simply as a matter of individual choice. In each instance, also, the restriction is a presumably valid exercise of the state's powers to protect the public health, safety and welfare—the so-called police powers. The substantive limitation on personal freedom is justified on the theory by a legislative judgment that uncontrolled individuality of choice would be socially dangerous.

A state's interest in protecting the public health and safety has been expressed on numerous occasions. As characterized by the decisions of the United States Supreme Court [see, for example, *Arizona v. Johnson*, 283 U.S. 423 (1930)], application of a state's professional licensing laws and regulations is an attempt to regulate the competence of individuals performing those services within the state.

Because protection of the public health and safety and granting permission only to those competent to practice is the basic and fundamental state interest upon which professional licensing laws are grounded, it may therefore be presumed that in drafting and enacting each of the 54 state and territorial engineering registration laws, the legislatures included only those activities and functions for which engineers possess the competence and skill to perform.

The vast majority of states codify certain basic definitions into the state engineering licensing law, including the definition of the "practice of engineering." This definition is vitally important because it identifies those areas of activity that the state legislature has identified as (1) permissible areas of practice by a licensee and (2) areas of practice that may only be performed by a licensee.

State legislatures have determined in almost every state that a fundamental aspect of the "practice of engineering" includes the design of buildings and structures. This conviction was based on their determination that the education, experience and other qualifications of licensed engineers demonstrate a level of competence to perform those services.

In spite of this almost universal determination by state legislatures, in recent years there have been several challenges to a licensed engineer's right to design buildings and serve as the prime professional in the design of buildings.

Case Law and Public Policy

Any discussion of the issue of engineer/architect interprofessional practice is impossible without some discussion of the relevant state and federal court decisions and attorney general opinions that have carefully analyzed the issues, statutes and regulations in determining the proper role and authority of the respective professions. State courts, most notably in New York, Tennessee, Florida, Nevada, Alabama and Georgia, have affirmed the basic principles cited in the following cases. Out of this litigation came a series of key decisions which should have put to rest any further question as to the authority and right of licensed engineers to engage in building design services. The following is a sampling of just some of those decisions and actions.

D'Lohosch v. Andros

D'Lohosch v. Andros, 109 NYS2d 491 (1951) involved an action by a licensed professional engineer seeking to recover a balance due for services rendered in drawing plans and specifications for a dwelling house which the defendants contracted to have built. The defendants claimed the plaintiff could not recover because he actually "performed and rendered services as an architect as distinguished from those of an engineer."

The court ruled that under New York statutes the definitions of architects and professional engineers were substantially the same. The court stated:

> However, both definitions specifically provide that both an engineer and an architect may plan, design and supervise the construction of buildings, both public or private. Both articles are similar with respect to the educational qualifications of licenses, disciplinary proceedings, penalties, prosecution for violations, etc. [We] cannot find that there is any statutory distinction between the services which may be legally rendered by a licensed engineer and that by an architect. . . . It must also be remembered that neither statute prohibits the practice of the other's profession. . . . Fundamentally, as stated in the statutes, the purpose of licensing both engineers and architects is to protect and safeguard life, health and property.

Sardis v. State of Nevada

In *John Sardis, P.E. v. State of Nevada*, 400 P2d 163 (1969), a licensed engineer charged with "practicing architecture in the state of Nevada without a certificate" sought to enjoin a district court from proceeding against him. The licensed engineer claimed that he was exempt from the architect's registration law.

In a unanimous decision, the Nevada Supreme Court reversed the lower court's decision and ruled in favor of Mr. Sardis. The high court rejected the state's contention that the exemption cited by Mr. Sardis applied only to licensed engineers "when the services he renders require the application of engineering principles and data." Citing the engineering statute's definition of the "practice of engineering," the Nevada

Supreme Court noted that the definition

> does not *restrict* the engineer to the services set forth therein, but rather states that the practice of professional engineering *includes* those professional services as enumerated. The purpose of the statute is to define those engineering services that one who is not a registered engineer may not do.

Verich v. Florida State Board of Architecture

Another significant case, *Alex Verich, P.E. v. Florida State Board of Architecture*, 239 So2d 29 (1970), raising the question of the relationship between engineering and architecture occurred in Florida. Alex Verich, a licensed engineer, prepared plans for a shopping center in West Palm Beach, Florida. At no time did Mr. Verich claim to be an architect in any manner whatsoever, nor did he enter into any contracts to perform architectural services. During the trial, experts from both sides differed as to whether the services provided constituted "engineering services" or "architectural services." Following the trial, a Florida circuit court granted the architect's board an injunction restraining Mr. Verich from "practicing architecture." Mr. Verich appealed and the Florida Court of Appeals reversed the lower court decision and found in favor of Mr. Verich.

In reversing the lower court's decision, the Florida appeals court noted that there is a clear "overlap between the professions of engineering and architecture." Specifically, the court noted that the architect's licensing act expressly provided that no professional engineer shall practice architecture or use the designation "architect" or any term derived therefrom, but also expressly provided that nothing in the state law shall be held to prevent a registered professional engineer (or the engineer's employees or subordinates under the engineer's responsible control) from performing architectural services which are purely incidental to their engineering practice. "Standing alone," said the court, "this statute appears to contain some contradictions in and of itself."

The appeals court noted that the definition of the term "professional engineering" in the engineering licensing law included, among other things,

> any professional service requiring use or knowledge of mathematics and the principles of engineering rendered for public or private buildings and any consultation, investigation, plan, design, or responsible supervision of construction in any public or private buildings. Thus, it can be seen that the preparation of plans and design for and responsible supervision of the construction of buildings is by statute defined as the practice of engineering.

Alabama State Board for Registration of Architects v. Jones

In 1972, the Alabama Supreme Court was faced with the issue of drawing a practical and workable distinction between the practice of engineering and architecture. In *Alabama State Board for Registration of Architects v. Edward A. Jones, P.E.*, 267 So2d 427 (1972), the Alabama State Board of Registration for Architects sought to enjoin a licensed professional engineer from "holding himself out as an architect" and from "practicing architecture." According to the architect's board, Mr. Jones had "planned, designed, made, or stamped working drawings of various types of buildings including churches, medical offices, washeterias, store buildings, etc." which did not bear the seal or signature of an architect. Instead, the documents were prepared and sealed by Mr. Jones, a professional engineer, which, according to the architect's board, demonstrated that Mr. Jones "thereby held himself out to be an architect and who did thereby practice architecture in the state of Alabama."

In a unanimous decision, the Alabama Supreme Court found in favor of Mr. Jones and noted that the differences between the practice of architecture and engineering are "to a large degree esoteric." The court stated: "The functions of the two professions so overlap that neither can be satisfactorily defined in a way to draw a clear line of demarcation between the two." After examining the statutory definitions of the two professions, the court concluded that the two statutes create a "distinction without a difference," noting that "each profession was regulated for the purpose of safeguarding life, health and property" and "each relates to the application of professional knowledge to the planning and designing of structures, and serving the erection thereof."

Texas Attorney General Opinion No. DM-161

In 1992, the executive director of the Texas Board of Architectural Examiners asked whether the state's architect registration law bars a professional engineer from preparing plans and specifications for public buildings whose construction costs exceed $100,000. The attorney general responded with an emphatic "no."

In the attorney general's opinion [Texas Attorney General Opinion No. DM-161, re: Construction of Section 16, Article 249a, V.T.C.S., The Act Regulating the Practice of Architecture (RQ-186)], the practice of architecture and engineering overlap in Texas, as well as in other states, and that under the Texas Engineering Practice Act, engineering includes building design. Certain 1965 amendments to the act which deleted the word "buildings" from the definition of the "practice of engineering" were intended to broaden that definition to prevent unqualified persons from practicing engineering—"not to omit engineering services already covered by the act."

According to the opinion, because Texas law also "exempts certain buildings from the practice of engineering," other buildings not falling within the

exemption would logically fall within the practice of engineering. While engineers "may not hold themselves out as architects, engineers may perform building design services as part of their work."

Such services include acting as the prime design professional for building construction, alteration and addition projects as well as preparing plans and specifications for the project. Additionally, the opinion notes, the Texas Engineering Practice Act was clarified in 1991 to allow a licensed engineer who has an architectural engineering degree to use the title "architectural engineer."

Federal Brooks Act

It is important to note that all agencies of the federal government have long abandoned any attempts to distinguish between architectural and engineering services for contracting purposes. Standard terminology and practice of all major federal design and construction agencies is to define all design contracts for all types of facilities, buildings, etc., as "architect-engineer" contracts. The long-established federal Brooks Act (40 U.S.C. 541 et seq.) contains a single definition for "architect-engineer" services. As a matter of policy, Congress has determined that it is neither appropriate nor possible to draw a meaningful distinction between the practice of architecture and engineering.

"Incidental Practice"

Many state engineering and architectural licensing laws contain a provision stating that a "professional engineer may practice architecture incidental to his practice of engineering." While some have viewed that as a legitimate basis on which licensed engineers may practice architecture, in truth such "incidental practice" provisions have greatly contributed to confusion and misunderstanding within the design professional community.

The most troublesome problem with the use of the term "incidental practice" is that it has been used by some to mean that licensed engineers "may only engage in building design incidental to their engineering practice." As demonstrated by the many cases, statutes, etc., listed herein, licensed engineers historically have had the right to engage in this activity. Thus, the "incidental practice" clause has been used to muddy the issue and distract the engineering community from the basic fact that, in almost every state, licensed professional engineers possess the lawful right to engage in building design.

A reasonable question to ask, therefore, is what does "incidental practice" mean? A reasonable interpretation of that term would refer to those areas of architectural practice that do not fall within the definition of the "practice of engineering." Among the areas that presumably might fall within such practice could include fabric selection, paint and coating color, and other aesthetic issues.

The "Prime Professional"

Many within the architectural community have long asserted that the architect is, by definition, the "master builder," and the one who should, in all cases, serve as the "prime professional" in the design of buildings, and subcontract "specialist services" through consultants (e.g., professional engineers). This position is essentially grounded in the claim that, as a result of education, training and examination, architects possess the necessary skills to perform this "prime professional" service. However, as noted throughout this article, this assertion has been rejected by the courts as well as by state and federal agencies. If the courts and legislatures have recognized the basic right of professional engineers to design buildings as a matter of law, how can it be plausibly asserted that professional engineers may not assume prime professional responsibility for the coordination of the professional services of others on the design team?

The engineering community's long-standing position has been a balanced and sensible position reflective of the realities of the current practice environment. The position is that state licensing laws for engineers and architects are predicated and justified solely as a means to protect the public health, safety and welfare and should never be used as a means to enhance the standing of one design profession over another. In the engineering community's view, the two professions must accept the basic premise that, in the design of buildings, it is not possible to define and delineate the functions of architects and engineers in such a way as to draw a valid line of demarcation between them which could be successfully applied in practice. On projects for the design of buildings, it is the prerogative of the client to select and designate the prime professional. The professional so retained for the project should perform only those services for which he or she is competent and should utilize the services of other qualified professionals as required to provide a proper and complete professional service to the client consistent with applicable law.

The engineering profession's view is based on the premise that, in the design of buildings and on the question of who should serve as the "prime professional," a level playing field should exist. Because public policy makers (i.e., the courts and state legislatures) have already recognized the engineering profession's rights in this area, the consumer of the service, not the service provider, should decide who should be the appropriate professional for the services desired. The individual selected must only perform those services for which he or she possesses competence and retain the services of other qualified professionals as required.

Fundamental Purpose

The fundamental purpose of state licensing laws is the protection of the public health, safety and welfare. Under state professional licensing laws, individuals are granted a privilege—a public trust—to engage in an area of practice

generally to the exclusion of others, based on demonstrated education, experience and qualifications. The necessary corollary is that individuals who do not possess demonstrated education, experience and qualifications should be prevented from offering such services to the public because they have not met the legally required level of professional competence. ■

Reference

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LICENSING

Angry Maine engineers profess new militancy after statute fiasco

The State of Maine is trying to end months of confusion among building code officials, many of whom are interpreting a revised architectural law to mean that only architects and not engineers can submit plans and other technical documents. But many engineers say they are bitter and plan to regain professional ground they claim was lost under the revised law.

On Nov. 22, Maine's Dept. of the Attorney General issued a memorandum to the design profession registration boards explaining that it was legal for code enforcement officials to accept work submitted to them by engineers. However, the memo reminded the boards that the new law prohibits code officials from accepting technical submissions involving the practice of architecture unless the document is stamped by an architect or the applicant certifies that the architectural work is incidental to the job.

"Basically, this negates all the engineer licenses in the State of Maine and puts us as poor relatives to the architects," complains William A. Lotz, a consulting engineer based in Acton who is also a member of the engineering registration board. "I flatly refuse to issue a certification saying I am practicing under an exemption in the architectural law. I just will not do that. I'll practice in New Hampshire."

Some of Maine's engineers believe the state's clarifications don't help much. "I do not view this as a fix, rather that there is a need to revamp the entire engineering registration law and soon," says Roger F.R. Karl, a consulting engineer in Winthrop.

Maine's law differs from those of many other states because it in effect reduces engineering to a unit of architecture, critics say. Most statutes provide for overlapping practice that permit more leeway to the respective professions, says Arthur E. Schwartz, general counsel to the National Society of Professional Engineers. In contrast, Maine's architectural statute "seems to come from the mistaken notion that design of buildings is equal to the practice of architecture," he adds.

Maine's amended architectural statute took effect in June without special notice. It expanded the scope of documents requiring an architect's stamp to cover most technical submissions. The

statute exempts professional engineers who practice architecture incidental to their work, but a September notice from the architects' board failed to mention that exemption. Code enforcement officers then began to reject documents from engineers.

The engineers say the humiliating experience of having work turned away has fueled a new wariness of architects. The chairman of each sion's registration boar t sure engineers in a joir me the provisions in the architectur ute were not written "to encro the practice of engineering." added that the two boards "ha veloped an excellent ongoin tionship."

By Richard Korman

HIGHWAYS

Houston tries for 24 lanes

Although Texas wants to expand part of the freeway encircling Houston, not all the city residents agree with the proposal. About 600 showed up at a public meeting to protest expansion of the city's West Loop into a 24-lane superhighway.

The state Dept. of Transportation proposes to completely rebuild the existing eight-lane Interstate 610 between I-10 and U.S. 59, the most heavily traveled section of the loop. Ten express lanes would be built between the north and southbound freeway, and three service lanes would flank each side. Local traffic would use the eight outside lanes.

Janelle Gabur, a highway department spokeswoman, says the proposed "collector-distributor" system is a compromise reached after an original proposal to build an elevated road was rejected by citizens' groups. Both proposals and a no-build option are being evaluated in an environmental impact statement that is expected to be completed in January.

Gabur says the West Loop the western side of Houston city's busiest highway, with 2 vehicles traveling on it a day. T pansion would allow the road commodate a projected 125,0 tional vehicles a day by 2 complete 3.5-mile West Lo sion is projected to cost $2

The proposal was devel community-wide task force when the elevated high was opposed, Gabur s signed by five Housto g firms who donated their time.

The expansion is touted by th as a means of relieving some of ton's ozone non-attainment pr by eliminating congestion on the way. But George Smith, a spok for the Sierra Club, says that if ing more freeways were the a then Houston would be a clea today. "What we want are mor tions. The highway departmen not look at high-occupancy lanes or mass transit," he says.

HIGHWAYS

Self-help highway funding falters

A fiery debate is raging in northern Virginia over how long it will be before a special tax district will generate enough revenue to pay off a highway project's year-to-year debts. The district was created so local landowners could help finance $118 million in accelerated improvements to Virginia Route 28 near Washington Dulles International Airport.

James T. Atwell, the Virginia Dept. of Transportation's assistant commissioner for finance, says the landmark 1988 agreement to finance the p calls for VDOT to pay for 20% improvements and local landowne pay the remaining 80% through estate tax surcharge of 20¢ per of assessed value (ENR 10 '89 p

VDOT and the landhc hac ured that through the ea. 90s enue from the surcharge would sc development occurred and tha 1996 it would cover the $11 milli annual bond payments due on project. Until then, the agency w

MEDIA

Engineering hits celluloid

Film crew climbed up on the New York City bridges for PBS series on great engineering projects.

Americans "don't have a good idea of their engineering heritage," claims Kenneth Mandel, producer of a six-part documentary on the great infrastructure projects in the U.S. In an effort to spread the word, Mandel and partner Daniel B. Polin have begun filming the bridges of New York City and the dams and water control facilities of the Mississippi and Colorado rivers. They will be the first two programs in the series, which will air on the Public Broadcasting System, probably beginning in February 1995 in conjunction with National Engineers Week, says Mandel.

Mandel and Polin, principals of the Great Projects Film Co. Inc., New York City, have "tried to get firsthand storytelling" by interviewing people who were involved in conceiving, designing and constructing the major New York City bridges, Hoover Dam and the string of dams on the Mississippi River. For example, they tracked down members and widows of "the 31ers," people who went to Nevada to build Hoover Dam in 1931. "Their numbers are dwindling but they're still a hearty crew," says Mandel. "Some of them knew [construction consortium project manager] Frank Crow personally." Mandel also interviewed Crow's daughter for the program, and people who were young Bureau of Reclamation engineers at the time. The producers have interviewed about 25 historians, engineers, professors and politicians to provide different perspectives on the projects.

To illustrate the enormity of the water projects, Mandel and Polin have shot dramatic panoramic scenes from the air and at water level. "Television is an emotional medium. You can say a lot without really saying it," says Mandel.

Along with getting many aerial shots of the bridges and the two rivers, the film crew climbed to the top of the towers of the Williamsburg Bridge in New York City, which were built before the days of elevators on bridges. The bridge is being rehabilitated, enabling the producers to get contrasting "then and now" perspectives on the bridge.

The crew also climbed out on the pipes that pump the turbulent water from Lake Havasu to the aqueduct and into the tunnel at Hoover Dam. "No special effects here," says Mandel. "This is the real thing."

Great Projects has raised $2 million so far for the series and is trying to raise another $3 million for production, accompanying educational materials for schools and promotion (ENR 8/3/92 p. 24). ■

CODES

Architects protest changes

Architects in Dade County, Fla., are pledging to fight a county ordinance adopted in March that enhances the role of engineers and requires that only an engineer prepare and seal plans for certain structural components. The measure, which takes effect May 1, was passed as a response to the destruction caused last summer by Hurricane Andrew. The storm was the nation's costliest natural disaster ever.

The new provisions were adopted as amendments to the South Florida Building Code, which county officials write and revise (ENR 3/15 p. 17). The architects are particularly upset about a provision that requires that professional engineers design and seal "all precast concrete elements and their attachments to the main structural frame."

"We're appalled at this ordinance," says Roney Mateu, president of the Miami chapter of the American Institute of Architects and a principal with Harper, Carreno and Mateu. "For years, the architects have had their position eroded by the engineers. But this is the last straw, we've had it."

The architects claim engineers capitalized on the tragic aftermath of Hurricane Andrew to press their agenda with the Dade County Commission. "Many engineers have gravitated to jobs in the [Dade County] building department and have shaped this policy," says a memo distributed among architects.

Carlos Penin, owner of CAP Engineering Consultants Inc., says the public will be better protected "by having structural engineers review the plans." He notes that the code amendments are a direct result of a county grand jury report that criticized the code and construction practices.

Architects were not shut out of the county task force that wrote the code amendments, claim supporters of the ordinance. The task force was composed of three architects, five engineers and one at-large member, and Mateu's business partner was a member, Penin notes. "If he [Mateu] thinks he's been blindsided, my response is he should talk to his partner more often," says Penin. ■

Building trades organizing plan goes to the roots of unionism

After a number of false starts, building trade unions finally seem to have come up with a winning game plan to use in their fight against the open shop. We have opposed a number of the unions' earlier efforts but not so with the bottom-up organizing plan now being placed into effect (see p. 6).

The 15 member unions of the AFL-CIO's Building and Construction Trades Dept. remain just about the sole bulwark protecting the wages, benefits and working conditions of construction workers in the U.S. The dilemma for unions and their contractors is how to compete for contracts dollar-for-dollar with nonunion outfits that pay peanuts and offer no benefits. The answer is fairly simple. They can't.

Some prior attempts to equalize the playing field involved top-down organizing through pre-hire project agreements and job-targeting devices that pool resources from working union members to subsidize union wages on jobs that would have gone to nonunion firms. Both have their drawbacks, especially the latter one, which really means getting as down and dirty as the firms that unions call irresponsible.

All economic and tactical weapons in the union arsenal remain armed and ready to go. But the new bottom-up organizing drive, called Construction Organizing Membership Education Training, may make them unnecessary. The object is to use out-of-work union members as organizers and educators at nonunion construction firms. And one of the big enforcement tools will be the National Labor Relations Board.

The new program will take a bit of getting used to for both union members and nonunion contractors. Union members have been forbidden from working for nonunion firms since the beginning of time. And the unions had been giving NLRB the cold shoulder for the past decade. Despite its political leanings one way or the other, the board cannot ignore clear abuses of federal labor law. And allegations of such violations of workers' rights soon will be flooding into NLRB offices.

This likely will be an excruciating experience for nonunion firms faced by hiring and dealing with union members as employees. But the basic premise of the National Labor Relations Act is to protect workers engaging in concerted activity relating to employment and shield them from discrimination in dealings with employers because of any union affiliation. There is no arguing with any program that supports workers' rights to organize themselves.

Our support of the program depends of course on its being conducted in a civilized, legal fashion without violence. That seems to be the objective. Unions are showing videotapes of the violence that occurred at BE&K Inc.'s paper mill project in Minnesota several years ago as an example of how not to conduct an organizing drive. That event sent droves of big owners running into the arms of accommodating nonunion contractors.

Workers' rights to self determination and better wages and working conditions cannot be quarreled with and likely will receive support by the Clinton administration, especially when it appoints new NLRB members.

Let the winds blow out

Some architects in the Miami area are highly disturbed by changes in the county building code mandating that only an engineer can prepare and seal plans for particular structural elements of certain types of buildings. The revisions can only enhance preservation of life and property. The objecting architects should back off and reflect.

Dade County's code amendments are based on evaluations made after Hurricane Andrew struck last summer (see p. 17). That disaster revealed many shortcomings in building practices and code enforcement. The nine-member panel that drafted the new provisions included three architects, along with five engineers. Certainly any internecine squabbling must have been played out during the panel's deliberations.

Architects have no reason to wallow in professional jealousy now. If anything, they should see the stiffer code as presenting a new selling point. Many smaller structures destroyed by Andrew probably never enjoyed the attention of an architect, let alone an engineer.

Architects can point to the identified shortcomings as illustrating the need to have professionals on board. If the code requires that an engineer design major structural elements, that does not seem unreasonable or excessively intrusive into the architect's domain.

The beginning of a new era

In the past century there have not been any really revolutionary changes in bridge materials. Iron gave way to steel. Prestressed concrete brought a whole new aspect to efficient design. Still, the basic materials remained metal and concrete.

Now, finally, composite materials are coming to construction (see p. 16). They have been tested under some trying conditions, ranging from golf club shafts to space craft components. The rewards of applying them to bridges and building frames could be great, vastly expanding the vision of structural designers.

to a state office two days before prime bid is due and the primes free to choose any of the submit electrical or mechanical prices.

"It's been very successful and has proved the relationship between specialty contractors and the gene contractors," says Becker.

It works, claims Sheldon Wolfe, a mer architect for Minnesota's state u versity. The state university adopted system after it had been used fo while. Wolfe now works for the Met politan Waste Control Commissi which does not use the system.

At the state university, the major s contractor prices were taken by te phone recording machines, Wolfe sa Although prime contractors could lect any of the bids, only low bids we picked, he says. "We didn't want to in the position of assigning subco tracts, so it worked," Wolfe recalls.

When the New York legislature sta a new session later this year, lawmak will consider a Wicks Law amendme containing an option similar to t Minnesota method. Agencies wou have the option of building Wicks L projects with a single prime contract But prime contractors that are appare low bidders would be required to su mit the names and contract value proposed subcontractors in the Wic protected trades within 48 hours of t bid opening. Specialty contractors su port the bill, but prime contracto oppose it.

By Richard Korman

Architects' guidelines anger engineers

The National Council of Architec tural Registration Boards (NCARB has amended its model law on architec registration to add project coordinatio to the list of architects' duties on an building project. Engineers are up i arms, claiming the amendment is move to prevent engineers from actin as prime professional on building pro jects.

The amendment expands the defini tion of the practice of architecture to include "the coordination of any ele ment of technical submissions prepared by others, including, as appropriate and without limitation, consulting engineers and landscape architects." NCARB says the amendment merely clarifies exist ing language.

The current controversy is one more

in a series of jurisdictional disputes. For example, after Maine adopted language from earlier NCARB guidelines into its architectural law, local building code officials began refusing to accept submissions unless they contained an architectural stamp. After protests from engineers, the state ended up scrapping the new language. An earlier NCARB guidebook for local code officials drew a storm of protests from engineers because it seemed to minimize the engineer's as compared to the architect's role in projects. The guide described architects as "taking all aspects of the project into account and coordinating submissions prepared by project team members" (ENR 4/27/92 p. 14).

"The wording of the amendment seems innocuous," says Joe Paul Jones, president of the National Society of Professional Engineers (NSPE). "But putting such wording into law creates the impression that only architects can act as coordinator or prime professional." Jones claims. "Owners should be able to choose who should be the prime professional on a project based on talent and ability and not have that decision made by law," Jones argues.

Samuel T. Balen, NCARB executive vice-president, disagrees. "This amendment is merely a clarification. All it says is that, if the architect is in charge of a project, part of the architect's responsibility is to coordinate the project, nothing more." As to engineers acting as prime professionals on building projects, "It's the same with engineers" in cases where they are put in charge of a project, Balen says.

Response coming. The National Council of Examiners for Engineering and Surveying (NCEES), NCARB's counterpart for engineers, is contemplating a response. While its board of directors has not decided on a specific approach, "NCEES will and must take some action" to counter the NCARB amendment, says NCEES Executive Director, Roger Stricklin.

"These registration laws are designed to protect the health, safety and welfare of the general public, not the engineering profession and not the architectural profession," says Jones. Balen dismisses this argument. "Would you rather have no one legally required to coordinate a project?" As for NSPE's criticism, Balen shrugs, "They're making a mountain out of...nothing. NSPE is creating a turf war where none should exist," he says.

As for the prospects for state adoption of the NCARB amendment, Jones is blunt. "We are notifying our members. We will battle from capitol steps to capitol steps" to ensure that state legislatures reject the amendment. ■

By Gary J. Tulac

002143

Matrimonial counseling needed

Engineers and architects often seem to rub each other the wrong way like a cranky old husband and wife who know each other's 'hot buttons.' Witness the latest brouhaha over the National Council of Architectural Registration Board's amendment to its model law. NCARB's decision to include "project coordination" as part of the definition of the practice of architecture set off a howl of protest by the National Society of Professional Engineers.

NSPE claims that the amendment is intended to prevent an engineer from acting as the prime professional on any building project. NCARB says the amendment is merely a clarification, establishing that *if* the architect is in charge, part of its responsibility is coordinating "any element of technical submissions" by others (see p. 22).

NSPE's reaction would seem out of proportion except that, in the past, provisions like the NCARB guidelines have threatened engineers' business opportunities. An example is an ill-considered legislative amendment in Maine that expanded the scope of documents requiring an architect's seal. After an outcry, the provision was rescinded (ENR 4/13/92 p. 11).

NCARB has a duty to maintain standards of professional competency, as does the National Council of Examiners for Engineering and Surveying. That doesn't mean that either has a right to undermine the professional status of the other, overtly or by implication. NCARB was on notice of objections to the amendment's language, but acted without addressing those concerns.

If NCARB feels sincerely that its amendment was not intended to prevent engineers from acting as prime professional, it should acknowledge that fact in its guidelines. It would save a lot of confusion—and vitriol.

Reforming controversial law may solve multiple problems

The already overlong debate in New York State over whether or not the Wicks Law adds to construction costs has received another lease on life. The law requires four prime contracts on most public building projects.

A study sponsored by electrical contractors takes issue with an earlier one for the School Construction Authority and claims that costs actually are lower on Wicks projects (see p. 21). But while there are good intentions behind the law, requiring multiple primes on projects eliminates flexibility and adds to bureaucracy. Only certain categories of specialty contractors benefit, and there are better ways of helping them.

The 80-year-old Wicks Law requires that public building projects greater than $50,000 be divided into separate prime contracts for general construction, plumbing, electrical and HVAC work. By its nature, such a project delivery system makes communication and coordination on projects more time-consuming and inefficient. That translates into more money. However, the law does suppress bid shopping by general contractors.

General contractors appeared to be gaining the upper hand in the fight to overturn the Wicks Law based on arguments of efficiency and control. But they may have only themselves to blame if there is a backlash and an alternative less desirable than repeal is proposed and accepted by the state legislature. The recession has brought out the worst in everyone engaged in public construction. Owners are shifting too much risk onto contractors, general contractors are bidding too low and are shopping subcontractors to death.

We continue to believe that use of multiple prime contracts for specialty contracting deprives the GC of the leverage needed for proper project control. However, we support less intrusive measures that tend to reduce the degree of bid shopping currently being practiced, while allowing normal project management.

This would be accomplished by following the example of Minnesota, which requires subcontractors to file their bids with the contracting agency shortly before the prime bidding is done and having the potential primes take their pick. The proposal that the New York legislature plans to consider would have the apparent low prime bidder file the sub bids shortly after the prime bids are opened. This has the advantage of allowing primes to build their teams and bid strategies in private and may encourage more innovation. In any event, either alternative is better than the Wicks Law.

An underappreciated resource

The construction business requires a lot of energy. Some people burn out from globe trotting or working long, intense hours on jobsites and are pleased to retire at age 55. Others have no such desire, but are regarded as "from the old school," and forced to make way for the younger generation.

However, people who have been around for a while have much to offer. They have seen, heard and done enough to enable them to quickly recognize a good solution or sniff out a problem nobody else anticipated.

One firm that holds to that is Gee & Jenson. It even boasts a 100-year-old working engineer, one of several employees who retired from other organizations (see p. 25). G&J Chairman Fred A. Greene says, "They have so much to offer. It's a resource this country should use." We agree.

Clearing the air

The article "Architects protest changes," (ENR 5/3 p. 17) contains incorrect information about the composition of a task force and a building code committee that were formed by Dade County to recommend changes following Hurricane Andrew.

According to the county's Building & Zoning Dept., the day after Hurricane Andrew a year ago, the county manager appointed an emergency task force composed of people that he thought were best suited to assess the devastation. It included six professors of engineering, the county's director of building and zoning (also an engineer) and the director of the National Hurricane Center.

In March 1993, over six months after the storm, the county manager recommended replacing the task force with a building code committee composed of a more diverse group. The recommended members included three architects, five engineers and one at-large member. Four out of five engineers recommended for the committee were part of the original task force.

Your article wrongly stated it was the task force and not the building code committee that included Roney J. Mateu's business partner. In turn, I retract my statement that Mateu "should talk to his business partner more often" if "he thinks he's been blindsided" by the recommendations.

CARLOS A. PENIN, P.E.
President
Florida Engineering Society
Miami Chapter
Miami, Fla.

Still seeking accord

The National Society of Professional Engineers has been working diligently for several years to achieve an accord with the American Institute of Architects (AIA) and the National Council of Architectural Registration Boards (NCARB) concerning the "Prime Professional" issue. The AIA has refused to sign the accord, originally drafted by a joint society committee effort.

The proposed accord essentially states what Mr. Samuel Balen, NCARB executive vice president, now says was the intent embodied in the NCARB model law (ENR 7/26 p. 22). However, in private meetings between the leadership of NSPE, AIA and NCARB, the architects have taken the hard line that only architects have the special training necessary to serve as the prime professional on a building project, and that "they would never agree otherwise."

If what Mr. Balen now publicly says truly represents the intent of the AIA and NCARB, then a nice gesture towards reconciliation would be for the architects to stop filing legislation, and to sign the proposed NSPE/AIA accord.

THOMAS D. HIXSON, P.E., L.S.
President
National Society of Professional Engineers
Alexandria, La.

First team

I read with interest your article, "Five teams win large Air Force contracts," (ENR 7/12 p. 14). I would like to inform you that The Environmental Company Inc. is a first tier subcontractor on the EA Engineering team along with SAIC and Montgomery/Watson. It is interesting to note that you always seem to get the large consulting firms correct, but don't dig deep enough to include those of us who are small business entities but who have made just as significant a contribution to the overall team presentation.

RICHARD M. CORNELIUS
President
The Environmental Company Inc.
Charlottesville, Va.

Figuring high-speed rail

Your article "Diversified markets sought as road products mature" erred in paraphrasing the results of my work on the proposed $6.8-billion high-speed rail system in Texas (ENR 8/9 p. 12). It's not true that, "The researchers claim motorists are willing to pay up to 37 times more to drive than to take a train for relatively short trips."

It's not 37 times more. Rather, when people mull whether to drive or take a train, there will be some cases when half the market will go with one mode and half with the other, if the auto trip costs $37 less than the train, assuming equal travel times.

Of course, high-speed rail is capable of much shorter travel times than auto. It becomes more competitive with auto for longer distances, so higher speeds are very important for the new mode to compete successfully with auto or air. Higher speed can mean considerably more farebox revenue with which to finance these rail projects.

DANIEL BRAND
Vice President
Charles River Associates Inc.
Boston

Winning design

The bidding results for the Jamuna River Bridge in Bangladesh "Local rock lowers bidding," made no mention of the designer of the apparent low bid by Hyundai Engineering and Construction Co. (ENR 7/12 p. 14).

The San Francisco office of T.Y. Lin International prepared this alternate design for Hyundai, and after the award will prepare the final design for the construction of this bridge.

JUAN A. MURILLO
Senior Vice President
T.Y. Lin International
San Francisco, Calif.

Transition worries

Now that research is in on the Strategic Highway Research Program (ENR 8/9 p. 12), states must incorporate these findings into their road-building programs and continue with long-term pavement research. Hopefully SHRP's findings will not be lost in transition from lab to construction site.

As an engineer for a road material producer, I am amazed how pavement construction practices vary between states and cities. There is absolutely no reason that the same road intersecting state or town lines should vary in design, yet this is common practice. Certainly, varying loads and temperatures should affect pavement design. But a designer's personal preference or a town's past history should not control how roads are built or maintained.

ROBERT YAREMKO
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Engineering TIMES

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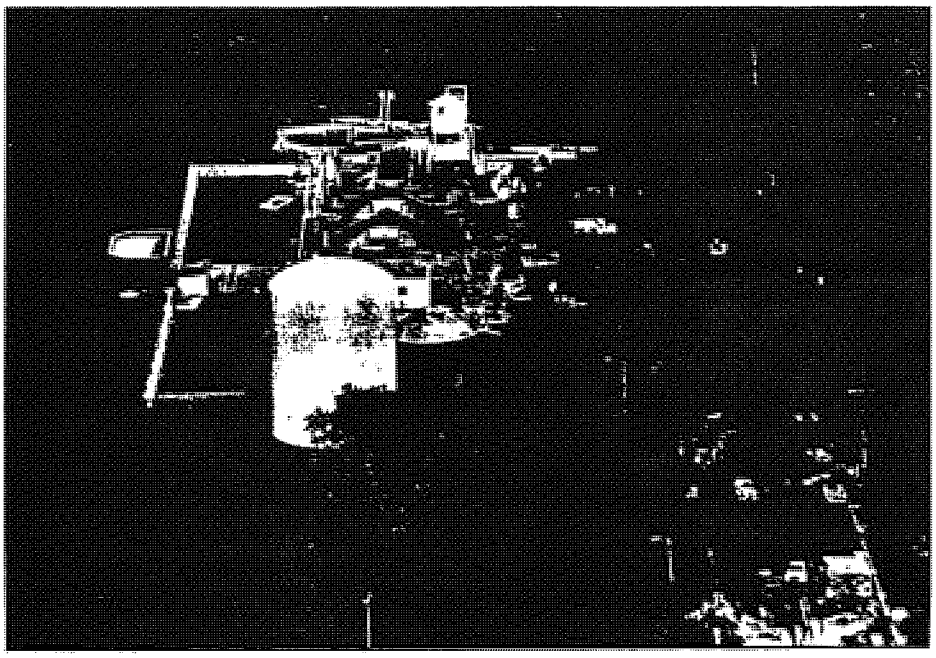
olume 15, Number 9 ■ Published by the National Society of Professional Engineers ■ September 1993

INSIDE

DEPARTMENTS



AP/Wide World Photos

Water treatment plants in Des Moines, Iowa (see story below), and Alton, Illinois (pictured), were some of the buildings overrun by the Great Flood of '93. For more on how engineers coped with the flooding, see page 15.

Head of Water Works Emerges As 'Folk Hero' in Iowa Flooding

By Allen Hogg
Associate Editor

L.D. McMullen had expected to spend much of July in Hawaii with his family, celebrating his 25th wedding anniversary and his daughter's high school graduation. A couple of hours after midnight on July 11, however, the CEO and general manager of the Des Moines Water Works found his plans changed.

That was the night that the level of the Raccoon River rose to 28 feet above normal, topping the heightened levees protecting McMullen's water treatment plant and leaving 250,000 central Iowa residents without running water.

It was perhaps the most visible crisis in the flooding that has hit much of the upper Mississippi River basin this summer (see story on page 15). Hospitals were left dry, and high-rise buildings could not be occupied because their sprinkler systems would not work.

McMullen originally predicted it would take 30 days until drinking water would be available again. Others believed it would take that long just to get water pumping through the system. But the concerted efforts of thousands of utility employees, contractors, National Guard troops, and volunteers had people in Des Moines drinking from their taps before August rolled around.

As leader of the efforts to restore water to the city, NSPE member McMullen found his fame spreading in ways he never would have imagined. He began appearing in television, newspaper, and magazine reports. Songs about the swelling waters soon identified him as "the Flood Stud," and he was toasted as "the General Schwarzkopf of clear water" in public celebrations. People were asking him to sign autographs; women even had him sign the backs of their T-shirts.

Instead of vacationing in Hawaii, McMullen ended up becom-

(Turn to page 14.)

Building Design

'Coordination' Reaffirmed as A Role of PEs

Response to Architects

The National Council of Examiners for Engineering and Surveying (NCEES) has revised its model law in an effort to ensure that engineers may serve as the coordinating professional in building design projects. This change was recommended by NSPE's Board of Directors at its recent annual meeting.

The NSPE recommendation followed action taken by the National Council of Architectural Registration Boards, which issues legislative guidelines designed to help states regulate architects. NCARB had expanded the definition of the practice of architecture in its guidelines to include "the coordination of any elements of technical submissions prepared by others including, as appropriate and without limitation, consulting engineers and landscape architects."

It is feared that architects in states adopting this language will try to prevent engineers from serving as "prime professional" on building projects.

In response, NCEES amended its model law at its recent annual meeting, specifying that the practice of engineering involves "design coordination," which is defined as including "the review and coordination of those technical submissions prepared by others, including as appropriate and without limitation, consulting engineers, architects, landscape architects, land surveyors, and other professionals working under direction of the engineer."

In addition to having recommended this change, the NSPE leadership has warned state societies to be alert for efforts to change state architectural laws.

Despite the fact that NSPE's actions were merely a response to NCARB's change of policy,

(Turn to page 14.)

MAILING LABEL

Woman Engineer Guides NIST On New U.S. Technology Path

By Duwayne Escobedo
Staff Writer

Tapping a 34-year-old woman engineer to oversee the Commerce Department's National Institute of Standards and Technology during a critical metamorphosis in the agency's history strikes appointee Arati Prabhakar as no big deal.

But pressed for her reaction to becoming the first woman to head the 3000-employee NIST, Prabhakar admits: "I guess it is remarkable." And on being the youngest director of the agency since its beginning in 1901? "It would be remarkable only in the sense that people would remark about it even if I were a 34-year-old male." Prabhakar would rather have you think she's just lucky.

Hardly. Encouraged by a mother "who began every sentence with, 'When you get your Ph.D. . . .' " Prabhakar learned early on to think big—a philosophy she's now trying to apply to NIST.

(Turn to page 10.)

Accord On Building Design

The chairmen and executive directors of the Texas State Board of Registration for Professional Engineers and the Texas State Board of Architectural Examiners have concluded an important agreement enabling owners of buildings eyed for construction to select either an architect or a professional engineer as the prime design consultant on the project.

Over the past 36 months there has been public confusion about Texas laws governing the authority to design buildings. Engineers and architects in various areas of the state were uncertain whether both professions had state authority to produce building designs.

The Texas attorney general had ruled last fall that engineers had the legal right to design public buildings after the Texas architects' board questioned whether its registration statute barred a PE from doing so.

A year-long review of existing state laws, which involved the architects' and engineers' boards and the Texas attorney general's office, concluded that licensed architects and professional engineers are authorized to prepare building designs but must stay within their area of qualifications.

public facility in downtown Des Moines. When that building lost power, everything had to be moved to one of the city's high schools.

"The school board was just superb," McMullen remarks. "It basically gave us the building and said, 'You can use as much of it as you want.' That was really very, very fortunate. It turned out to be a nice temporary home for us."

Engineering Expertise

The work of the other teams depended on more doses of engineering expertise.

Geotechnical engineers determined how to fortify the mile-long ce surrounding the treatment nt site while at the same time getting out 10.5 million gallons of dirty water that had been trapped behind it. Structural engineers were brought in to ensure the buildings were still sound. Mechanical and electronics engineers worked to repair systems, and, according to McMullen, three electrical engineers were in the plant "all the time."

"We had about all the engineering disciplines involved that you could possibly think of," says the former University of Iowa professor, who received his degrees in civil and environmental engineering.

"It was like a small army around there," McMullen adds, noting that the 235-member Water Works staff was at times assisted by 50 contractors, 100 soldiers from the National Guard, and an estimated 1000 volunteers involved in the sandbagging process.

A particular challenge facing McMullen's crews involved coming up with the clean water needed to run much of the utility's equipment, including valves and chemical feed systems. The plant discharge normally used for this purpose had, of course, been shut down along with the rest of the water system.

helped turn what could have been a major setback into what he calls

items for granted. He is optimistic that the disaster will spur plans that

> ***"We had about all the engineering disciplines involved [in the flood response] that you could possibly think of."***
>
> —L.D. McMullen

"a temporary one," and on July 30 the water was declared safe to drink again.

By this time, McMullen's star was rapidly rising. He had been appearing at city press conferences—usually "unshaven and in work clothes," notes IES's Scott—since the flooding began. At first twice a day, then three times a week as the recovery got underway, he helped keep the public informed about the progress being made.

"That turned out to be a very positive thing based on the feedback that was coming from the customers," McMullen notes.

The Flood Stud

The next thing McMullen knew, *The Des Moines Register* printed words to a song in which he was dubbed "the Flood Stud." His name also started appearing in other tunes being written about rising waters, songs with titles like "Water in the Tank" and "I Ain't Gonna Flush No More, No More."

"I've been mentioned a couple of times," he acknowledges, citing one tune in which "a person wakes up in his dream and there's L.D. McMullen and his water machine."

An early August civic celebration designed to let the country know Des Moines was open for business again turned into a salute to McMullen. Crowds began chanting "L.D., L.D." The master of ceremonies made the

were underway to build a second treatment plant in Des Moines.

McMullen notes one Des Moines hospital had contingency plans for the loss of telephones, gas, electricity, and oxygen, but was not ready for its water to go out.

"They just assumed that we'd always be there, that there would never be a loss of water," he comments.

Fleeting Fame

McMullen is first to admit that even as the effects of the flood linger on, his own moment in the sun will probably be fleeting.

"Once you release water for all uses, we'll go back to being the silent utility again," he says.

Before he fades from the limelight, however, he is discovering that even temporary notoriety has its privileges.

McMullen notes that he had used expiring frequent flier coupons to purchase his family's tickets to Hawaii, so his travel agent had to call his airline's office in Denver to see if the trip could be rescheduled for the Christmas holiday.

After hearing whose trip was being rescheduled, the official in Denver said, "Oh, we know L.D. McMullen."

The airline "basically said they would honor the tickets whenever we wanted to take the trip," says McMullen. "We didn't lose out on anything."

NCARB Provokes Engineers

(Continued from page 1.)

NCARB Executive Vice-President Samuel Balen has accused the Society of creating "a turf war."

"They're making a mountain out of . . . nothing," Balen told *ENR* magazine.

NSPE President Dudley Hixson replied to Balen's charges by noting that NCARB and American Institute of Architects leaders have refused to endorse an accord created by a joint architect-engineer committee that would help resolve the "prime professional" issue.

"We are simply responding to an unprovoked frontal attack, initiated while efforts were underway at NSPE's initiative to provide a basis for increased cooperation and understanding between the architectural and engineering professions," Hixson stated.

Engineering TIMES

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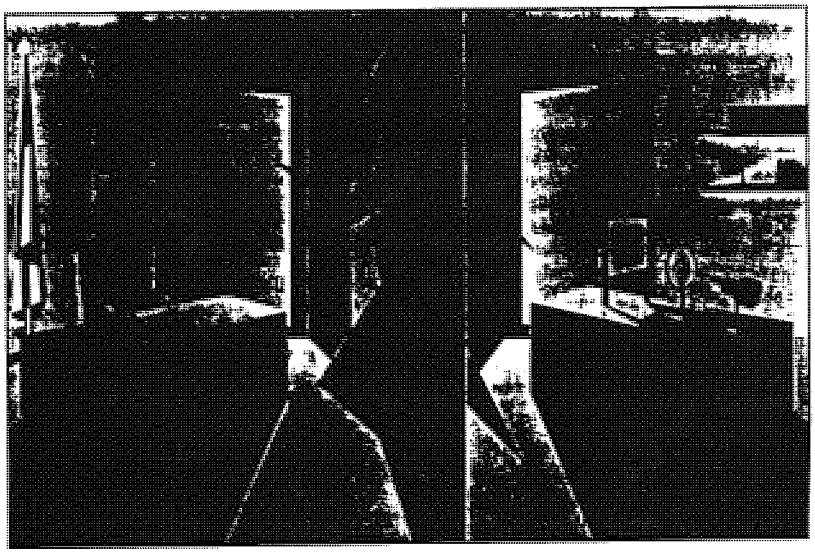
ıe 15, Number 10 ■ Published by the National Society of Professional Engineers ■ October 1993

Universities Turn to Engineers for Leaders

By Allen Hogg
Associate Editor



When Thomas Everhart left the chancellorship of the University of Illinois in 1987 to become president of the California Institute of Technology, he was, by his own reckoning, the only engineer to lead a university on the West Coast.

Everhart now looks around and finds himself with lots of company.

Fellow electrical engineer John Slaughter became president of Occidental College, a Los Angeles liberal arts school, after leaving the chancellorship of the University of Maryland-College Park in 1988. In 1990 mechanical engineer Chang-Lin Tien was named chancellor at the University of California-Berkeley. And electrical engineer Steven Sample became president of the University of Southern California in 1991, after leaving the presidency of the State University of New York at Buffalo.

"Sometimes," observes Everhart, "these things go in waves."

And it is not just on the West Coast that engineers are becoming campus leaders. When students around the country returned to school this fall, the people occupying the presidents' chairs were perhaps as likely to be engineers as members of any other profession.

In fact, the Association of American Universities (AAU), an organization comprised of executives from 58 top research institutions, has as many members who received engineering degrees as went to law school. Even Cornelius Pings, who became AAU president earlier this year after serving as provost at Southern Cal, is a chemical engineer.

"What I think is most newsworthy is engineers coming into academic leadership posts at major national research universities where the president has responsibility for the fine arts, for the humanities, for the social sciences, for medicine, for the whole panoply of academic disciplines. I don't think that would have been possible 10 or 20 years ago," says USC's Sample.

He adds, "That may say something good for the U.S."

(Turn to page 8.)

Texas A/Es' Accord Gives Peace a Chance

By Duwayne Escobedo
Staff Writer

Zuniga Engineering Co. never thought twice about leading the design and construction of a $3 million elementary school building for the Laredo, Texas, United Independent School Board in 1990.

But, recalls Oscar Zuniga, local and state architects "took a little exception" to his engineering firm winning the contract.

Well, maybe more than a little. The event touched off a conflict that had simmered between Texas professional engineers and architects over whether the state law allowed engineers to act as the prime design professional on building projects—until a recent accord brought hope for peace (see September *ET*).

Some architects had claimed that under the Architect's Practice Act only registered architects could design any public buildings costing more than $100,000. The Texas Society of Architects (TSA) assessed its members $15 apiece to finance possible litigation against the school board and Zuniga.

Meanwhile, similar disputes arising around the state spurred the Texas Board of Architectural Examiners (TBAE) to ask Attorney General Dan Morales for his opinion on the scope of the state's architect registration law.

Despite the pressure architects put on the Laredo school board, Zuniga constructed the school, which was completed a year ago.

For Zuniga the hostilities are not quite forgotten. "If the same situation took place right now, an architect would find ten gun barrels pointing at him," he says. "The architect would lose his head in any fight."

However, the Texas State Board of Registration for Professional Engineers (TSBRPE) and TBAE reached an agreement that both sides hope will resolve any future A/E disputes peacefully.

The agreement, signed by TSBRPE Chairman Earnest Gloyna and TBAE Chairman Theodore Maffitt, Jr., and approved unanimously by both state boards, reaffirms last year's Texas attorney general's decision recognizing the right of professional engineers and architects to design buildings. The agreement also establishes a joint panel to settle any further questions of authority.

Judging by architects' reactions to the August agreement, Maffitt thinks A/Es may coexist happily

(Turn to page 13.)

MAILING LAI

Firms Not Held Liable for Job Site Accidents

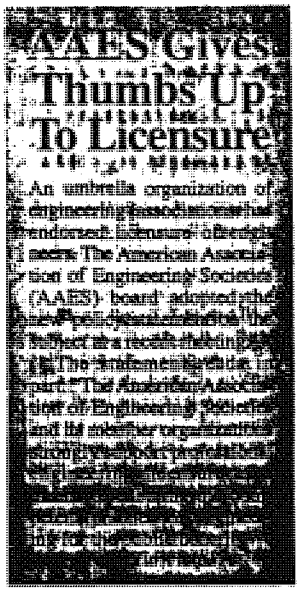
The A/E community hopes that two recent decisions will stymie a Department of Labor trend toward holding engineering consulting firms responsible for safety at construction job sites where the firms have no actual authority.

A ruling handed down by an administrative law judge with the Occupational Safety and Health Review Commission (OSHRC) has cleared the engineering firm CH2M Hill Central Inc. of liability in a 1988 tunnel explosion that killed three construction workers in Milwaukee.

Less than a week earlier, a U.S. Court of Appeals had handed the A/E community another victory in the case of the structural engineering firm Simpson, Gumpertz & Heger (SGH). The court ruled that the construction site, where a collapse occurred during a concrete pour, was not a "place of employment" for SGH and that a design firm is not responsible for protecting workers at a site where the firm has no employees.

NSPE and other design groups had filed a "friend of the court" brief in support of SGH's conten-

(Turn to page 11.)



AAES Gives Thumbs Up To Licensure

An umbrella organization of engineering [illegible] endorsed licensure of [illegible] engineers. The American Association of Engineering Societies (AAES) board adopted the [illegible] position statement in [illegible] The statement states, in part: "The American Association of Engineering Societies and its member organizations strongly support [illegible]

Engineering TIMES

Engineers Get a Victory

After years of litigation, confrontation between the Department of Labor and NSPE (in conjunction with other design professional organizations) might be ready for a breather—at least if two recent rulings on construction site safety give DOL the message that it can't win its case (see story on page 1).

The issue: Can design professionals be held liable under Occupational Safety and Health Administration regulations for injuries to workers at a construction site? The Department of Labor has said yes, the OSHA construction standards apply to worksites, not specifically to the employers of those who carry out the construction work. Therefore, engineers' actions that OSHA believes lead to injuries can open the door for citations. NSPE has said no, an engineer has no authority over construction contractors or their employees and thus cannot be considered responsible for maintaining safe working conditions. The contractor must assume ultimate safety responsibility.

In one case, the engineering firm of Simpson, Gumpertz & Heger was cited for OSHA safety violations after a construction site accident. As DOL appeals moved from one legal forum to another, NSPE and its A/E allies each time weighed in with "friend of the court" briefs. And each time the ruling mirrored the A/E point of view. In the case of an environmental engineering unit of CH2M Hill, an administrative law judge also rejected DOL's arguments for increased OSHA liability for engineers. Here the engineering firm actually had some project management duties, but the judge said the construction contractor—and not the engineer—carried the full safety responsibility.

On construction site safety, legal precedent keeps building to contain engineer liability. Let's hope DOL will take note.

Architect-Engineer Peace

History has a habit of repeating itself. A 1972 headline in NSPE's *Professional Engineer* magazine proclaims, "Architects versus Engineers." Similar headlines continue to appear in *ET*, and have proliferated recently.

But maybe there's hope for a turnabout. Texas licensed architects recently took the olive branch offered by professional engineers, and both professions' state boards now seem committed to putting aside their differences after years of contention over who could serve as the prime design professional on building projects (see story on page 1).

In their accord, Texas A/Es agreed to clear up any confusion that still might exist at the state and local levels about who can design buildings, and came up with a way to resolve future disputes. Both sides realized nothing could be gained by battling. Giving architects a monopoly on designing buildings would have not only prevented qualified PEs from offering services they have historically performed, but denied owners the right to select the professional of their choice.

How much longer before the professions shake hands for good nationwide? NSPE has called on the National Council of Architectural Registration Boards and the American Institute of Architects to sign an accord to avoid further confrontations. Maybe the Texas breakthrough can provide the momentum.

What's in a Designation?

LETTERS

Continuing Education

To the Editor:
Re: "Say No To Mandatory Continuing Education," August "Viewpoint"

How self-serving can an engineer be? Fischetti does not want mandatory continuing education simply because he does not want to bother. It might take a few hours or cost a few bucks, neither of which he wants to invest in the public welfare. With attitudes like this, engineers are going to sink to the bottom of the list of respected professions Fischetti quotes from.

In Florida, mandatory continuing education for professional land surveyors has been a fact of life for five years. All the troubles Fischetti envisions have been overcome—or did not materialize—and the profession is better for it. More than that, the public is better for it, since many marginally competent or less advanced practitioners have increased their knowledge (or retired), lessening the chance that the public will encounter malpractice. The engineering profession will enjoy similar success, given the chance.

Surely there will always be problems. This is no reason not to try. Our education does not end at graduation—especially in this time of vast technological advances. If we were required to prove competency to achieve licensure, should we not be required to demonstrate continuing competency? How can we look each other (much less the public) in the eye if we do not ensure competency simply because it is bothersome?

The public should and certainly will demand such assurances. Why not act now, before being forced to react later?

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Owen Pose
Mobil

To the Editor:
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Engineering TIMES

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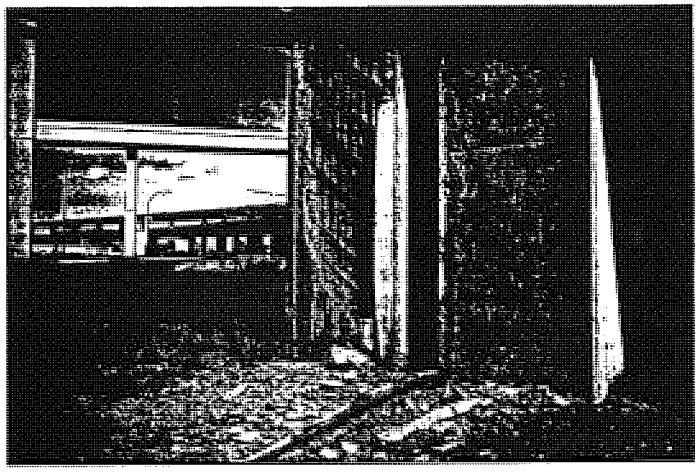
NSIDE

U.S. Infrastructure Losing Battle Against Corrosion

By Duwayne Escobedo
Staff Writer



Repair of bridges crumbling from corrosion will cost the U.S. an estimated $78 billion.

To the average observer—and to many engineers—corrosion often goes unseen until a water main bursts, a bridge crumbles, or potholes pock the street.

Measures can be taken to curb or even stop this prime culprit in the decay of America's infrastructure. But so far, corrosion protection techniques still suffer from neglect.

Ignoring corrosion can result in severe consequences, as Atlanta found out last June. A 70-year-old sewer main, repaired once 30 years ago, broke, leading to the collapse of a parking lot and the deaths of two people.

"I sure wish people would become more aware of corrosion," says Ed Escalante, who has studied corrosion for the past three decades with the National Institute of Standards and Technology (NIST). "It amazes me that something more isn't being done. To me there's nothing more important in the U.S. than our infrastructure. Water lines, gas lines, sewer lines and so on, they're all falling apart. To eliminate any one of them stops us dead in our tracks."

Corrosion is no small problem. The most extensive study performed on corrosion's impact was completed in 1975 by Battelle Columbus Laboratories and the National Bureau of Standards, now known as NIST. The study concluded that corrosion cost the U.S. economy an equivalent of 4.2% of its gross national product. Corrosion experts still rely on that figure when extrapolating that corrosion currently costs the U.S. more than $200 billion annually.

Air, water, and soil, which contain carbon, chloride, and a host of other corrosive elements, all bring about corrosion. Since moving to another planet is not an option, other ways have been developed to lower the toll on the U.S. infrastructure. Common corrosion protection techniques involve applying protective coatings, such as magnesium, or using cathodic protection, which entails placing a metal screen between the concrete and the steel in a structure to draw corrosive elements away from the steel.

But as the Rust Belt well knows, one easy way to lower corrosion's costs would be to stop dumping salts on icy and snowy

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NSPE: Make Continuing Ed Mandatory

By Stefan Jaeger
Editor

National debate on continuing professional competency for engineers came to a head at NSPE's recent Board of Directors meeting, and in a turnabout, the Society for the first time endorsed mandatory CPC for the profession.

Proponents of the new policy emphasized the critical importance of ensuring that engineers keep pace with rapid technological change. They also saw the need to bring engineers in line with the CPC requirements common to the other major professions and to give NSPE a leadership role in what many see as the inevitable proliferation of mandatory CPC legislation in the states.

As part of its January vote in Tucson, Arizona, the NSPE board called on states to seek uniformity through the model CPC rules of the National Council of Examiners for Engineering and Surveying so that engineers licensed in several states do not have to meet multiple CPC requirements.

The outcome of the vote remained in doubt until the end as members of the NSPE board engaged in emotional debate.

"Mandatory continuing competency can be confusing and painful," acknowledged Arnold Rosenberg of Virginia, the state that introduced the CPC resolution. "But if you look at the other professions, where does [our current policy of voluntary CPC] leave us? It leaves us in the dust."

Rosenberg pointed out that formal voluntary CPC programs for engineers have shown only about a 10% participation rate and that public perception must be taken into account. "We should expect no less of engineers than we do of pharmacists, accountants, and physicians," Rosenberg said. Even if professional engineers do keep up on their own, "public perception is the reality of life. Voluntary CPC is a half-way measure that gets you nowhere."

Rosenberg recounted a debate in the Virginia legislature, where abolishing engineering licensure had been proposed. How could taking engineering exams at a young age with no assurance of future education ensure protection of the public health and safety, it was asked. The proposal failed, but Rosenberg said it had made for

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MAILING LABEL

Engineers Report New Tangles With Architects

By Duwayne Escobedo
Staff Writer

Joey Griffen is a licensed professional engineer in 21 states. For more than 14 years he has designed buildings for Lowe's Home Centers. Because Griffen works directly for Lowe's as the design manager of its engineering and construction division, he does not compete with other engineers or architects to build Lowe's stores.

Yet Griffen awaits a ruling this month from the North Carolina State Board of Registration for Professional Engineers and Land Surveyors over whether he's guilty of misconduct for misrepresenting himself as an architect on drawings he submitted for a center in Raleigh, North Carolina.

"If I had never read of similar stories in other states I probably would have been caught off guard," Griffen says. "[But] I didn't expect to have problems in North Carolina. I hope this is the first and last time this happens."

Griffen isn't the only one currently experiencing challenges by architects over whether PEs can design buildings and serve as the prime design professional on such projects. Other professional engineers across the country have reported similar problems, including PEs in Arkansas, Ohio, and Florida.

In Arkansas, the state architects board had convinced local building inspectors that an architect's stamp was needed on all building plans. In Ohio, the engineering board proposed a rule to prevent the architects board from sending

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Engineer Unemployment

Employment figures released for the fourth quarter of 1993 suggest that the decline in unemployment among engineers announced by the Bureau of Labor Statistics earlier last year was probably exaggerated.

For BLS surveys, Americans are asked to describe their occupations and duties and their descriptions are compared to those listed in the U.S. government's *Standard Industrial Classification Manual*. These surveys had indicated that the unemployment rate for engineers fell from a record 4.4% for the second quarter of 1993 to 3.8% for the third.

In the fourth quarter, however, the unemployment rate was reported to be back up to 4.2% with 1,719,000 engineers employed and 75,000 out of work.

Bu ding Design Disputes W n Architects Continue

(Continued from page 1.)
notices falsely telling engineers who were designing buildings that they were in violation of state law. And in Florida, both A/E professional boards reached an agreement that most PEs oppose.

To help PEs counter architects' attempts to limit the practice of engineering, NSPE has developed some information resources that outline the legal precedents supporting a PE's right to design buildings (see story above).

Still, PEs in other states such as Tennessee, Texas, and Delaware, report good relations with architects.

Larry Rogers, vice president of engineering for Forcum-Lannom Associates Inc. and president-elect of the Tennessee Society of Professional Engineers, is hard pressed to recall any trouble with architects over the design of buildings. "I think we have it much better than most states," Rogers says. "We're trying to work together successfully."

In Texas, an agreement reached in August by the Texas State Board of Registration for Professional Engineers and the Texas Board of Architectural Examiners recognizing the right of both professions to design buildings has quelled A/E conflicts for now. The Delaware licensing boards meet this month to create a similar agreement.

'A' Is For?

Griffen never thought he'd personally suffer allegations that he was practicing architecture by designing buildings. The charges leveled at him by the architecture board resulted simply because his engineering seal appears on sheets marked with an "A." The "A" does not stand for architecture or imply the sheets require the practicing of architecture. It simply is traditional in the development of building documents to assign sheet numbers such as A1, A2, and so on.

The other charge stems from the fact that Griffen's name appears as the designer of record for the "architectural" portion of the project. The term is required by the North Carolina state building codes but never implied that the work must be performed by an architect rather than an engineer.

As a result of the charges, Griffen now numbers all sheets with the letter "G" and uses the term "general construction" in place of "architectural" on all drawings he seals.

William "Butch" Green's year-old problem with the Arkansas Board of Architects over four industrial buildings and an office building his company, Spectrum Engineering Inc., designed and is building seems to be drawing to an end.

The architecture board had convinced neighboring Arkansas towns Fayetteville and Springdale that the project and others like it required an architect's seal.

Springdale decided last month, and Fayetteville in December, to accept either an engineer's or architect's seal on all building plans.

Albert Miller, president of the Arkansas Board of Registration for Professional Engineers and Land Surveyors, had sent letters to Fayetteville and Springdale showing that engineers can design and seal building plans. Miller refused a request by the president of the architects board demanding that he nullify the letters.

Arkansas' engineering board and architecture board had formed a joint committee to settle differences involving incidental practice. The committee came to an impasse earlier in the year when architects insisted that only they were qualified to design and build buildings involving human use.

"Engineers and architects shouldn't be beating each other's brains out," Green says. "Architects need to accept that there's an overlap of the two professions. But they want it all."

Ohio Ordeal

Ohio architects appear to want the exclusive right to design buildings as well. The Ohio State Board of Registration for Professional Engineers and Surveyors reports that the state architects board has sent out cease and desist orders to hundreds of PEs designing buildings or serving as the prime professional. The architects board's orders claim professional engineers are performing architectural work.

The Ohio engineering board proposed a rule aimed at reinforcing the Engineering Practice Act, which gives engineers the right to design buildings, and making it clear that only the state engineering board and the Ohio courts have the authority to discipline engineers who violate the provisions of the engineering statute. It was hoped the rule would put an end to harassment of PEs by the state architects board, according to PE board chairman Charles Neff.

Engineers and architects squared off over the proposed rule in a hearing before the Ohio legislature's Joint Committee on Agency Rule Review, where the rule was withdrawn.

"It was an awful ordeal," says Alex Verich of Alex Verich & Associates Consulting Engineers in Warren, Ohio. NSPE's general counsel had also come to testify on behalf of PEs.

Verich, who knows a thing or two about engineers' and architects' disputes, testified during the hearing on behalf of the board. The PE has designed buildings for 42 years and won a precedent before the Florida Supreme Court in 1970 that ruled a licensed engineer could design buildings in the state.

Currently, Verich sits on a joint engineer-architect committee created last year by the Ohio attorney general in an effort to help the professions work out their differences. The committee is scheduled to hold its second meeting on February 10. In preparation for the meeting, Verich, a certified plans examiner for Trumbull County, examined eight sets of plans, seven of which were designed by engineers. "They're all very, very good plans," Verich says. "But the joint practice committee is all one sided. Architects just don't want engineers to design buildings, period.

"It has been a constant problem," Verich adds. "[But] in Ohio I've never had a problem previously."

Verich says Ohio and other states could easily solve A/E disputes if the boards would work together and recognize the right of both professions to design buildings.

But in Florida, many professional engineers, including Robert Doughy, are worried about the boards working together.

Agreement Criticized

The Florida Board of Professional Engineers and the Florida Board of Architecture agreed in the fall to a joint statement confirming an overlap of the professions. That's not the problem. The problem is the establishment of a practice review panel made up of one engineer and architect board member each. The two-member panel plans to review and evaluate complaints regarding "cross professional negligence," or allegations of unauthorized practice by engineers or architects. The panel then will make recommendations to the respective boards on whether disciplinary action should be taken. Appointments to the panel have yet to be made.

The Florida Engineering Society opposes the joint agreement because it may artificially limit a PE's scope of practice, and because the term "cross professional negligence" has no accepted definition.

Doughy, a regional vice president for a Florida engineering firm and former member of the state engineering board, echoes many PEs' sentiments when he says the A/E boards' agreement and panel "is a misguided and illegal attempt." He adds: "It is not consistent with the state statute. Any ruling they come up with as far as I'm concerned is erroneous."

Doughy lacks trust for architects. "They don't want to understand the problem and realize that architecture really is nothing more than the art work on a building."

Doughy expects spats between engineers and architects over building design to continue to pop up in Florida and elsewhere. "This thing settles down when the economy is good," he says. "It's been going on since time began."

Engineers Lobby To Teach

The Institute of Electrical and Electronics Engineers–USA has called on states to create alternative teacher certification programs that would make it easier for experienced engineers to become precollege science and mathematics teachers.

"Most states make it burdensome financially and in terms of self-esteem for professionals without formal pedagogical training to become certified as teachers," the IEEE-USA board contends. "Engineers with years of training . . . and practical knowledge of their applications on the job are excellent candidates for the teaching profession. They may require training in teaching techniques, but they are well equipped in technical knowledge and practical engineering experience."

IEEE-USA has adopted a position encouraging state legislatures and departments of education to adopt alternative credentialing programs to enable electrical and electronics engineers to enter the teaching profession with a minimum of retraining and financial burden.

The organization suggests as an alternative method of training an intensive short course followed by mentoring, team teaching, or periodic reinforcement courses.

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■ Society surveys for satisfaction.
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PARTMENTS

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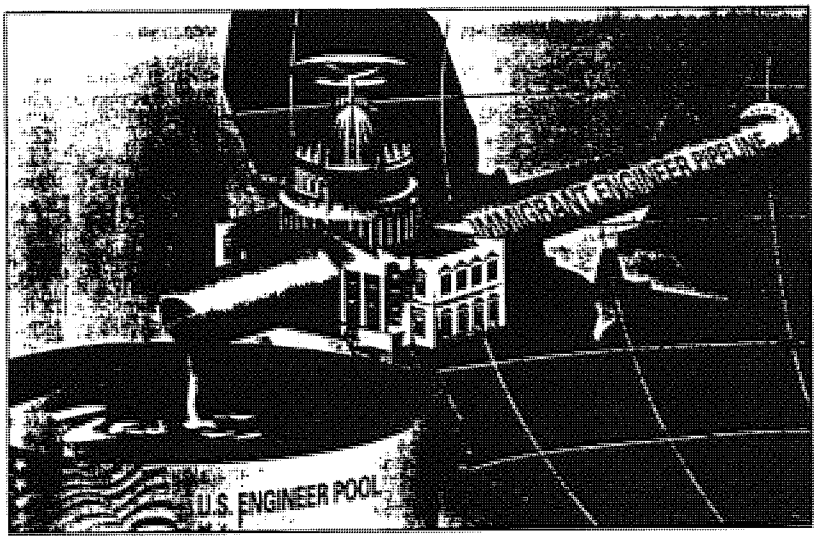
Limits Debated for Engineer Immigration

By Molly Galvin
Associate Editor



They take jobs away from qualified American engineers and work for less money, in turn driving everybody's compensation ranges down.

They're highly skilled, dedicated workers who have made valuable contributions to almost every engineering field—and also to the U.S. economy.

If American engineers were forced to pick which of the above statements applied to professionals from other countries who work in the U.S., some of them would find it a difficult, highly sensitive, and even emotional task. While few would deny the important contributions that foreign engineers have made in the American work force, many U.S. engineers are being hit by layoffs and downsizing, and others are struggling with lower compensation and benefits.

Even so, few engineers would recommend that no foreign professionals be allowed to work in the U.S. But some interest groups, including the Institute of Electrical and Electronics Engineers-USA (IEEE-USA), are questioning whether the American pie is big enough to feed everybody, especially after immigration laws were amended four years ago to make it easier for employers to hire highly skilled workers from other countries. Some are also raising the question of whether foreign workers are accepting jobs for lower than prevailing wages.

But others counter that restricting the flow of foreign workers will also limit the U.S.'s ability to compete in the global marketplace. "Companies within the U.S. are global corporations, not just domestic corporations," notes Arnold Eagle, president of the American Council on International Personnel (ACIP), which represents the interests of businesses from a gamut of industry types. "There is a need within many of these companies to have highly technical people, and some of those people are not located here in the U.S."

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Engineer Education Meets the Real World

By Molly Galvin
Associate Editor

It's a relatively rare occurrence when industry, government, education, and even licensing representatives agree on anything. But when it comes to engineering education—and the future of the profession in general—the major players are repeating the same mantra: change.

The message was loud and clear at the Accreditation Board for Engineering and Technology's Annual Meeting, where speaker after speaker from different engineering disciplines and backgrounds told the same story: The world that a young graduate enters today is a very different place than it was even a decade ago. "I think that tomorrow's engineers can look for much more career volatility and much less long-term employment," said keynote speaker Richard Anderson, retired vice president and chief technical officer for the Grumman Corp.

Speakers from nearly every facet of engineering—from chemical to mechanical to electrical to civil—noted that in order to prepare for an erratic career, graduates will need, along with a solid core of technical knowledge, more training and development in several key areas.

Soft skills—New engineers need a strong base in "soft" skills such as communication, leadership, and teamwork.

Almost every organization, large and small, has made radical overhauls in internal structure over the last few years, Anderson noted. Downsizing, total quality management (TQM), reengineering, and other trends are eliminating many of the middle

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MAILING

Fourth PE Joins Incumbents on Capitol Hill

On election day, at least one new PE joined the House of Representatives ranks, while incumbent PEs batted three for three at the ballot box.

John Hostettler (R-Ind.), a PE from Evansville, Indiana, knocked out House veteran Frank McCloskey by a 52% to 48% margin. Hostettler holds a BS in mechanical engineering from Rose-Hulman Institute of Technology and worked for Southern Indiana Gas & Electric. He also worked as a performance engineer for a power plant.

Incumbent PEs Joe Barton (R-Tex.), Jay Kim (R-Calif.), and Lewis Payne (D-Va.) will head back to Capitol Hill and the first Republican-controlled Congress since 1952. All three received support from NSPE-PAC.

Barton, an engineering consultant, returns for his sixth term after winning 76% of the vote. He serves on the Energy and Commerce Committee and the Science, Space and Technology Committee. Barton was a defender of the Superconducting Super Collider and Space Station Freedom. He also was instrumental in streamlining licensing procedures for nuclear power plants.

Jay Kim, the first Korean-American member of Congress, returns to the House for his second term. He serves on the Public Works and Transportation Committee and the Small Business Committee. Kim holds a civil engineering degree from the University of Southern California and was owner of JayKim Engineers. As a member of the Public Works Committee, he sponsored the 1993 Infrastructure Protection Act, which would take all infrastructure-related trust funds off budget. NSPE's Legislative & Gov-

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NSPE Answers Architects

NSPE recently protested the contents of an *AIArchitect* article, in which it is claimed that NSPE is "urging its chapters to seek the legal authority for engineers to be prime professionals on building projects" and that "under current laws, engineers cannot be prime professionals on building projects in most states."

In a letter to the American Institute of Architects' newsletter, NSPE President Monte Phillips noted that NSPE could not be "seeking" such legal authority because "such authority is already vested in engineers under most state engineer-

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See PAC 1

Arkansas A/Es Await Opinion On Status of Design Primes

By David Siegel
Staff Writer

The Arkansas State Board of Architects (ASBA) has asked the state attorney general to issue an opinion regarding the status of engineers as prime professionals on building design projects. At press time an opinion was considered imminent.

In August, ASBA President Lugean Chilcote wrote to Arkansas Attorney General Winston Bryant asking, "Can an engineer be the prime professional for a building project designed for human occupancy or habitation, and is an engineer limited to providing only architectural services that are minor and incidental to engineering projects?"

In July, that question had been addressed informally by Assistant Attorney General Wade Hodge at the request of the engineers' board. Hodge serves as the engineers' liaison to the attorney general. His informal opinion asserts that building design is within the scope of engineering practice. He explains that even though the Arkansas statute could be clearer, "it is my conclusion that if challenged, an engineer's authority to design buildings would be upheld."

NSPE has provided support for that view by presenting its position to Attorney General Bryant's office and by assisting the engineers' board in defining "prime professional."

In a letter to Hodge, NSPE General Counsel Arthur Schwartz stated that the Arkansas engineering licensure law is similar to those of most other states and that engineers have the right to design buildings and serve as prime professionals on such projects. He also noted that because of the overlap between the professions, incidental practice cannot reasonably be interpreted as limiting an Arkansas PE's right to perform "building design and consultation services."

Revolutionary New Light

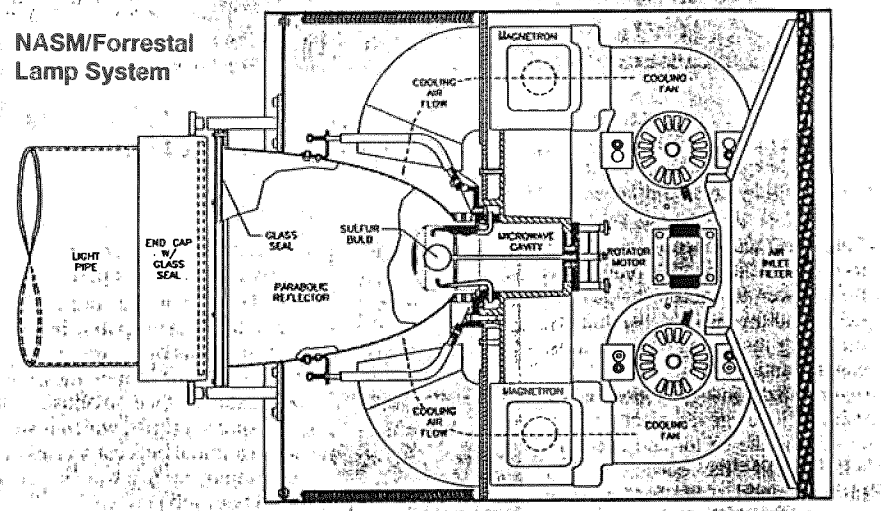
The Department of Energy has announced a major breakthrough in lighting technology that outshines current systems in brightness and energy efficiency and offers a potentially limitless lifetime.

The new Sulfur Lamp, invented by the Maryland company Fusion Lighting, eliminates the most common source of light failure—burn-out or failure of metal parts. It generates light by electromagnetically heating sulfur with microwave energy.

The new lighting system consists of golf-ball-sized bulbs connected to 10-foot long, 10-inch diameter light pipes. According to DOE, the system is ideal for illuminating large spaces such as factories, warehouses, arenas, and shopping malls. Such lighting is already being used at DOE's Forrestal Building and the Smithsonian's Air and Space Museum.

Like sunlight, the light generated by the sulfur lamp system is bright and full color while producing little heat or ultraviolet light—unlike fluorescent and high-intensity discharge lamps, which emit only parts of the full color spectrum, according to DOE.

NASM/Forrestal Lamp System



At the Forrestal Building, one 240-foot pipe has eliminated 240 conventional mercury lamps, boosted light levels four times, and cut energy use by 72%. Similarly, at the Air and Space Museum, three 90-foot pipes have replaced 94 conventional lamps, boosted light levels three times, and cut energy use by 25%.

Currently, the lamp's life is limited only by the life of the microwave generator, which is approximately 10,000 to 15,000 hours. In the long term, DOE expects that solid state generators could give the lamp an almost indefinite usable life.

Support for the project came from DOE, the Environmental Protection Agency, NASA, and Lorné Whitehead, inventor of the light pipes.

STATELINE

CPC Mandatory

■ New Mexico—The New Mexico State Board of Registration for Professional Engineers and Surveyors adopted a final regulation in September that will require voluntary continuing professional competency

Contractors Welcome Prompt Payment Law

AEs Help Negotiate Building Codes Rule

■ Vermont—Vermont's Department of Labor and Industry is moving to amend the state's building code which currently does not always require plans and specifications for public buildings to be stamped by

ENR NEWS

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PROFESSIONAL PRACTICE

The dollars behind design rights

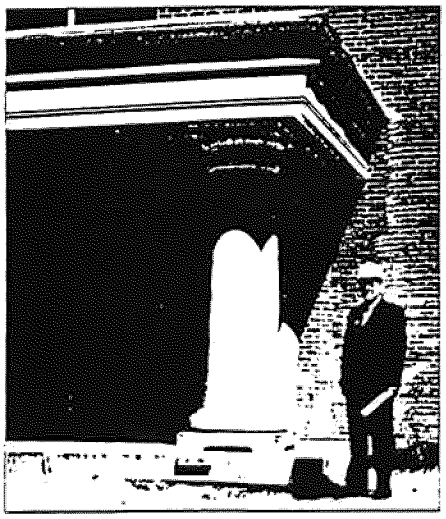
Allen F. Thibodeau ordinarily doesn't stir up trouble, but when it comes to the rights of engineers to design buildings, Thibodeau likes to emphasize his point.

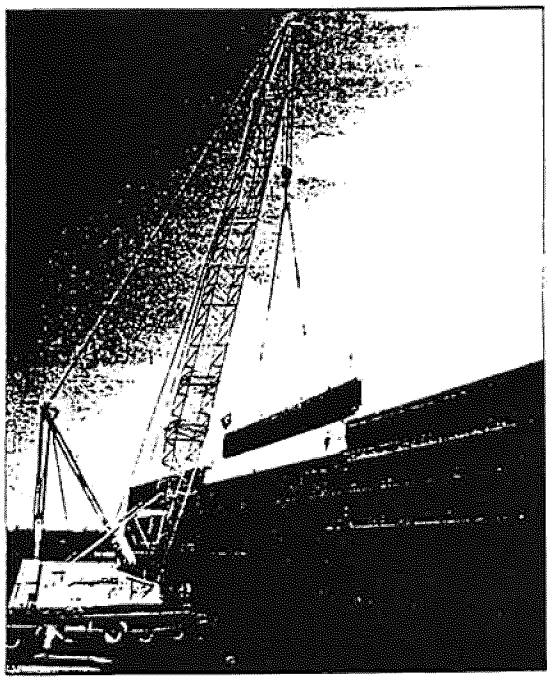
Thibodeau is the chief engineer for MacMillin Co., a design-build contractor based in Keene, N.H. When he stamped the plans for a 5,000-sq-ft addition to MacMillin's building, Thibodeau knew the plans would be rejected by Michael Forrest, Keene's code enforcement superintendent. Forrest believes only architects may serve as the prime designer on a building expansion under New Hampshire's architectural law and building code.

Thibodeau disagreed and took his case to the Keene board of appeals—and the fight was on. On March 10, the state's architectural registration board referred the matter to the county prosecutor for criminal investigation. "We are not interested in being martyrs, just in fair play and preserving what is rightfully ours," Thibodeau says. Then the appeals board ruled in his favor. New Hampshire's attorney general says he will clarify the issue soon.

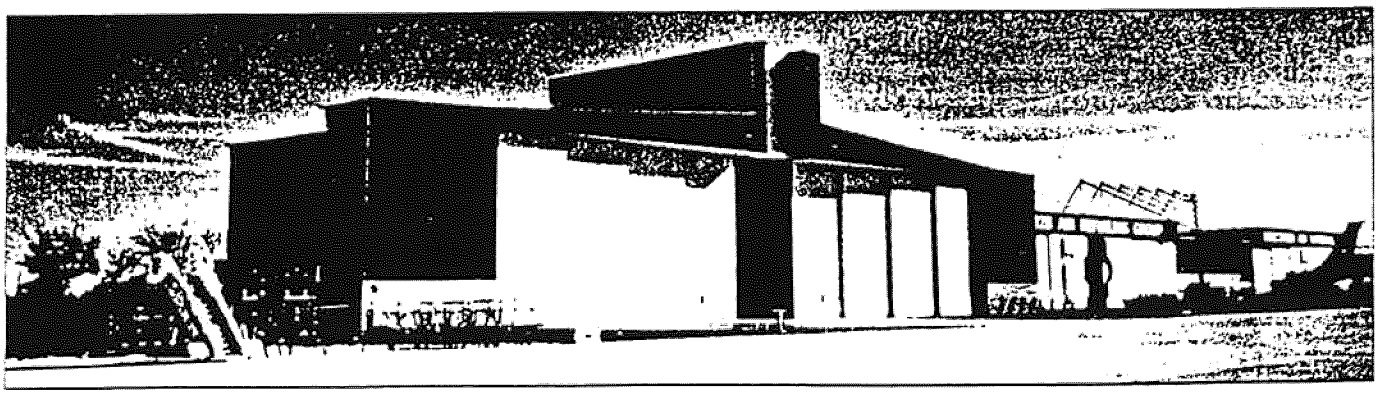
Surprisingly, Thibodeau's small-town struggle is resonating at big engineering and architectural practices. The issue of who may perform building design services or serve as prime professional is not only a matter of professional ideology. It puts at stake hundreds of thousands of dollars of fees and extra costs determined by who serves as prime and sub and who must be hired when an architectural stamp is required. With design fees squeezed way down into the single digits, that money could be the difference between profit or loss.

"It's a big problem that we face on a regular basis," says M. Stephen Dennis, in-house counsel for Lev Zetlin Associates, an engineering consultant in New York City. On a parking structure for which LZA recently submitted drawings in Connecticut, the local building official questioned the propriety of using an engineer's seal rather than an architect's. "He said he was catching a lot of flack from architects," says Dennis. Eventually, the owner brought in an architect to review the drawings at cost of about $25,000.





Engineer Allen Thibodeau (right) deliberately challenged local code official in Keene, N.H., over issue that involves big fees for design of a garage (far right) or a hangar.



LZA employs architects but cannot ster as a corporate architect be- ..e the firm's shareholders are en- gineers. That means it would have to pay an outside architect to review the plans in Connecticut. On a $5-million garage, that means hundreds of thousands of dollars. "It could preclude us from doing future garage work as a prime in that state," says Dennis.

The National Society of Professional Engineers recently asked the Justice Dept. to conduct an antitrust investigation of various state and national architectural organizations. According to those familiar with the request, NSPE has asked the U.S. Justice Dept. to determine if the American Institute of Architects and its chapters and the National Council of Architectural Registration Boards have conspired to restrain the public's ability to buy building design from engineers.

AIA President Chester A. Widom calls the request baffling and notes that AIA has agreed to try to end turf battles. "This confrontation should not have occurred," agrees Samuel Balen, NCARB executive director. "Legislators in the U.S. knew what they were doing [when they drafted statutes] and knew architecture was different and engineering was different and established it that way." Balen says architecture involves the design for human occupation and inhabitance while engineering involves building technical systems as well as bridges, dams and plants.

Restricted scope. NSPE members and other engineers suggest the architectural profession has tried to restrict the scope of engineering services in an attempt to plug the architects' leaky financial boat. According to engineers, architects are losing their preeminent role on building projects as owners adopt design-build and other methods of buying design services. Design-build has grown to 30% of the buildings market, from 10% to 15% of the buildings market in 1985, according to market researcher John Lawson. Speedier, more smoothly delivered projects are a major reason owners are switching. Engineers now are four times more likely to contract directly with owners rather than through architects compared with the practices a decade ago, according to a committee of the American Consulting Engineers Council.

Architectural statutes in most states still permit overlapping practice between the two professions. Some states say exactly what building types and parts each profession may seal.

At multidisciplinary firms, the issue usually turns on the way the firm presents itself to the marketplace. For example, Atlanta-based Rosser International usually sells engineering services in a package in which it serves as the prime architectural consultant. With a few exceptions, "an architect should be responsible for the design of most any kind of building," including airplane hangars, says Richard Little, Rosser's chief engineer. When engineers are prime, however, incidental architecture is unavoidable, he acknowledges.

Allen Thibodeau points out that he hired a licensed architect to perform design on his company's addition. When the issue of who would be prime professional came up, he put it this way: "I can engineer a building." ▣

By Richard Korman

PROFESSIONAL PRACTICE

Lean AIA in fresh pursuits

The American Institute of Architects is leaner than it was a year ago, having reduced its head count from 186 to 160 and eliminated 70 budgeted—but not necessarily filled—positions. The transition from an "unfocused, micro-managed society about ¾ in. thick and 14 miles wide," says its president, to a driving member-responsive organization is not without pain. But AIA is trying to be leaner not meaner, putting money freed from payroll into high-priority programs. So far, so good, say many members.

"Construction will be a whole new industry in five to seven years" because of changing technology and project delivery methods, said Chester A. Widom, AIA's 1995 president, at the AIA National Convention and Expo95 in Atlanta, May 5-8. "We want to stay ahead of the curve," added Widom, a partner in Widom Wein Cohen, Santa Monica, C[illegible]. In response, the Washington, L[illegible]-based AIA, which has 57,000 members, is renewing emphasis on government affairs, research, technology, image-building and on preparing architects for nontraditional roles in the construction process.

Widom (right), Post focus on architects' needs, image, roles.

In 1992, the AIA board decided it had lost "the large picture," said Widom. Now, the board is a policymaking group, leaving day-to-day decisions to the staff. On March 1, 1994, the 47-member board brought in a new chief executive officer (ENR 5/23/94 p. 16).

AIA now has 10 major departments, each headed by a vice president, and has outsourced various functions such as managing the convention's exposition. It has replaced staff in some jobs, including public affairs and member communications. "Certainly the most painful aspect of change at the AIA would be the impact on staff," said Terrence M. McDermott, CEO. "We have strived for the most humane transition possible."

AIA member Thomas Vonier, a consulting architect in Washington and Paris, thinks change was necessary. "There was a lot of atrophied leadership there," he said. He projects that the [long-time] conflict between the national AIA and the state and local chapters "will be resolved," probably in a positive way, as a result of the reorganization.

Marilyn Jordan Taylor, 1995 president of the New York [Manhattan] AIA chapter and a partner in the New York City office of Skidmore, Owings & Merrill, said there has been "an absolutely radical transformation" with regard to the so-called professional interest areas, member committees on subjects such as urban design or housing for the aging. "The PIAs are freer to act on their own," she said.

"Two years ago, most members of the New York chapter saw no value to 'national' at all," she added. But that

is changing because Terry has been "enormously responsive to concerns."

Taylor wants the national AIA to give local chapters advice on national political issues. The government affairs group, under McDermott's direction, is trying to provide that. It was involved in getting a community revitalization tax credit bill introduced in Congress late last month. And AIA is helping to shape tort reform legislation currently under consideration.

To signal a stronger commitment to to building technology and market research, the AIA formed a division on Jan. 15 called the American Institute for Architectural Research. Its predecessor group was "housed" in AIA headquarters but staffed by the Association of Collegiate Schools of Architecture, which is cooperating in the new venture. The move represents "a push for a much bigger research presence nationally," says Deane M. Evans, AIAR vice president, who also headed the predecessor AIA/ACSA research council. "Terry sees research as an essential component of what a professional society should stand for."

AIA is also trying to give members leading-edge tools. Last year, AIA offered—at no charge to members—its AIAOnline software, which for the price of the telephone time allows members to dial into and download a host of business and design-related information. Since last year, there has been a 500% increase in average monthly use. (AIA has no financial interest in usage.)

Delivery. AIA is also trying to help architects deliver projects in nontraditional ways, based on estimates that at least 5,000 members are already engaged in design-build, 3,000 in construction management and 2,000 in other alternative delivery systems. The numbers represent an increase of 20% in two years. Some of the most well-attended seminars at the convention, which drew about 10,000 people total, were those on project delivery.

In January, the AIA and the Associated General Contractors released *Recommended Guidelines for Procurement of Design-Build Projects in the Public Sector.* Without endorsing any delivery system, "we wanted to develop a fair and equitable process" for those owners that want a single source of responsibility on a project, said Raymond G. Post Jr., AIA president-elect and head of Post Architects, Baton Rouge, La.

Another AIA first is a national advertising campaign, in five magazines. "Research shows that architects are universally accepted as a creative force, but less understood in terms of tangible benefits," said Charles Hamlin, AIA vice president for media relations.

The three-year campaign is controversial because of its minimum $1-million annual budget and because some architects think it unnecessary. But architect Michael E. Willis, president of AIA's San Francisco chapter, said: "At first blush, we like it. It's good for the architect's national image." ■

By Nadine M. Post in Atlanta

CONSTRUCTION ACCIDENTS

Korea investigates blast

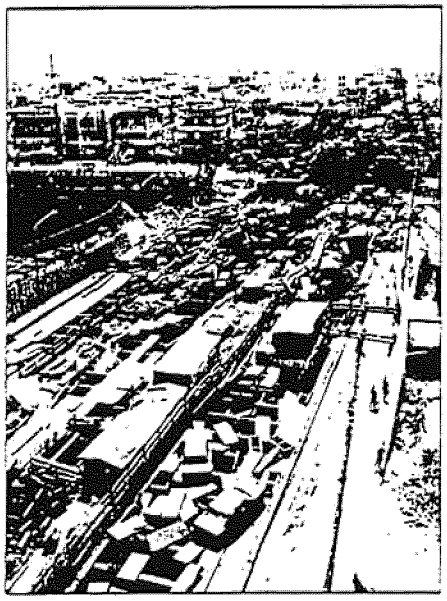
Officials continue to investigate the cause of a gas explosion at a subway construction site in Taegu, South Korea.

Many of the 101 victims killed in the April 28 rush hour blast were in cars and buses that fell into the cut-and-cover subway excavation. The explosion blew away steel plates supported on a steel framework that had formed a temporary road surface.

In addition to devastating 300 meters of subway and the city street above it, the blast destroyed buildings lining the street and broke windows up to four blocks away. Local media reported that 2,000 households lost electricity.

A subway construction bureau spokesman says the suspected cause of the blast is a rupture in a buried gas main at a shopping center construction site adjacent to the subway line. Construction crews were reportedly strengthening bearing soils in preparation for foundation work, he says.

Local newspapers reported that prosecutors are seeking the arrest of officials of the shopping center contractor, Seoul-based Standard Engineering & Construction Inc. A person at the company's head office could not confirm whether any employees had been arrested or not. He says, "An investigation is under way but the overall situation is not clear." Company officials were not available for comment.



Steel plates lifted and cars fell into excavation.

The subway construction bureau spokesman adds, however, that the case is not considered closed. Because of calls for a more thorough investigation, the city has set up a task force directed by Mayor Lee Jong Ju to investigate other possibilities.

The subway, originally scheduled to be completed in December, is directly beneath a busy city street that has six lanes in each direction. The roughly 30-m-wide cut for the subway is in the center of the street with traffic on both sides squeezed into a space "too wide for one vehicle, too narrow for two," the spokesman says.

A source says traffic was running partly on the original road surface and partly on a temporary roadway supported above the excavation.

Contractor for the subway was reported to be Woo-Sin General Construction Co., but company officials could not be reached for comment.

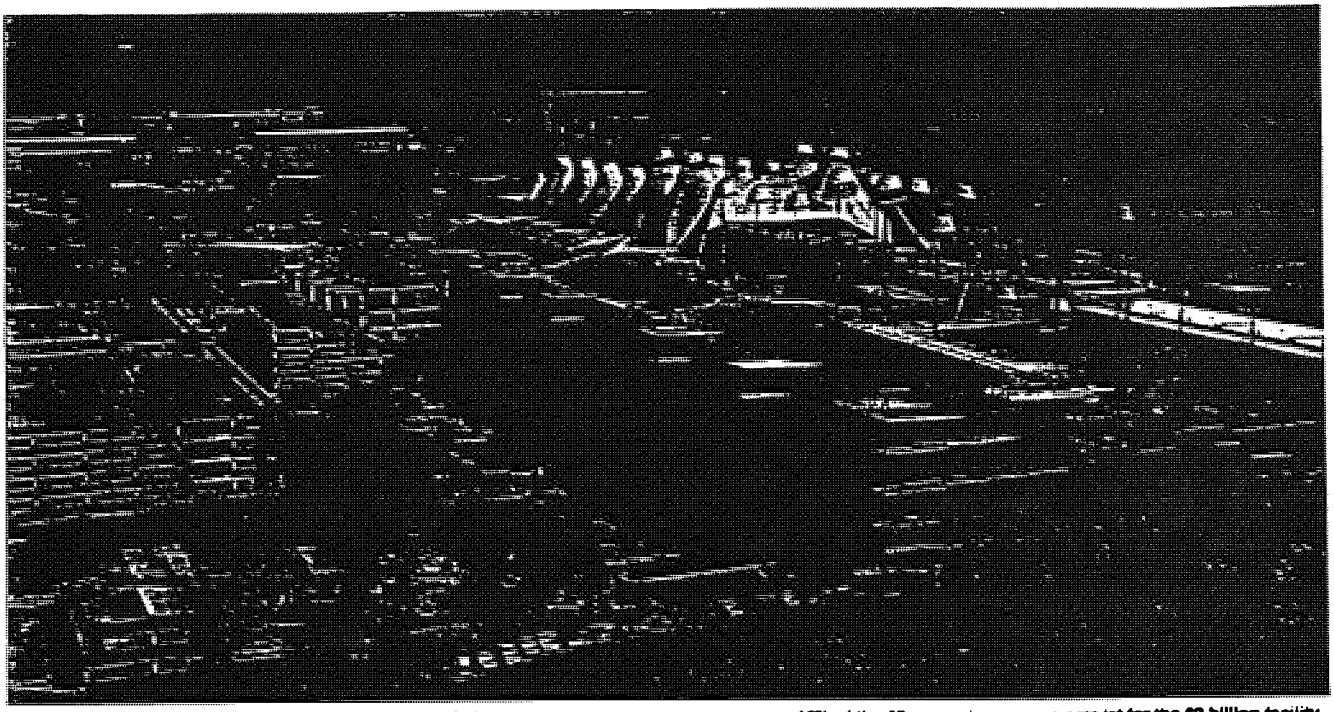
A spokesman for the city-owned gas company blames the accident on "the neglect of proper procedures that should be carried out before beginning large-scale construction." He declines to identify who he thinks is at fault. He says that, "There are accurate maps of installed gas lines available." The gas line carried an LPG-air mixture.

The accident is the latest in a series of disasters to rock South Korea. Last October, a section of a major bridge over the Han River in Seoul dropped into the water during the morning rush hour, claiming more than 30 lives. Then last December an underground gas tank in a residential area of Seoul exploded, killing 12. The government has come under public criticism for failing to enforce safety standards. ■

By Dennis Normile

Engineers in Prime Time On Modern Design Team

By RICHARD WEINGARDT



Construction at the new Denver International Airport, finds engineers as prime designers having 86% of the 58 major design contracts let for the $3 billion facility.

There was a time not so long ago when engineering was a secondary consideration on many building projects. With the possible exception of such things as power plants and water treatment facilities, where the best esthetic possible was to hide them from public view, engineering took a backseat to architecture. Many engineering firms worked almost exclusively for architects who asked them to fit the structural, mechanical, and electrical systems into a grand design already created by the architect as lead designer. In fact, most clients for "people buildings" - schools, offices, hospitals, libraries, apartments, and other public structures - called upon architects and gave engineering, and engineers, only cursory consideration.

Times have changed, however. We no longer build "people buildings" with esthetic statement as the number one priority. Buildings today need to be engineered just as much as they need to be designed. We are required to accommodate more complex and detailed uses for these structures; we must address environmental concerns; we need to engineer "intelligence" into the design from the outset. For the non-people facilities - power plants and water treatment facilities, as well as such projects as bridges, highways, water diversion projects, stadiums, and parking structures - it is engineering that needs to broaden its scope. These structures today not only must be "engineering useful," as they have always been, but also esthetically pleasing and, increasingly, designed to fit in along with more "people-accessible" multi-purpose complexes.

As a result of change and the new realities of design, engineers are being called upon much more often to be the lead designers on a variety of projects once the sole domain of architects. But this does not necessarily constitute a design competition between architects and engineers for whom will lead. It represents the nurturing of broader partnerships between the two halves of the building design equation - "partnering" as a means of meeting the more complex and demanding design needs in a changing world.

This new relationship is leading to a beneficial change in how each member of the design community, as well as their clients, think about the design professions. The separateness so prevalent in the past is giving way to the design team approach which will offer clients

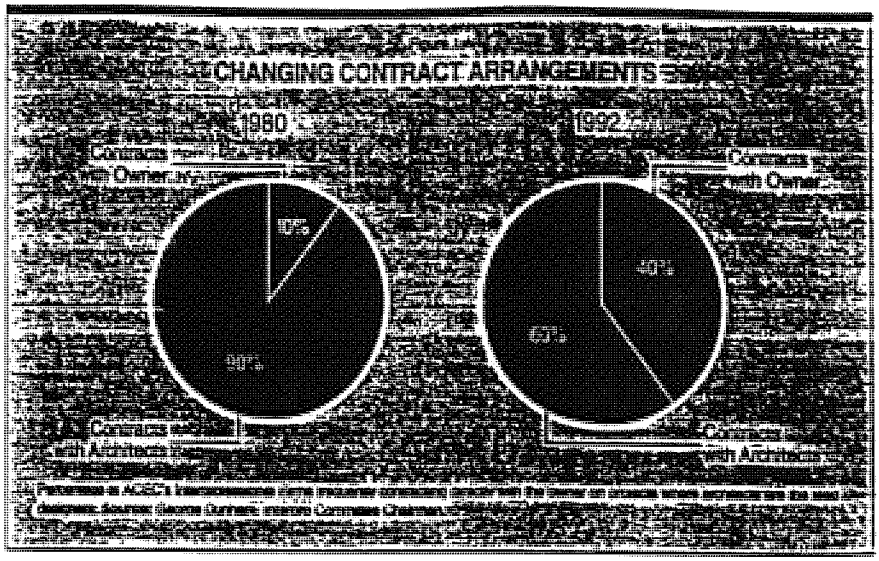
better value and sharper focus on need and function, while at the same time offering design professionals the opportunity - the absolute need - to grow technically, esthetically and personally. It is, in the end, change for the better.

Frank Gianotti, an engineer in Memphis, TN, feels there has been a significant amount of partnering between design professionals in recent years. His company is currently joint venturing with architects on a wide variety of projects, from banks to industrial buildings and water treatment plants. "Ten years ago, we didn't do any," he says.

According to Gianotti, his firm hired its first staff architect 13 years ago, and now six percent of its employees are architects. Ten years ago, 25 percent of his clients were architects; today, they are only seven percent of his client mix.

George Dunham, chairman of American Consulting Engineers Council's (ACEC) Interprofessional Committee and head of Dunham Associates, a 120-person mechanical, electrical, and structural firm headquartered in Rapid City, S.D., suggests there are troubling problems for engineers in working for architects. One of the problems he cites is that many architects like to select consultants by low bid and insist they not become involved in construction observation. Instead, they put a young architect with little experience on-site to approve mechanical and electrical installations, structural concrete pours, and steel erection.

Dunham says nine times out of ten, when an owner has a problem with a building, the problem is either with the environmental system or the electrical system. As a result, the sophisticated owners are becoming concerned about those components of the design team. Because of the problems that all interpro firms have with architects, the interpro group has started to push for design teams being made up in such a fashion that the owner is not only aware of who the interpro engineers are, but also has a role in selecting them. The American Institute of Architects (AIA), however, has already gone on record as saying that members dislike the idea, that the architect must be the head of the team and must have the ability to select his engineers.



Joseph Paoluccio, CEO of PWNA, a civil, mechanical, electrical engineering firm in San Diego, says that when he started his firm in 1961, it was strictly mechanical and all of his clients were architects. Seven years later he began doing prime design work providing civil, mechanical, and electrical engineering services. By 1980, 85 percent of his work was prime design, while services provided to architects, now all large firms, was down to 15 percent.

That same year, Paoluccio became a registered architect and created Paoluccio Paoluccio Associates, PPA, Architects and Planners, and now, after combining PWNA and PPA, virtually all of his firm's work is prime design. "Our projects are not the large, signature-type buildings we used to do as consultants to architects," he says, "but rather are the more utilitarian-type structures." His current projects include: a vehicle maintenance building, electronics measurements facility, and two $8.8 million Enlisted Men's Quarters for the Navy.

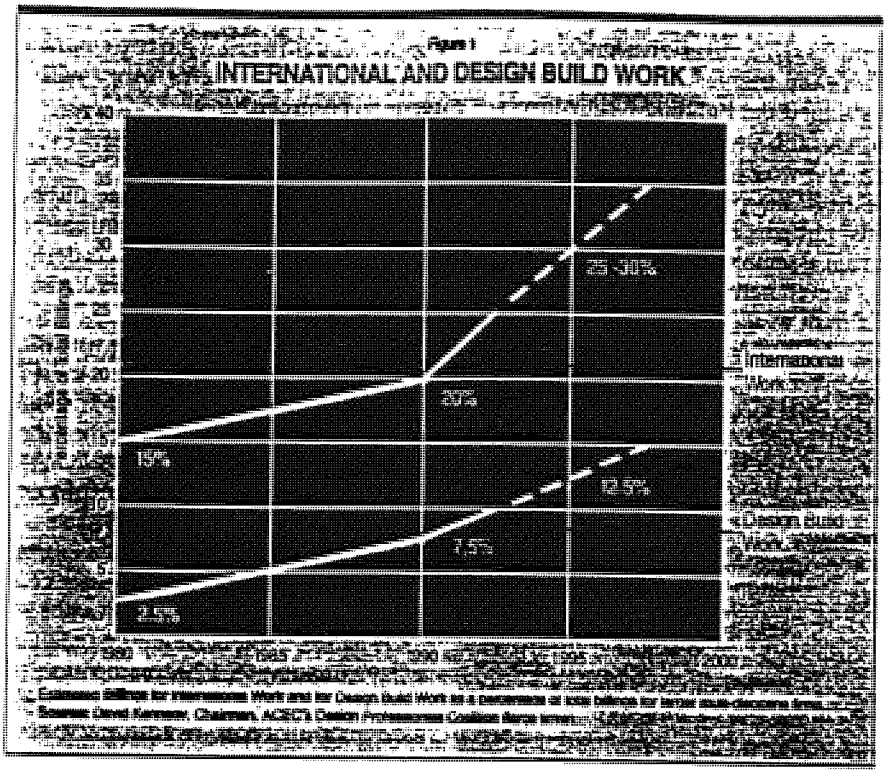
"While we miss the large buildings," Paoluccio adds, "it is very rewarding to me, a prime design professional, to be dealing directly with the owners, to be the decision-maker. And we're carving out a much better living for ourselves."

For the future, Paoluccio sees engineers more often than not as the prime design professionals, with architects working for the engineers on select projects. Architects, he says, will be retained to provide conceptual design and planning, leaving the technical design to A/E or E/A firms.

As a result of change and the new realities of design, engineers are being called upon much more often to be the lead designers on a variety of projects.

My own company's client mix has also changed dramatically in recent years. Ten years ago, 75 percent of our contracts were with architects; today they represent less than 50 percent of our volume. Richard Weingardt Consultants is basically a structural engineering firm and its prime-design building projects range from parking structures and grandstands to warehouses and food processing plants. We continue to work for architects on large, signature-type "people" buildings.

When we work for architects, we are usually asked - along with several other firms - to submit price proposals, and rarely do architects select the firm that is not the low bidder. However, several



owners, such as the University of Colorado, have participated in the selection of the architect's consultants, and low-bid selection has been discouraged in favor of QBS - Quality Based Selection.

There are several reasons for the trend of engineers contracting directly with the owner rather than with the architects: 1) The selection of the engineer by bidding even though the architect has been selected by QBS; 2) Management tactics such as slow payment or the use of the consultant's money long after the architect has been paid; and 3) Unrealistic budgets and schedules and the resistance to using engineers to observe construction of systems they have designed. It should be noted that architects also have complaints about working with engineers.

Frequent criticisms include a lack of design sensitivity, inflexibility, incomplete drawings, inability to articulate engineer's designs, and little or no assistance in obtaining the commission for the project.

David Kennedy, head of Kennedy Jenks Consultants, a 350-person multi-discipline firm based in San Francisco, and chairman of ACEC's Design Professional Coalition (DPC), which speaks for the large firms, says there seems to be somewhat more partnering now among the smaller DPC firms. However, the larger firms are moving away from this concept, particularly on environmental or infrastructure projects. He also notes that price is being used more often as a factor in selection, while true QBS (or mini-Brooks criteria) is being used a bit less than it was 10 years ago.

International Trends

His firm's international work is up from 15 percent 10 years ago to about 20-25 percent now, and Kennedy expects it to grow to about 30 percent in the next five years. Some larger firms, he says, are gearing up for international work, putting Americans overseas on a permanent basis. This gives them closer ties to the community and helps them acquire a knowledge of local practices and customs. These firms, he says, are also building indigenous staffs.

"It is expensive to place Americans overseas," Kennedy says, "and we don't get any incentives or tax breaks to do it. Therefore, it is best to locate one or two people in the foreign country and develop your practice around the indigenous staff, even bringing one or two of them to the U.S. for training in systems and management procedures and then returning them to the country of origin. It is less costly to work with local people on their own wage scales than to ship our own people over to do the job."

Kennedy believes that most of the large, multi-discipline firms want a presence in the foreign market and want to be in it for the long term.

However, many small or specialty firms, such as Richard Weingardt Consultants, feel they should have an established local firm as an associate when doing an overseas job. We work with a local partner on all overseas assignments to minimize risk, ease permitting and smooth local transactions.

George Dunham says that only 10-15% of the interpro firms he is aware of are doing foreign work, with no significant trends in either direction over the last 10 years.

"Most interpro firms are small and don't have the ability to identify and market foreign projects," he says. "Also, many of them have resisted the move because of the risks involved. Our firm, even at its size, has been reluctant to get into foreign work because the hazards are so great."

The hazards Dunham speaks of are not imaginary. Our firm has done work in eight foreign countries, and we've gotten hurt on two jobs, both performed without local associates. Since then, we have always "partnered" with firms that were established in the country. They were not necessarily engineering firms but local companies with expertise needed for the project. In addition, we don't work in a foreign country unless our money is put in escrow in an international bank.

Design/Build

David Kennedy discerns a trend with more engineers willing to get involved in design/build teams. On building projects, design/build is up from five percent 10 years ago to 10-15 percent now, and the percentage is increasing, a trend he sees as not all bad.

"A lot of our ACEC members are working to put together teams that include all the necessary players, including the contractor, architect, and finance peo-

ple, and then make contact with the owners. It seems to be a trend, particularly in international work but, with some exceptions, in the domestic market as well.

Only a few DPC firms are doing office buildings now, Kennedy says. They are more involved in industrial and infrastructure type buildings such as airport terminals, hangars, some incinerators, power plants, and similar structures. A minority of the coalition firms are doing things like office buildings in Hong Kong and Singapore.

Joseph Paoluccio, who has done many projects for the University of California - one a $5.25 million design/build project that he quit because he could not accept the design compromises - says the university has since changed its policy on design/build. Under its original policy, the designer worked for the developer or contractor, and the result of this was high-maintenance, low-quality buildings.

Now, the design professional is retained by the university and provides a design package which then goes to a design/build contractor who uses his own staff to develop the working drawings. The design professional then reviews the drawings and works with the university for a high-quality design and a low-maintenance project. The project is built by the design/build contractor and his staff, with the design team of record - the architects and engineers who designed the building - fully involved. Under this procedure, the people who do the working drawings are not considered the project design professionals, but part of the design production team assembled by the contractor.

Eleven percent of Allen and Hoshall's current workload is design/build or program management; 10 years ago it was zero. Gianotti stresses that the prime requisite for the design/build team is that it must be associated with ethical clients, whether owners, developers, or contractors. One of his first successful major design/build projects was a complex industrial manufacturing assembly and distribution facility in Tennessee for a large Japanese company. Another came when the Navy selected his firm to prepare scope documents to go to design/build contracts on a large project, possibly foreshadowing a trend from at least one federal government agency.

James B. Stewart, of the General Services Administration (GSA), estimates that the agency pays five percent for using design/build. However, he feels that the time saved over traditional methods will justify using the procedure more often when time is an important factor. Much of the time saved is within GSA itself because, Stewart says, the agency does not need to negotiate two contracts - one with the A/E, the other with a general contractor.

Successful Teamwork

There are many forces outside the design professions that will greatly affect the way engineers and architects design buildings in the future. Each group must solve whatever problems it has, learn to work better together, and get involved in stronger partnering if they are to thrive as professionals. Partnering offers the client the benefit of unbiased design and relieves the design professionals of having to make compromises with contractors.

Engineers and architects have been trying to work more as a unit in recent years; the evidence is that they will continue to do so, and well they should, for today's buildings are becoming increasingly sophisticated. For example, high-tech buildings and institutional buildings such as hospitals have become so "intelligent," complex, and refined that engineering systems account for a growing percentage of their costs.

Value engineering suggests that engineers should be the lead designers, or at least play a prominent role on the architect's team. In addition, increased use of the professional who designed the system to perform the observation on its construction - whether the system is structural, mechanical, or electrical - has decreased the instances of litigation between designers. Using a stronger partnering concept and the principles of Total Quality Management, design teams have provided better, longer-lasting buildings and more satisfied clients and owners.

By meshing their creativity and talent, architects and engineers will be able to function as partnerships that consistently satisfy the expectations, schedules, and budgets of their clients. Through cooperation, mutual respect, and shared commitment to problem-solving, the modern design team will be able to set new standards of excellence for the design profession.

TRENDS IN ENGINEERING AND BUILDING

Following are the results of a survey conducted by ACEC's Small Firm Coalition (SFC) comparing aspects of its members' practice today with how they operated 10 years ago.

Questions	1992	1982
1. What percent of your firm's work is contracted directly with the owner?	81%	66%
2. What percent of your firm's work is contracted with an architectural firm?	9%	34%
3. When you contract with an architectural firm, who is involved in your firm's selection?		
■ Owner on some projects	100%	25%
■ Architect only on some projects	50%	50%
4. In what percent of your firm's work does it function as a non-architectural prime?	79%	69%
5. When your firm is a non-architectural prime, how does it handle the architecture?		
■ Use architectural firm subcontractor on some projects	75%	75%
■ Hire staff architect for some projects	25%	0%
6. What percent of your firms work is on buildings*?	47%	49%

*Any structure occupied by humans: commercial/office, residences, parks/utilities, parking garages

Richard Weingardt is President of Richard Weingardt Consultants, Denver, CO and Senior Vice President of ACEC.

National Society of Professional Engineers®

Code Of Ethics for Engineers

Preamble

Engineering is an important and learned profession. The members of the profession recognize that their work has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety and welfare. In the practice of their profession, engineers must perform under a standard of professional behavior which requires adherence to the highest principles of ethical conduct on behalf of the public, clients, employers and the profession.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health and welfare of the public in the performance of their professional duties.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act in professional matters for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts in the solicitation of professional employment.

II. Rules of Practice

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
   a. Engineers shall at all times recognize that their primary obligation is to protect the safety, health, property and welfare of the public. If their professional judgment is overruled under circumstances where the safety, health, property or welfare of the public are endangered, they shall notify their employer or client and such other authority as may be appropriate.
   b. Engineers shall approve only those engineering documents which are safe for public health, property and welfare in conformity with accepted standards.
   c. Engineers shall not reveal facts, data or information obtained in a professional capacity without the prior consent of the client or employer except as authorized or required by law or this Code.
   d. Engineers shall not permit the use of their name or firm name nor associate in business ventures with any person or firm which they have reason to believe is engaging in fraudulent or dishonest business or professional practices.
   e. Engineers having knowledge of any alleged violation of this Code shall cooperate with the proper authorities in furnishing such information or assistance as may be required.
2. Engineers shall perform services only in the areas of their competence.
   a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
   b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
   c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.
3. Engineers shall issue public statements only in an objective and truthful manner.
   a. Engineers shall be objective and truthful in professional reports, statements or testimony. They shall include all relevant and pertinent information in such reports, statements or testimony.
   b. Engineers may express publicly a professional opinion on technical subjects only when that opinion is founded upon adequate knowledge of the facts and competence in the subject matter.
   c. Engineers shall issue no statements, criticisms or arguments on technical matters which are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.
4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees.
   a. Engineers shall disclose all known or potential conflicts of interest to their employers or clients by promptly informing them of any business association, interest, or other circumstances which could influence or appear to influence their judgment or the quality of their services.
   b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed to, and agreed to by, all interested parties.
   c. Engineers shall not solicit or accept financial or other valuable consideration directly or indirectly, from contractors, their agents, or other parties in connection with work for employers or clients for which they are responsible.
   d. Engineers in public service as members, advisors or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to professional services solicited or provided by them or their organizations in private or public engineering practice.
   e. Engineers shall not solicit or accept a professional contract from a governmental body on which a principal or officer of their organization serves as a member.
5. Engineers shall avoid deceptive acts in the solicitation of professional employment.
   a. Engineers shall not falsify or permit misrepresentation of their, or their associates', academic or professional qualifications. They shall not misrepresent or exaggerate their degree of responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers or past accomplishments with the intent and purpose of enhancing their qualifications and their work.
   b. Engineers shall not offer, give, solicit or receive, either directly or indirectly, any political contribution in an amount intended to influence the award of a contract by public authority, or which may be reasonably construed by the public of having the effect or intent to influence the award of a contract. They shall not offer any gift, or other valuable consideration in order to secure work. They shall not pay a commission, percentage or brokerage fee in order to secure work except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

III. Professional Obligations

1. Engineers shall be guided in all their professional relations by the highest standards of integrity.
   a. Engineers shall admit and accept their own errors when proven wrong and refrain from distorting or altering the facts in an attempt to justify their decisions.
   b. Engineers shall advise their clients or employers when they believe a project will not be successful.
   c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside employment they will notify their employers.
   d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.
   e. Engineers shall not actively participate in strikes, picket lines, or other collective coercive action.
   f. Engineers shall avoid any act tending to promote their own interest at the expense of the dignity and integrity of the profession.
2. Engineers shall at all times strive to serve the public interest.
   a. Engineers shall seek opportunities to be of constructive service in civic affairs and work for the advancement of the safety, health and well-being of their community.
   b. Engineers shall not complete, sign or seal plans and/or specifications that are not of a design safe to the public health and welfare and in conformity with accepted engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
   c. Engineers shall endeavor to extend public knowledge and appreciation of engineering and its achievements and to protect the engineering profession from misrepresentation and misunderstanding.
3. Engineers shall avoid all conduct or practice which is likely to discredit the profession or deceive the public.
   a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact necessary to keep statements from being misleading or intended or likely to create an unjustified expectation, or statements containing prediction of future success.
   b. Consistent with the foregoing, Engineers may advertise for recruitment of personnel.
   c. Consistent with the foregoing, Engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.
4. Engineers shall not disclose confidential information concerning the business affairs or technical processes of any present or former client or employer without his consent.

a. Engineers in the employ of others shall not without the consent of all interested parties enter promotional efforts or negotiations for work or make arrangements for other employment as a principal or to practice in connection with a specific project for which the Engineer has gained particular and specialized knowledge.

b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the Engineer has gained particular specialized knowledge on behalf of a former client or employer.

5. Engineers shall not be influenced in their professional duties by conflicting interests.
   a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.
   b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the Engineer in connection with work for which the Engineer is responsible.
6. Engineers shall uphold the principle of appropriate and adequate compensation for those engaged in engineering work.
   a. Engineers shall not accept remuneration from either an employee or employment agency for giving employment.
   b. Engineers, when employing other engineers, shall offer a salary according to professional qualifications.
7. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.
   a. Engineers shall not request, propose, or accept a professional commission on a contingent basis under circumstances in which their professional judgment may be compromised.
   b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.
   c. Engineers shall not use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice without consent.
8. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice or employment of other engineers, nor untruthfully criticize other engineers' work. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.
   a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.
   b. Engineers in governmental, industrial or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
   c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.
9. Engineers shall accept personal responsibility for their professional activities; provided, however, that Engineers may seek indemnification for professional services arising out of their practice for other than gross negligence, where the Engineer's interests cannot otherwise be protected.
   a. Engineers shall conform with state registration laws in the practice of engineering.
   b. Engineers shall not use association with a nonengineer, a corporation, or partnership as a "cloak" for unethical acts, but must accept personal responsibility for all professional acts.
10. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.
    a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
    b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the Engineer for others without express permission.
    c. Engineers, before undertaking work for others in connection with which the Engineer may make improvements, plans, designs, inventions, or other records which may justify copyrights or patents, should enter into a positive agreement regarding ownership.
    d. Engineers' designs, data, records, and notes referring exclusively to an employer's work are the employer's property.
11. Engineers shall cooperate in extending the effectiveness of the profession by interchanging information and experience with other engineers and students, and will endeavor to provide opportunity for the professional development and advancement of engineers under their supervision.
    a. Engineers shall encourage engineering employees' efforts to improve their education.
    b. Engineers shall encourage engineering employees to attend and present papers at professional and technical society meetings.
    c. Engineers shall urge engineering employees to become registered at the earliest possible date.
    d. Engineers shall assign a professional engineer duties of a nature to utilize full training and experience, insofar as possible, and delegate lesser functions to subprofessionals or to technicians.
    e. Engineers shall provide a prospective engineering employee with complete information on working conditions and proposed status of employment, and after employment will keep employees informed of any changes.

"By order of the United States District Court for the District of Columbia, former Section 11(c) of the NSPE Code of Ethics prohibiting competitive bidding, and all policy statements, opinions, rulings or other guidelines interpreting its scope, have been rescinded as unlawfully interfering with the legal right of engineers, protected under the antitrust laws, to provide price information to prospective clients; accordingly, nothing contained in the NSPE Code of Ethics, policy statements, opinions, rulings or other guidelines prohibits the submission of price quotations or competitive bids for engineering services at any time or in any amount."

Statement by NSPE Executive Committee

In order to correct misunderstandings which have been indicated in some instances since the issuance of the Supreme Court decision and the entry of the Final Judgment, it is noted that in its decision of April 25, 1978, the Supreme Court of the United States declared: "The Sherman Act does not require competitive bidding."

It is further noted that as made clear in the Supreme Court decision:

1. Engineers and firms may individually refuse to bid for engineering services.
2. Clients are not required to seek bids for engineering services.
3. Federal, state, and local laws governing procedures to procure engineering services are not affected, and remain in full force and effect.
4. State societies and local chapters are free to actively and aggressively seek legislation for professional selection and negotiation procedures by public agencies.
5. State registration board rules of professional conduct, including rules prohibiting competitive bidding for engineering services, are not affected and remain in full force and effect. State registration boards with authority to adopt rules of professional conduct may adopt rules governing procedures to obtain engineering services.
6. As noted by the Supreme Court, "nothing in the judgment prevents NSPE and its members from attempting to influence governmental action . . . ."

Note:
In regard to the question of application of the Code to corporations vis-a-vis real persons, business form or type should not negate nor influence conformance of individuals to the Code. The Code deals with professional services, which services must be performed by real persons. Real persons in turn establish and implement policies within business structures. The Code is clearly written to apply to the Engineer and it is incumbent on a member of NSPE to endeavor to live up to its provisions. This applies to all pertinent sections of the Code.

National Society of Professional Engineers
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MEMORANDUM

To: FES President and Board of Directors

Date: November 11th, 1993

From Eugene N. Bechamps, PE
Chairman,
Ethical Practices
Coordinating Committee

Re: Rules of Professional Conduct/NSPE Code of Ethics.

The EPCC was requested to incorporate the NSPE Code of Ethics into the analysis of the SBPE "Rules of Professional Conduct".

The Committee conducted a conference call meeting on October 26, 1993. During this meeting the EPCC reviewed the NSPE Code of Ethics, as revised. This revision was based on the consent agreement between NSPE and the Federal Trade Commission, issued on August 6, 1993. The analysis of the committee is shown on the attached document entitled "Comparison of NSPE Code of Ethics and Rules of SBPE".

There are 74 separate sections in the NSPE Code, of these:

53 are covered specifically in SBPE Rules
2 are covered in a related fashion in SBPE Rules
19 are not covered by SBPE Rules

The EPCC agreed without descent that none of the 19 should be in rules of the SBPE. The reason for this conclusion is that the only intent of Chapter 471, is the protection of the public. The 19 speak more to the protection of engineers and the engineering profession. The EPCC unanimously recommend adoption of this report by the Board of Directors.

In a related matter the EPCC recommends that the Board of Directors publish the announcement by NSPE of the consent agreement with the FTC.

COMPARISON OF NSPE CODE OF ETHICS AND RULES OF STATE BOARD OF PROFESSIONAL ENGINEERS

NSPE CODE OF ETHICS	RULES OF STATE BOARD OF PROFESSIONAL ENGINEERS
I. FUNDAMENTAL CANONS	
1. *Hold paramount the safety, health, and welfare of the public in the performance of their professional duties.*	21H-18.001, 21H-19.001(6)(l), 21H-19.001(4)(a)
2. *Perform services only in areas of their competence.*	21H-19.001(5), 21H-19.001(6)(c)
3. *Issue public statements only in an objective and truthful manner.*	21H-19.001(6)(a), (b)
4. *Act in professional matters for each employer or client as faithful agents or trustees.*	21H-19.001(6)(f),(g),(h)
5. *Avoid deceptive acts int he solicitation of professional employment.*	21H-19.001(2)(a) thru (g)
II. RULES OF PRACTICE	
1. *Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.*	21H-18.001
a. *Engineer shall at all times recognize that their primary obligation is to protect the safety, health, property, and welfare of the public. If their professional judgement is overruled under circumstance where the safety, health, property, or welfare of the public are endangered,they shall notify their employer or client and such other authority as may be appropriate.*	21H-19.001(6)(l)
b. *Engineers shall approve only those engineering documents which are safe for public health, property, and welfare in conformity with accepted standards.*	21-19.001(4)(a)
c. *Engineer shall not reveal facts, data, or information obtained in a professional capacity without the prior consent of the client or employer except as authorized or required by law or this Code.*	21H-19.001(6)(r)
d. *Engineers shall nor permit the use of their name or firm name nor associate in business ventures with any person or firm*	21H-19.001(6)(k)

which they have reason to believe is engaging in fraudulent or dishonest business or professional practices.

e. Engineers having knowledge of any alleged violation of this Code shall cooperate with the proper authorities in furnishing such information or assistance as may be required. — 21H-19.001(6)(m)

2. Engineers shall perform services only in the areas of their competence. — 21H-19.001(5)

a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved. — 21H-19.001(6)(c), (d)

b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to nay plan or document not prepared under their direction and control. — 21H-19.001(6)(d), (j)

c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment. — 21H-19.001(6)(q)

3. Engineers shall issue public statements only in an objective and truthful manner. — 21H-19.001(6)(b)

a. Engineers shall be objective and truthful in professional reports, statements or testimony. They shall include all relevant and pertinent infirmation in such reports, statements or testimony. — 21H-19.001(6)(b)

b. Engineers may express publicly a professional opinion on technical subjects only when that opinion is founded upon adequate knowledge of the facts and competence in the subject matter. — 21H-19.001(6)(a)

c. Engineers shall issue no statements, criticisms, or arguments on technical matters which are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly — 21H-19.001(6)(p)

identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.

4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees. — 21H-19.001(6)(f), (g),(h)

a. Engineers shall disclose all known or potential conflicts of interest to their employers or clients by promptly informing them of any business association, interest or other circumstances which could influence or appear to influence their judgment or the quality of their services. — 21H-19.001(6)(f)

b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed to, and agreed to, by all interested parties. — 21H-19.001(6)(f)

c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from contractors, their agents, or other parties in connection with work for employers or clients for which they are responsible. — 21H-19.001(6)(g),(h)

d. Engineers in public service as members, advisors, or employees of a governmental body or quasi-governmental body or department shall not participate in decisions with respect to professional services solicited or provided by them or their organizations in private or public engineering practice. — 21H-19.001(6)(f)

e. Engineers shall not solicit or accept a professional contract from a governmental body on which a principal or officer of their organization serves as a member. — 21H-19.001(6)(f)

5. Engineers shall avoid deceptive acts in the solicitation of professional employment. — 21H-19.001(2)

a. Engineers shall not falsify or permit misrepresentation of their, or their associates, academic or professional qualifications. They shall nor misrepresentation of their, or their associates, academic or professional qualifications. They shall not misrepresent — 21H-19.001(2)(f), (g)

or exaggerate their degree of responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employees, associates, joint ventures or past accomplishments with the intent and purpose of enhancing their qualifications and their work.

b. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any political contribution in an amount intended to influence the award of a contract by public authority, or which may be reasonably construed by the public of having the effect or intent to influence the award of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work except to a bona fide employee or bona fide established commercial or marketing agencies retained by them. — 21H-19.001(6)(e)

III. **PROFESSIONAL OBLIGATIONS**

1. Engineers shall be guided in all their professional relations by the highest standards of integrity. — Not covered in SBPE Rules

a. Engineers shall admit and accept their own errors when proven wrong and refrain from distorting or altering the facts in an attempt to justify their decisions. — 21H-19.001(6)(b)

b. Engineers shall advise their clients or employers when they believe a project will not be successful. — 21H-19.001(6)(b)

c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside employment they will notify their employers. — 21H-19.001(6)(f)

d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses. — 21H-19.001(2)(a),(b),(d)

e. Engineers shall not actively participate in strikes, picket lines, or other collective coercive action. — Not covered in SBPE Rules

f. Engineers shall avoid any act tending to promote their own interest at the expense of the dignity and integrity of the profession.	Not covered in SBPE Rules
2. Engineers shall at all times strive to serve the public interest.	21H-18.001
a. Engineers shall seek opportunities to be of constructive service in civic affairs and work for the advancement of the safety, health, and well-being of their community.	21H-18.001
b. Engineers shall not complete, sign, or seal plans and/or specifications that are not of a design safe to the public health and welfare and in conformity with accepted engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.	21H-19.001 (4)(a), (6)(l)
c. Engineers shall endeavor to extend public knowledge and appreciation of engineering and its achievements and to protect the engineering profession from misrepresentation and misunderstanding.	Not covered in SBPE Rules
3. Engineers shall avoid all conduct or practice which is likely to discredit the profession or deceive the public.	21H-19.001(2)
a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact necessary to keep statements from being misleading or intended or likely to create an unjustified expectation or statements containing prediction of future success.	21H-19.001(2)(a),(b),(c),(d)
b. Consistent with the foregoing, Engineers may advertise for recruitment of personnel.	21H-19.001(2)
c. Consistent with the foregoing, Engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.	21H-19.001(2)(e)
4. Engineers shall not disclose confidential information concerning the business affairs or technical process of any present or former client or employer without this consent.	21H-19.001(6)(r)

a. Engineers in the employ of others shall not without the consent of all interested parties enter promotional efforts or negotiations for work or make arrangements for other employment as a principal or to practice in connection with a specific project for which the Engineer has gained particular and specialized knowledge.	21H-19.001(6)(f)
b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the Engineer has gained particular specialized knowledge.	21H-19.001(6)(f)
5. Engineers shall not be influenced in their professional duties by conflicting interests.	21H-19.001(6)(f)
a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.	21H-19.001(6)(g)
b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the Engineers in connection with work for which the Engineer is responsible.	21H-19.001(6)(h)
6. Engineers shall uphold the principle of appropriate and adequate compensation for those engaged in engineering work.	Not covered in SBPE Rules
a. Engineers shall not accept remuneration from either an employee or employment agency for giving employment.	Not covered in SBPE Rules
b. Engineers, when employing other engineers, shall offer a salary according to professional qualifications.	Not covered in SBPE Rules
7. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.	21H-19.001 (2)(g)

a. Engineers shall not request, propose, or accept a professional commission on a contingent basis under circumstances in which their professional judgment may be compromised.	Not covered in SBPE Rules
b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical consideration.	21H-19.001(6)(f)
c. Engineers shall not use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice without consent.	21H-19.001 (6) (f)
8. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospect,s, practice, or employment of other engineers, nor untruthfully criticize other engineers' work. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.	21H-19.001 (6)(b),(l)
a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.	21H-27 Related
b. Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.	Not covered in SBPE Rules
c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.	Not covered in SBPE Rules
9. Engineers shall accept responsibility for their professional activities; provided, however, that Engineers may seek indemnification for professional services arising out of their practice for other than gross negligence, where the Engineer's interests cannot otherwise be protected.	Not covered in SBPE Rules
a. Engineers shall conform with state registration laws in the practice of engineering.	21H-19.001(4)(b), (6)(n), (o)

b. Engineers shall not use association with a non-engineer, a corporation, or partnership, as a "cloak" for unethical acts, but must accept personal responsibility for all professional acts.	21H-19.001 (3)
10. Engineers shall give credit for engineering work to those to whom credit is dues, and will recognize the proprietary interests of others.	Not covered in SBPE Rules
a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.	21H-19.001(6)(q) Related
b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the Engineer for others without express permission.	21H-19.001(6)(f)
c. Engineers, before undertaking work for others in connection with which the Engineer may make improvements, plans, designs, inventions, or other records which may justify copyrights or patents, should enter into a positive agreement regarding ownership.	Not covered in SBPE Rules
d. Engineers' designs, data, records, and notes referring exclusively to an employer's work are the employer's property.	21H-19.001(6)(r)
11. Engineers shall cooperate in extending the effectiveness of the profession by interchanging information and experience with other engineers and students, and will endeavor to provide opportunity for the professional development and advancement of engineers under their supervision.	Not covered in SBPE Rules
a. Engineers shall encourage engineering employees' efforts to improve their education.	Not covered in SBPE Rules
b. Engineers shall encourage engineering employees to attend and present papers at professional and technical society meetings.	Not covered in SBPE Rules
c. Engineers shall urge engineering employees to become registered at the earliest possible date.	Not covered in SBPE Rules

d. Engineers shall assign a professional engineer duties of a nature to utilize full training and experience, insofar as possible, and delegate lesser functions to subprofessionals or to technicians.	Not covered in SBPE Rules
e. Engineers shall provide a prospective engineering employee with complete information on working conditions and proposed status of employment, and after employment will keep employees informed of any changes.	Not covered in SBPE Rules

The Ethical Practices Coordinating Committee has reviewed the concerns expressed regarding a Code of Professional Conduct being included in the Rules of the Board of Professional Engineers. The Committee reviewed several documents in pursuing this task. The documents reviewed and the reasons for the selection of these documents is as follows:

1. Model Rules of Professional Conduct prepared by the National Council of Examiners for Engineering and Surveying (NCEES). This document was selected because it is the "model" used by most states which have or desire to have Rules of Professional Conduct.

2. Rules of Professional Conduct. (Code of Ethics) adopted by the Board of Registration for Professional Engineers and Land Surveyors of the State of Alabama. This document was selected because these rules are relatively recent, (1987).

3. The Board of Professional Engineers Rules on Grounds for Disciplinary Proceedings, (Chapter 21H-19). This document was selected because it is the base document for professional conduct for engineers in Florida.

The committee compared the Florida rules with the NCEES model rules and the Alabama rules in an attempt to identify those areas where the Florida rules were deficient.

NCEES Model Rules of Professional Conduct

The result of the analysis was not as suspected, the committee found that the Florida rules do in-fact cover each item in the NCEES model rules and therefore there is no deficiency in the Florida rules as they relate to the NCEES model rules. The analysis of the NCEES rules is attached as Exhibit A.

Alabama Rules of Professional Conduct

The analysis of the Alabama rules revealed that while there are some areas in the Alabama rules that are not included in the Florida rules, most of these areas are those which this committee does not think are appropriate. Some of these are:

a. Prohibits supplanting another engineer
b. Prohibits reducing fees to obtain employment
c. Prohibits reviewing work of another engineer.

The analysis of the Alabama rules is attached as Exhibit B.

Recommendation

The Committee recommends that FES publicize the existing rules of the Board of Professional Engineers and identify them as de-facto rules of professional conduct. Rule 21H-19 is actually identified as rules of professional conduct. See 21H-19.001 (6) (m). A capsulized statement of these rules is attached as Exhibit C.

EXHIBIT A

NCEES RULES OF PROFESSIONAL CONDUCT	FLORIDA RULES OF PROFESSIONAL CONDUCT
I. REGISTRANT'S OBLIGATION TO SOCIETY	
a. Registrants, in the performance of their services for clients, employers, and customers, shall be cognizant that their first and foremost responsibility is to the public welfare.	21H-18.001
b. Registrants shall approve and seal only those design documents and surveys that conform to accepted engineering and land surveying standards and safeguard the life, health, property, and welfare of the public.	21H-19.001 (4) (a)
c. Registrants shall notify their employer or client and such other authority as may be appropriate when their professional judgment is overruled under circumstances where the life, health, property, or welfare of the public is endangered.	21H-19.001 (6) (l)
d. Registrants shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony.	21H-19.001 (6) (b)
e. Registrants shall express a professional opinion publicly only when it is founded upon an adequate knowledge of the facts and a competent evaluation of the subject matter.	21H-19.001 (6) (a)
f. Registrants shall issue no statements, criticisms, or arguments on technical matters which are inspired or paid for by interested parties, unless they explicitly identify the interested parties on whose behalf they are speaking, and reveal any interest they have in the matters.	21H-19.001 (6) (f) 21H-19.001 (6) (p)
g. Registrants shall not permit the use of their name or firm name by, nor associate in the business ventures with, any person or firm which is engaging in fraudulent or dishonest business or professional practices.	21H-19.001 (6) (k)
h. Registrants having knowledge of possible violations of any of these "Rules of Professional Conduct" shall provide the state board information and assistance necessary to the final determination of such violation.	21H-19.001 (6) (m)
II. REGISTRANT'S OBLIGATION TO EMPLOYER AND CLIENTS	
a. Registrants shall undertake assignments only when qualified by education or experience in the specific technical fields of engineering or land surveying involved.	21H-19.001 (6) (c)
b. Registrants shall not affix their signatures or seals to any plans or documents dealing with subject matter in which they lack competence, nor to any such plan or document not prepared under their direct control and personal supervision.	21H-19.001 (6) (d) 21H-19.001 (6) (j)
c. Registrants may accept assignments for coordination of an entire project, provided that each design segment is signed and sealed by the registrant responsible for preparation of that design segment.	21H-19.001 (6) (q)
d. Registrants shall not reveal facts, data, or information obtained in a professional capacity without the prior consent of the client or employer except as authorized or required by law.	21H-19.001 (6) (r)
e. Registrants shall not solicit or accept financial or other valuable consideration, directly or indirectly, from contractors, their agents, or other parties in connection with work for employers or clients.	21H-19.001 (6) (g) 21H-19.001 (6) (h)
f. Registrants shall make full prior disclosures to their employers or clients of potential conflicts of interest or other circumstances which could influence or appear to influence their judgment or the quality of their service.	21H-19.001 (6) (f)
g. Registrants shall not accept compensation, financial or otherwise, from more than one party for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.	21H-19.001 (6) (f)
h. Registrants shall not solicit or accept a professional contract from a governmental body on which a principal or officer of their organization serves as a member. Conversely, registrants serving as members, advisors, or employees of a governmental body or department, who are the principals or employees of a private concern, shall not participate in decisions with respect to professional services offered or provided by said concern to the governmental body which they serve.	21H-19.001 (6) (f)

NCEES RULES OF PROFESSIONAL CONDUCT	FLORIDA RULES OF PROFESSIONAL CONDUCT

III. REGISTRANT'S OBLIGATION TO OTHER REGISTRANTS

a. Registrants shall not falsify or permit misrepresentation of their, or their associates', academic or professional qualifications. They shall not misrepresent or exaggerate their degree of responsibility in prior assignments nor the complexity of said assignments. Presentations incident to the solicitation of employment or business shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures or past accomplishments. — 21H-19.001 (2) (f) 21H-19.001 (2) (g)

b. Registrants shall not offer, give, solicit, or receive, either directly or indirectly, any commission or gift, or other valuable consideration in order to secure work, and shall not make any political contribution with the intent to influence the award of a contract by public authority. — 21H-19.001 (6) (e)

c. Registrants shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice or employment of other registrants, nor indiscriminately criticize other registrants' work. — 21H-19.001 (6) (b)

ALABAMA RULES OF PROFESSIONAL CONDUT	FLORIDA RULES OF PROFESSIONAL CONDUCT
330-X-14-.02 Conflict of Interest. (Canon 1) The Engineer and/or Land Surveyor shall exercise independent judgments, decisions and practices on behalf of clients and employers as follows:	
(a) The Engineer and/or Land Surveyor shall avoid all conflicts of interest with his client or employer, but when a conflict of interest is unavoidable, the Engineer and/or Land Surveyor shall immediately inform his employer or client of any business association, interest, or circumstances which might tend to influence his professional judgments, decisions or practices or the quality of his services.	21H-19.001 (6) (f)
(b) The Engineer and/or Land Surveyor shall not solicit or accept any gratuity, material favor or benefits of any substantial nature, including but not limited to any act, article, money or other material possessions which is of such value or proportion that its acceptance creates a clandestine obligation on the part of the receiver or otherwise compromises his ability to exercise his own judgment, without regard to such benefit, directly or indirectly, from any party, his agents, servants or employees dealing with his client or employer in connection with any project on which he is performing or has contracted to perform Engineering and/or Land Surveying services.	21H-19.001 (6) (g) 21H-19.001 (6) (h)
(c) The Engineer and/or Land Surveyor shall not solicit or accept, directly or indirectly, any Engineering and/or Land Surveying contract, selection, or employment from a governmental body in which a principal or officer of his organization serves as a member or employee.	21H-19.001 (6) (e)
(d) When in public service as a member or employee of a governmental body, the Engineer and/or Land Surveyor shall not participate, directly or indirectly, in considerations or actions with respect to retaining services offered or provided by him, his associates or his organization to such governmental body. Rule effective September 10, 1982. Amended November 9, 1984, effective date of amendment December 19, 1984 (Auth: Section 34-11-35, Code of Alabama, 1975).	21H-19.001 (6) (e)

ALABAMA RULES OF PROFESSIONAL CONDUT	FLORIDA RULES OF PROFESSIONAL CONDUCT
330-X-14-.03 Qualified by Education and Experience. (Canon II) The Engineer and/or Land Surveyor shall act competently and use proper care in performing engineering and/or land surveying services for clients or employers and shall act only in fields in which he is qualified by education and experience as follows:	
(a) The Engineer and/or Land Surveyor shall not accept any Engineering and/or Land Surveying employment, or undertake any Engineering and/or Land Surveying assignment, for which he is not qualified by education or experience to perform or to carry out adequately and competently; providing and excepting, however, that an Engineer and/or Land Surveyor may accept an assignment requiring education and experience outside his field of competence to the extent, only, that his personal Engineering and/or Land Surveying services are restricted solely to those phases of the service or project in which he is qualified and competent, and that all other phases of such service or project shall be performed by legally qualified consultants, associates or employees.	21H-19.001 (6) (c)
(b) The Engineer and/or Land Surveyor shall not affix his signature or seal to any Engineering and/or Land Surveying plan or document dealing with subject matter on which he is not qualified by education or experience to form a dependable judgment.	21H-19.001 (6) (d)
(c) The Engineer and/or Land Surveyor shall be completely objective and truthful in all professional reports, statements or testimony. He shall include all relevant and pertinent information in such reports, statements or testimony.	21H-19.001 (6) (b)
(d) The Engineer and/or Land Surveyor, when serving as an expert or technical witness before any court, commission or other tribunal, shall express an opinion only when it is founded upon adequate knowledge of the facts in issue, upon a background of technical competence in the subject matter, and upon honest conviction of the accuracy and propriety of his testimony.	21H-19.001 (6) (c)
(e) The Engineer and/or Land Surveyor shall issue no statements, or criticisms or arguments on matters connected with public policy which are inspired or paid for by an interested party, or parties, unless he has prefaced his comments by explicitly identifying himself, by disclosing the identities of the party, or parties, on whose behalf he is speaking, and by revealing the existence of any pecuniary interest he may have in the instant matter.	21H-19.001 (6) (p)
(f) The Engineer and/or Land Surveyor shall not engage in any professional matter for which a specific license is required without first being licensed in that profession. Effective date: September 10, 1982 (Auth: Section 34-11-33, Code of Alabama, 1975)	Not specifically covered in Fla. Fla. permits incidental practice

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330-X-14-.04 Confidences of Clients and Employers. (Canon III) The Engineer and/or Land Surveyor shall safeguard and preserve the confidences and private information of clients and employers as follows:

(a) Except as permitted by 330-X-14-.04(b), the Engineer and/or Land Surveyor shall not knowingly: 21H-19.001 (6) (f)

1. Reveal a confidence or private information regarding or in the possession of his client or employer, current or former;

2. Use a confidence or private information regarding or in the possession of his client or employer, current or former, to the disadvantage of such client or employer;

3. Use a confidence or private information regarding or in the possession of his client or employer for the advantage of a third person, unless the client or employer, current or former, consents after full disclosure;

4. Nothing in this Article shall relieve an Engineer and/or Land Surveyor from complying with Rule 330-X-14-.03(a).

(b) The Engineer and/or Land Surveyor may reveal confidences or private information under the following circumstances: 21H-19.001 (6) (f)

1. When he has obtained the consent of the client or clients, employer or employers, current or former, affected, but only after full disclosure to them;

2. When required by law or court order;

3. When necessary to establish legal proof of his relationship with a client or employer, current or former, in a court action to recover salaries, fees or other compensation due him as a result of his employment or association with such client or employer, current or former;

4. When necessary to defend himself or his employees or associates in a legal action alleging wrongful conduct.

(c) The Engineer and/or Land Surveyor shall exercise reasonable care to prevent unauthorized disclosure or use by his employees and associates of private information or confidences regarding or in the possession of a client or employer, current or former. 21H-19.001 (6) (f)

Rule effective September 10, 1982. Amended November 9, 1984, effective date of amendment December 19, 1984

(Auth: Section 34-11-33, Code of Alabama, 1975)

ALABAMA RULES OF PROFESSIONAL CONDUT	FLORIDA RULES OF PROFESSIONAL CONDUCT
330-X-14-.05 Practice. (Canon IV) The Engineer and/or Land Surveyor shall endeavor to build his practice and professional reputation on the merit of his services as follows:	
(a) The Engineer and/or Land Surveyor shall not offer, or promise to pay or deliver, directly or indirectly, any commission, political contribution, gift, favor, gratuity, benefit or reward as an inducement to secure any specific Professional Engineering and/or Land Surveying work or assignment; providing and excepting, however, that an Engineer and/or Land Surveyor may pay a duly licensed employment agency its fee or commission for securing Engineering and/or Land Surveying employment in a salaried position.	21H-19.001 (6) (e)
(b) The Engineer and/or Land Surveyor shall not solicit professional employment by self-laudatory advertising, or in any manner contrary to high professional standards.	21H-19.001 (2)
(c) The Engineer and/or Land Surveyor shall not make, publish or cause to be made or published, any representation or statement concerning his professional qualifications or those of his partners, associates, firm or organization which is in any way misleading, or tends to mislead the recipient thereof, or the public, concerning his Engineering and/or Land Surveying education, experience, specializations or other Engineering and/or Land Surveying qualifications.	21H-19.001 (2)
(d) The Engineer and/or Land Surveyor shall not supplant, nor attempt to supplant, directly or indirectly, another Engineer and/or Land Surveyor in a particular engineering or land surveying project, after contracts have been awarded to such other Engineer and/or Land Surveyor.	Not covered in Fla. rules
(e) The Engineer and/or Land Surveyor shall not attempt to compete with another Engineer and/or Land Surveyor for employment by reducing his usual charges or by the use of unethical practices.	Not covered in Fla. rules
(f) The Engineer and/or Land Surveyor, in the public interest, shall not participate in fee determination procedures (contract negotiations) which contribute to an inferior quality of workmanship. An Engineer and/or Land Surveyor having submitted a statement of qualification and performance data, and having first been judged as a qualified individual or firm to provide the services required for the proposed project, may proceed to negotiate a contract with a client and establish compensation for the required services.	CCNA
Should the Engineer or Land Surveyor be unable to negotiate a satisfactory contract with the client for any reason, the Engineer or Land Surveyor shall withdraw from further consideration for the engineering or land surveying services.	
Rule effective September 10, 1982. Amended November 9, 1984, effective date of amendment December 19, 1984. Amended September 11, 1987, effective date of amendment October 20, 1987	
(Auth: Section 34-11-33, Code of Alabama, 1975)	

ALABAMA RULES OF PROFESSIONAL CONDUT	FLORIDA RULES OF PROFESSIONAL CONDUCT
frank but private appraisal of Engineers and/or Land Surveyors or other persons or firms considered for employment; 11. Aid or abet, directly or indirectly, any unregistered person in connection with the unauthorized practice of Engineering and/or Land Surveying; or any firm or corporation in the practice of Engineering and/or Land Surveying unless carried on in accordance with the provisions of section 34-11-9 of the Alabama law regulating practice of Engineering and Land Surveying;	21H-19.001 (6) (k)
12. Review the work of another Engineer and/or Land Surveyor, except with the knowledge or consent of such Engineer and/or Land Surveyor, unless the connection of such Engineer and/or Land Surveyor with the work has been terminated.	Not covered in Fla. rules
(b) The Engineer and/or Land Surveyor shall be personally and professionally responsible and accountable for the care, custody, control and use of his Engineer's and/or Land Surveyor's seal, his professional signature and identification. The Engineer and/or Land Surveyor whose seal has been lost, misplaced or stolen shall, upon discovery of its loss, report same immediately to the Board, which may invalidate the stolen registration number of said seal, if it deems this necessary, and issue another registration number to said Engineer and/or Land Surveyor.	Not covered in Fla. rules
(c) When in public service as a member or employee of any governmental body, agency or department, the Engineer and/or Land Surveyor shall not participate, directly or indirectly, use or make use of any property, facility or service of such governmental body, agency or department for the benefit of any private business or activity in which such Engineer and/or Land Surveyor also may be engaged, unless prior, proper authority is obtained in writing.	21H-19.001 (f)
(d) The Engineer and/or Land Surveyor shall not, directly or indirectly, use or make use of any property/facility or service of his client or employer for the benefit of said Engineer and/or Land Surveyor, unless prior, proper authority is obtained in writing.	21H-19.001 (f)
(e) The Engineer and/or Land Surveyor shall not practice or offer to practice Engineering and/or Land Surveying in any governmental jurisdiction in which to do so would be in violation of the laws regulating the practice of Professional Engineering and/or Land Surveying in that jurisdiction. Rule effective September 10, 1982. Amended November 9, 1984, effective date of amendment December 19, 1984 (Auth: Section 34-11-35, Code of Alabama, 1975)	21H-19.001 (n)

ALABAMA RULES OF PROFESSIONAL CONDUT	FLORIDA RULES OF PROFESSIONAL CONDUCT
330-X-14-.06 Ethics. (Canon V) The Engineer and/or Land Surveyor shall contribute to the maintenance, integrity, independence and competency of the engineering and/or land surveying profession as follows:	
(a) The Engineer and/or Land Surveyor shall not:	
1. Violate any provision of the Alabama Law regulating practice of Engineering and Land Surveying;	21H-19.001 (6) (n)
2. Participate, directly or indirectly, in any plan, scheme or arrangement attempting or having as its purpose the evasion of any provision of the Alabama Law regulating practice of Engineering and Land Surveying;	21H-19.001 (6) (n)
3. Fail to exercise reasonable care or diligence to prevent his partners, associates, and employees from engaging in conduct which if done by him, would violate any provision of the Alabama law regulating practice of Engineering and Land Surveying;	21H-19.001 (6) (n)
4. Engage in any illegal conduct involving moral turpitude;	21H-19.001 (6) (i)
5. Engage in any conduct that discredits or tends to discredit the profession of Engineering and/or Land Surveying;	21H-19.001 (6) (a)
6. Permit or allow himself, his professional identification, seal, firm, or business name, or his services to be used or made use of, directly or indirectly, or in any manner whatsoever, so as to make possible or create the opportunity for the unauthorized practice of Engineering and/or Land Surveying by any person, firm or corporation in this State;	21H-19.001 (6) (k)
7. Perform any acts, allow omissions or make any assertions or representations which are fraudulent, deceitful, or misleading, or which in any manner whatsoever tend to create a misleading impression;	21H-19.001 (2)
8. Knowingly associate with or permit or allow the use of his name, firm name or professional identification or seal in any business venture, project or enterprise which he knows or has reason to believe is engaged in professional practices which violate any provision of the Alabama law regulating practice of Engineering and Land Surveying;	21H-19.001 (3)
9. Knowingly associate with or permit the use of his name, professional identification, seal, firm or business name in connection with any venture or enterprise which he knows, or has reason to believe, is engaging in trade, business or professional practice of a fraudulent, deceitful or dishonest nature;	21H-19.001 (3)
10. Injure or attempt to injure or damage the professional reputation of another by any means whatsoever; provided and except, however; that this shall not relieve an Engineer and/or Land Surveyor of the obligation to expose unethical or illegal conduct to the proper authorities or preclude a	21H-19.001 (6) (a) (b)

EXHIBIT C

RULES OF PROFESSIONAL CONDUCT

Location	Grounds for Disciplinary Proceedings (Rule 21H-19)
21 H-19.001 (2), (a) thru (g)	False, Fraudulent, deceptive advertising.
21 H-19.001 (3)	Practicing under a misleading name.
21 H-19.001 ((4) (a)	Being negligent in the practice of engineering.
21 H-19.001 (4) (6)	Failure to comply with "responsibility statements."
21 H-19.001 (5)	Practicing engineering while being incompetent because of mental or physical limitations.
21 H-19.001 (6)	Engineer shall not commit misconduct.
21 H-19.001 (6) (a)	Publicly expressing an opinion with being informed.
21 H-19.001 (6) (b)	Being untruthful, deceptive, misleading in any professional report.
21 H-19.001 (6) (c)	Performing an engineering assignment when not qualified.
21 H-19.001 (6) (d)	Sealing engineering document when not competent.
21 H-19.001 (6) (e)	Offering a bribe to secure work.

21 H-19.001 (6) (f)	Becoming involved in a conflict of interest with employer or client without advising same.
21 H-19.001 (6) (g)	Accepting financial consideration from material equipment suppliers.
21 H-19.001 (6) (h)	Accepting gratuities from contractors, etc., without written consent of employer or client.
21 H-19.001 (6) (i)	Use of engineering to commit felony.
21 H-19.001 (6) (j)	Sealing document not prepared under Engineers supervision or control.
21 H-19.001 (6) (k)	Becoming involved with fraudulent/dishonest persons/firms.
21 H-19.001 (6) (l)	Failing to inform employer and/or responsible public authority of his judgement being overruled by unqualified lay authority.
21 H-19.001 (6) (m)	Engineer to report violations of Chapter 471 or Rules of Professional Conduct.
21 H-19.001 (6) (n)	Violation of any law which regulates engineering.
21 H-19.001 (6) (o)	Failure of engineer or firm to obey disciplinary order.
21 H-19.001 (6) (p)	Making criticisms on engineering matters which is inspired or paid for by interested parties, without identifying the interested parties.

21H Rules of the State Board of Professional Engineers

CHAPTER 21H-18
ORGANIZATION AND PURPOSE

21H-18.001 Purpose. The Florida Board of Engineers has been established by the Legislature pursuant to 471.011, Florida Statutes, in order to protect health and safety of the people of the State of Florida through the regulation of the practice of engineering.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.001 FS.
History—New 1-8-80, Formerly 21H-18.01.

21H-18.002 Board of Organization and Officers.

(1) The Florida Board of Engineers, hereinafter referred to as the Board shall consist of nine (9) members, seven of whom shall be professional engineers and two of whom shall be lay persons who are not, and have not been a professional engineer or member of any closely related profession or occupation. Board members shall possess the requisite qualifications set forth in 471.007(1), Florida Statutes. Election of officers shall be held annually at the first regular meeting of each calendar year, at which time a Chairman and Vice-Chairman shall be nominated and elected by an affirmative vote of not less than five members of the Board. Newly elected officers shall assume office immediately after adjournment of the meeting at which they are elected.

(2) The Chairman shall be the Executive head of the Board, preside at meetings, appoint all committees, and direct all activities requiring authorization and direction by an officer of the Board while the Board is in recess.

(3) The Vice-Chairman shall perform all of the duties of the chairman in the event the chairman is incapacitated or otherwise not available.

Specific Authority 120.53 (1) FS. Law Implemented 120.53 (1), 455.207, 471.007(1) FS.
History —New 1-8-80, Formerly 21H-18.02.

21H-18.003 Administrative Headquarters. The Board's administrative headquarters shall be maintained in Leon County, Florida, and shall house all records pertinent to the orderly administration of the Board's activities.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1) 471.007 FS.
History—New 1-8-80, Formerly 21H-18.03.

21H-18.004 Committees. The chairman of the Board shall appoint such committees as required to provide for the orderly conduct of the Board's business. These committees shall include, but not be limited to, the following:

(1) Legislative and Rules Committee. This committee serves as a liaison between the Board and the Department for purposes of providing suggestions and comments relative to the Department's legislative package. This committee further examines and makes suggestions regarding existing or proposed administrative rules.

(2) Responsibility Committee. This committee is charged with the continuing duty of reviewing and proposing amendments to the statements on responsibilities for professional engineers.

(3) Application Review Committee. This committee assists the Board and the Board staff in the review of any applications pursuant to Chapter 471, Florida Statutes, and reports to the full Board.

(4) Board Operations Committee. This committee reviews and makes suggestions to the Department relating to the staff and operations of the Board office.

(5) Joint Engineer/Land Surveyor Committee. This committee serves as a liaison between these two boards and examines and discusses issues of common interest.

(6) Joint Engineer/Landscape Architect Committee. This committee serves as a liaison between these two boards and examines and discusses issues of common interest.

(7) Joint Engineer/Geologist Committee. This committee serves as a liaison between these two boards and examines and discusses issues of common interest.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1) FS.
History — New 1-8-80, Formerly 21H-18.04, Amended 1-6-92.

21H-18.005 Probable Cause Determination. Probable cause determination as to violation of Chapter 471, Chapter 455 and rules promulgated pursuant thereto shall be made by a probable cause panel of three (3) board members. Said members shall be appointed as a standing probable cause committee at the first board meeting of each calendar year and shall serve for a period of one (1) year. All proceedings of the probable cause panel shall be conducted in accordance with Chapters 120 and 455, Florida Statutes.

Specific Authority 455.225 FS. Law Implemented 455.225 FS.
History—New 1-8-80, Amended 4-5-81, Formerly 21H-18.05.

21H-18.006 Official Seal of the Board. The official seal of the Board shall consist of the seal of the State of Florida surrounded by the words, "Florida Board of Engineers".

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.005 FS.
History—New 1-8-80, Formerly 21H-18.06.

21H-18.007 Board Meetings.

(1) Board meetings shall be held as are required to transact the Board's business throughout the year. Special meetings may be called by the Chairman or by no less than four members requesting such special meetings. All meetings shall be conducted in accordance with acceptable parliamentary procedure.

(2) The order of business for regular meetings shall normally be as follows:

Call to order
Reading and approval of minutes of previous meeting
Report of Executive Director
Reconsideration of applicants
Review of examination grades
Consideration of new applicants
Old business
New business
Scheduling of hearings
Scheduling of meetings
Election of officers (first meeting of year)
Adjournment

Specific Authority 120.53(1) FS. Law Implemented 120.53(1) FS.
History— New 1-8-80, Formerly 21H-18.07.

21H-18.008 Adoption of Model Rules of Procedure. Except as hereinafter provided all administrative proceedings of the Board shall be conducted in accordance with Chapter 120, Florida Statutes, and Chapter 28, Florida Administrative Code (Model Rules of Administrative Procedure).

Specific Authority 120.53(1) FS. **Law Implemented** 120.53(1) FS.
History—New 1-8-80. Formerly 21H-18.08.

21H-18.009 Official Records. The Board shall keep a book or books to contain in proper order the minutes of all the meetings of the Board. All of the records are maintained by the Department of Professional Regulation and are to be found at its headquarters in Leon County, Florida.

Specific Authority 120.53(1) FS. **Law Implemented** 120.53(1), 471.007, 455.229 FS.
History—New 1-8-80. Formerly 21H-18.09.

21H-18.010 Approved Schools and Colleges. A list of the approved degree programs of schools and colleges acceptable to the Board, both as education and as experience, for admittance to the examination shall be maintained by the Board as an official record of the Board with such additions or deletions as the Board may determine by official act from time to time.

Specific Authority 120.53(1) FS. **Law Implemented** 120.53(1), 471.013 FS.
History—New 1-8-80. Formerly 21H-18.10.

21H-18.011 Definitions. As used in Chapter 471 and in these rules where the context will permit the following terms have the following meanings:

(1) "Responsible Charge" shall mean direct control and personal supervision of engineering work done by oneself or by others over which the applicant exercises supervisory authority.

(2) "Engineering Design" shall mean that the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. Central to the process are the essential and complementary roles of synthesis and analysis. This definition is intended to be interpreted in its broadest sense. In particular the words "system, component, or process" and "convert resources optimally" operate to indicate that sociological, economic, aesthetic, legal, ethical, etc., considerations can be included.

(3) The term "evaluation of engineering works and systems" as used in the definition in the practice of engineering set forth in Chapter 471.005(4)(a), F.S., includes but is not limited to services provided by testing laboratories involving the following:

(a) The planning and implementation of any investigation or testing program for the purpose of developing design criteria either by an engineering testing laboratory or other professional engineers.

(b) The planning or implementation of any investigation, inspection or testing program for the purpose of determining the causes of failures.

(c) The preparation of any report documenting soils or other construction materials test data.

(d) The preparation of any report offering any engineering evaluation, advice or test results, whenever such reports go beyond the tabulation of test data. Reports which document soils or other construction materials test data will be considered as engineering reports.

(e) Services performed by any entity or provided by a testing laboratory for any entity subject to regulation by a state or federal regulatory agency which enforces standards as to testing shall be exempt from this rule except where the services otherwise would require the participation of a professional engineer.

(4) "Certification" shall mean a statement signed and /or sealed by a professional engineer representing that the engineering services addressed therein, as defined in Section 471.005 Florida Statutes, have been performed by the professional engineer, and based upon the professional engineer's knowledge, information and belief, and in accordance with commonly accepted procedures consistent with applicable standards of practice, and is not a guaranty or warranty, either express or implied.

Specific Authority 71.003(2)(f) 471.013(1)(a)1.2. FS. **Law Implemented** 471.009(2)(f) 471.013(1)(a)1.2. FS.
History—New 6-23-80. Amended 12-19-82, 11-22-83, Formerly 21H-18.11. Amended 1-16-91.

21H-18-012 Other Board Business for Which Compensation is Allowed. The following are considered to be other business involving the Board as required by 455.207(4), F.S.

(1) All joint Board or Committee meetings required by statutes, Board rule or Board action.

(2) Meetings of Board members with Department staff or contractors of the Department at the Department's or the Board's request. Any participation or meeting of members noticed or unnoticed will be on file in the Board office.

(3) Where a Board member has been requested by the Secretary of the Department to participate in a meeting.

(4) Probable Cause Panel Meeting.

(5) Any telephone conference calls.

(6) All activity of Board members, if authorized by the Board, when grading, proctoring or reviewing examination given by the Department.

(7) All participation in Board authorized meetings with professional associates of which the Board is a member or invitee. This would include all meetings of national associations of registration Boards of which the Board is a member as well as Board authorized participation in meetings of national or professional associations or organizations involved in educating, regulating or reviewing the profession over which the Board has statut' authority.

(8) Any and all other activities which are Board approv and which are necessary for Board members to attend in order to further protect the public health, safety and welfare, through the regulation of which the Board has statutory authority.

Specific Authority 120.53(1) FS., Ch. 81-302, § 28, Laws of Florida. **Law Implemented** 120.53(1), FS., Ch. 81-302, § 28, Laws of Florida.
History—New 11-2-81, Formerly 21H-18.12.

21H-18.013 Criteria for Investigators and Consultants.

(1) Except for investigation of non-technical matters all investigators and consultants hired by the Department of Professional Regulation who undertake the Investigation of Florida Professional Engineers shall be professional Engineers with at least ten (10) years of current continuous practice in any state or territory or shall have the capability of discussing with and enlisting the cooperation of engineers, architects, attorneys, contractors, and state law enforcement officials dealing in engineering matters and, a degree from an accredited four-year college or university: and five years of professional regulation experience or three years of sworn law enforcement or investigative experience. (Accredited college courses in law, engineering, or related sciences may be substituted for the required college training.)

(2) Non-technical matters which do not encompass the professional proficiency of a licensee in the practice of Engineering may be investigated by any individual deemed suitable by the Department of Professional Regulation.

Specific Authority 455.203(8) FS. **Law Implemented** 455.203(8) FS.
History—New 1-25-82, Amended 5-18-82, Formerly 21H-18.13.

21H-18.014 Joint Architecture and Engineering Committee Rule. The Board of Professional Engineers s appoint three professional engineers to serve on a joint comm with the Board of Architecture as provided by Rule 21H-18.0 .. The purpose of the Joint Architecture and Engineering Committee shall be to provide professional advice to interested parties

throughout the state regarding the overlapping of Chapter 481, Part I and Chapter 471, Florida Statutes, as they relate to architecture and engineering relations. A Joint Architecture and Engineering Subcommittee shall, when requested, supply expert advice to the Department of Professional Regulation with regard to instances of alleged cross-professional complaints or allegations of either architects or professional engineers practicing architecture or engineering which is not incidental to their profession as that term is used in Section 471.003 or 481.229, Florida Statutes.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 481.229, 471.003 FS. **History**—New 5-29-83. Formerly 21H-18.14.

21H-18.015 Education Advisory Committee. The Board shall appoint an Educational Advisory Committee which shall be composed of not less than one (1) member of the Board. The committee shall be advised by expert consultants retained by the Department of Professional Regulation. Said consultants shall be individuals who have knowledge and experience of curricula of engineering schools and colleges and of national accreditation standards for professional degrees in engineering programs which shall have been gained either as a college faculty member or as a professional engineer. The Educational Advisory Committee shall examine and review applications for examination or licensure by endorsement made to the Board under the provisions of 21H-20.006, to insure that the engineering curricula and applicants' degree programs meet required standards of accreditation. The Educational Advisory Committee shall make recommendations to the Board as to whether an applicant shall be approved for admittance to the examination or for licensure by endorsement.

Specific Authority 120.53(1) FS. Law Implemented 120.53(1), 471.013 FS. **History**—New 8-18-87, Amended 2-18-88.

CHAPTER 21H-19
GROUNDS FOR DISCIPLINARY PROCEEDINGS

21H-19.001 Grounds for Disciplinary Proceedings.

(1) Pursuant to 471.033(2), Florida Statutes, the Board, to the extent not otherwise set forth in Florida Statutes, hereby specifies that the following acts or omissions are grounds for disciplinary proceedings pursuant to 471.033(1)(f), Florida Statutes.

(2) A professional engineer shall not advertise in a false, fraudulent, deceptive or misleading manner. As used in 471.033(1)(f), Florida Statutes, the term "advertising goods or services in a manner which is fraudulent, false, deceptive, or misleading in form or content" shall include without limitation a false, fraudulent, misleading, or deceptive statement or claim which:

(a) contains a material misrepresentation of facts;

(b) omits to state any material fact necessary to make the statement in the light of all circumstances not misleading;

(c) is intended or is likely to create an unjustified expectation;

(d) states or implies that an engineer is a certified specialist in any area outside of his field of expertise;

(e) contains a representation or implication that is likely to cause an ordinary prudent person to misunderstand or be deceived or fails to contain reasonable warnings or disclaimers necessary to make a representation or implication not deceptive;

(f) falsifies or misrepresents the extent of his education, training or experience to any person or to the public at large, tending to establish or imply qualification for selection for engineering employment, advancement, or professional engagement. A professional engineer shall not misrepresent or exaggerate his degree of responsibility in or for the subject matter of prior assignments;

(g) in any brochure or other presentation made to any person or to the public at large, incident to the solicitation of an engineering employment, misrepresents pertinent facts concerning a professional engineer's employer, employees, associates, joint ventures, or his or their past accomplishments with the intent and purpose of enhancing his qualifications and his works.

(3) A professional engineer, corporation or partnership shall not practice engineering under an assumed, fictitious or corporate name that is misleading as to the identity, responsibility or status of those practicing thereunder or is otherwise false, fraudulent, misleading or deceptive within the meaning of 21H-19.001(2). The name of a corporation or partnership, if otherwise authorized, may include the name or names of one or more deceased or retired members of the firm, or of a predecessor firm in a continuing line of succession. An engineering firm may not offer services to the public under a firm name which contains only the name of an individual not licensed as a professional engineer, registered architect or land surveyor in any state.

(4)(a) A professional engineer shall not be negligent in the practice of engineering. The term negligence set forth in 471.033(1)(g), Florida Statutes, is herein defined as the failure by a professional engineer to utilize due care in performing in an engineering capacity or failing to have due regard for acceptable standards of engineering principles. Professional engineers shall approve and seal only those documents that conform to acceptable engineering standards and safeguard the life, health, property and welfare of the public.

(b) Failure to comply with the procedures set forth in the publication "Statements on Responsibilities of Professional Engineers, Second Edition" as published and adopted by the Board of Professional Engineers shall be considered as non-compliance with this section unless the deviation or departures therefrom are justified by the specific circumstances of the project in question and the sound professional judgement of the professional engineer.

(5) A professional engineer shall not be incompetent to practice engineering. Incompetence in the practice of engineering as set forth in 471.033(1)(g), Florida Statutes, shall mean the physical or mental incapacity or inability of a professional engineer to perform the duties normally required of the professional engineer.

(6) A professional engineer shall not commit misconduct in the practice of engineering. Misconduct in the practice of engineering as set forth in 471.033(1)(g), Florida Statutes, shall include, but not be limited to:

(a) expressing an opinion publicly on an engineering subject without being informed as to the facts relating thereto and being competent to form a sound opinion thereupon;

(b) being untruthful, deceptive, or misleading in any professional report, statement, or testimony whether or not under oath or omitting relevant and pertinent information from such report, statement or testimony when the result of such omission

would or reasonably could lead to a fallacious conclusion on the part of the client, employer or the general public;

(c) performing an engineering assignment when not qualified by training or experience in the field or discipline of professional engineering involved;

1. All professional engineer asbestos consultants are subject to the provisions of section 455.301-.309, F.S., Chapter 471, F.S., and Rule 21H-19, F.A.C., and shall be disciplined as provided therein.

2. The approval of any professional engineer as a "special inspector" under the provisions of Chapter 553, Florida Statutes, does not constitute acceptance by the Board that any such professional engineer is in fact qualified by training or experience to perform the duties of a "special inspector" by virtue of training or experience. Any such professional engineer must still be qualified by training or experience to perform such duties and failure to be so qualified could result in discipline under this chapter or Chapter 471.

(d) affixing a signature or seal to any engineering plan or document in a subject matter over which a professional engineer lacks competence because of inadequate training or experience;

(e) offering directly or indirectly any bribe or commission or tendering any gift to obtain selection of preferment for engineering employment with the exception of the payment of the usual commission for securing salaried positions through licensed employment agencies;

(f) becoming involved in a conflict of interest with an employer or client, without the knowledge and approval of the client or employer, but if unavoidable a professional engineer shall immediately take the following actions:

1. Disclose in writing to his employer or client the full circumstances as to a possible conflict of interest; and,

2. Assure in writing that the conflict will in no manner influence the professional engineer's judgment or the quality of his services to his employer or client; and,

3. Promptly inform his client or employer in writing of any business association, interest or circumstances which may be influencing his judgment or the quality of his services to his client or employer;

(g) soliciting or accepting financial or other valuable considerations from material or equipment suppliers for specifying their products without the written consent to the engineer's employer or client;

(h) soliciting or accepting gratuities directly or indirectly from contractors, their agents or other parties dealing with the professional engineer's client or employer in connection with work for which the professional engineer is responsible without the written consent of the engineer's employer or client;

(i) use by a professional engineer of his engineering expertise and/or his professional engineering status to commit a felony;

(j) affixing his seal and/or signature to plans, specifications, drawings, or other documents required to be sealed pursuant to 471.025(1), Florida Statutes, when such document has not been personally prepared by the engineer or prepared under his responsible supervision, direction and control;

(k) a professional engineer shall not knowingly associate with or permit the use of his name or firm name in a business venture by any person or firm which he knows or has reason to believe is engaging in business or professional practices of a fraudulent or dishonest nature;

(l) if his engineering judgment is overruled by an unqualified lay authority with the results that the public health and safety is threatened, failure by a professional engineer to inform his employer, responsible supervision and the responsible public authority of the possible circumstances;

(m) if a professional engineer has knowledge or reason to believe that any person or firm is guilty of violating any of the provisions of Chapter 471, Florida Statutes, or any of these rules of professional conduct, failure to immediately present this information to the Department of Professional Regulations;

(n) violation of any law of the State of Florida dir regulating the practice of engineering;

(o) failure on the part of any professional engineer or certificate holder to obey the terms of a final order imposing discipline upon said professional engineer or certificate holder;

(p) making any statement, criticism or argument on engineering matters which is inspired or paid for by interested parties, unless the professional engineer specifically identifies the interested parties on whose behalf he is speaking, and reveals any interest he or the interested parties have in such matters;

(q) sealing and signing all documents for an entire engineering project, unless each design segment is signed and sealed by the professional engineer in responsible charge of the preparation of that design segment;

(r) revealing facts, data or information obtained in a professional capacity without the prior consent of the professional engineers's client or employer except as authorized or required by law.

Specific Authority 471.033(2) FS. Law Implemented 471.025(1), 471.033(1)(f)(g), (2) FS.

History--New 1-8-80, Amended 6-23-80, 3-23-81, 6-4-85, Formerly 21H-19.01, Amended 5-14-86, 4-23-87, 11-8-88, 1-11-89, 7-3-90.

21H-19.002 Payments Of Fine. All fines imposed by the Board for violations of section 471.033, F.S., shall be paid within a period of thirty (30) days from the date of the final order entered by the Board. This time limit may be modified by the Board at its discretion in order to prevent undue hardship to the public.

Specific Authority 455.227(2), FS. Law Implemented 455.227(2), 471.033(3)(c) FS. **History**—New 8-19-80, Formerly 21H-19.02.

21H-19.003 Purpose. To comply with the purpose of Chapter 471 which is to safeguard life, health, and property to prom the public welfare and to maintain a high standard of int and practice, the Board of Professional Engineers has deve Grounds for Disciplinary Proceeding. These rules shall be bindi ing on every person holding a license to offer or perform engineering services in this State. All persons registered under Chapter 471 are required to be familiar with Chapter 471 and the rules promulgated thereto. The Grounds for Disciplinary Proceedings delineate specific obligations which must be met by a professional engineer.

Specific Authority 471.033(2), 120.53(1) FS. Law Implemented 471.001, 471.033 FS **History**—New 5-14-86.

21H-19.004 Disciplinary Guidelines; Range of Penalties; Aggravating and Mitigating Circumstances.

(1) The Board sets forth below a range of disciplinary guidelines from which disciplinary penalties will be imposed upon practitioners (including holders of certificate of authorization) guilty of violating Chapter 471, F.S. The purpose of the disciplinary guidelines is to give notice to licensees of the range of penalties which will normally be imposed upon violations of particular provisions of Chapter 471. The disciplinary guidelines are based upon a single count violation of each provision listed. Multiple counts of violations of the same provision of Chapter 471 or the rules promulgated thereto, or other unrelated violations contained in the same administrative complaint will be grounds for enhancement of penalties. All penalties at the upper range of the sanctions set forth in the guidelines, i.e., suspension, revocation, etc., include lesser penalties, i.e., fine, probation or reprimand which may be included in the final penalty at the Board's discretion. All impositions of probation as a penalty shall include successful completion of the Engineering Law and Rules Study Guide, completion of a Board-approved course in Engineering Professionalism and Ethics, and an appearance before the B at the end of the probationary period. Other terms m imposed by the Board as its discretion.

(See chart next page)

(2) The following disciplinary guidelines shall be followed by the Board in imposing disciplinary penalties upon licensees for violation of the below mentioned statutes and rules:

	VIOLATION	PENALTY RANGE MINIMUM	MAXIMUM
(a)	Failure to date plans (471.025(1), F.S.)	Guidance Letter	Reprimand and one (1) year probation
(b)	Signing or sealing work not competent to perform (471.025(3), F.S.) (Rule 21H-19.001(3)(c)(d))	Reprimand and $1,000 fine and one (1) year probation	Reprimand, $1,000 fine, one (1) year suspension and two (2) year probation
(c)	"Plan Stamping" (471.033(1)(j), F.S.) (Rule 21H-19.001(3)(j)(q))	Reprimand & one (1) year probation & $1,000 fine	Reprimand, $1,000 fine, one (1) year suspension and two (2) year probation
(d)	Violating a final order of the Board (471.003(1)(k), F.S.) (Rule 21H-19.001(1)(o))	Revocation and $1,000 fine	
(e)	Attempting to procure or procuring a license by bribery or fraudulent misrepresentation (471.033(1)(b), F.S.)	Revocation and $1,000 fine if licensed (denial of license and refer to State Attorney if not licensed)	
(f)	License disciplined by another jurisdiction (471.033(1)(c), F.S.)	Same penalty as imposed in other jurisdiction or as closely as possible to penalties set forth in Florida Statutes	
(g)	Criminal Conviction relating to engineering (471.033(1)(d), F.S) (Rule 21H-19.001(3)(i))	Misdemeanor: reprimand & one (1) year probation	Reprimand, $1,000 fine, one (1) year suspension and two (2) year probation
		Felony: Revocation and $1,000	
(h)	Practice on suspended license (471.033(1)(i), F.S)	Revocation and $1,000 fine	
(i)	Practice on inactive license (471.033(1)(i), F.S.)	Fine based on length of time in practice while inactive; $100/ month or $1,000 maximum (penalty will require licensee to renew license or cease practice)	
(j)	Practice on revoked license (471.033(1)(i), F.S.)	Refer to State Attorney for criminal prosecution	
(k)	Knowingly making or filing false report (471.033(1)(e), F.S.) (Rule 21H-19.001(3)(b))	One (1) year suspension, two (2) year probation and $1,000 fine	Revocation and $1,000 fine
(l)	Fraudulent, false, deceptive, or misleading advertising (471.033(1)(f), F.S.) (Rule 21H-19.001(3)(c))	Letter of guidance	Reprimand, one (1) year probation and $1,000 fine

	VIOLATION	PENALTY RANGE MINIMUM	MAXIMUM
(m)	Negligence (471.033(1)(g), F.S.)	Reprimand, two (2) year probation and $1,000 fine	Reprimand $1,000 fine five (5) year suspension and ten (10) year probation
(n)	Fraud or deceit (471.033(1)(g), F.S.)	Reprimand, one (1) year suspension, two (2) year probation and $1,000 fine	$1,000 fine and revocation
(o)	Misconduct 1. (471.033(1)(i), F.S.) (Rule 21H-19.001(3)(g)(h)) Soliciting or accepting gratuities without client knowledge:	Reprimand, one (1) year probation and $1,000 fine	Reprimand, one (1) year suspension, two (2) year probation and $1,000 fine
	2. (Rule 21H-19.001(3)(r)) Failure to preserve client's confidence:	Reprimand, one (1) year probation and $1,000 fine	Reprimand, one (1) year suspension and two (2) year probation (if pecuniary benefit accrues to engineer)
	3. (Rule 21H-19.001(3)(l)) Professional judgment is overruled by unqualified person:	Reprimand, one (1) year probation and $1,000 fine	Reprimand, one (1) year suspension, two (2) year probation and $1,000 fine
	4. (Rule 21H-19.001(3)(k)) Use of name/firm in fraudulent venture:	Reprimand one (1) year probation and $1,000 fine	Reprimand $1,000 fine, one (1) year suspension and two (2) year probation
(p)	Incompetence (mental or physical impairment) (471.033(1)(i), F.S.)	Suspension until ability to practice proved followed by probation	
(q)	Undisclosed conflict of interest (471.033(1)(i), F.S.) (21H-19.001(3)(f)(p))	Reprimand, $1,000 fine, and two (2) year probation	Revocation and $1,000 fine
(r)	Firm practicing without certificate of authorization (471.023, F.S.)	Guidance letter to become certified or cease practice. If firm applies for certificate, Board will impose a fine of $100/month or a $1,000 maximum per month of uncertified practice.	

(3) The board shall be entitled to deviate from the above-mentioned guidelines upon a showing of aggravating or mitigating circumstances by clear and convincing evidence presented to the board prior to the imposition of a final penalty. The fact that a Hearing Officer of the Division of Administrative Hearings may or may not have been aware of the below mentioned aggravating or mitigating circumstances prior to a recommendation of penalty in a Recommended Order shall not obviate the duty of the board to consider aggravating and mitigating circumstances brought to its attention prior to the issuance of a Final Order.

(a) Aggravating circumstances; circumstances which may justify deviating from the above set forth disciplinary guidelines and cause the enhancement of a penalty beyond the maximum level of discipline in the guidelines shall include but not be limited to the following:

1. History of previous violations of the practice act and the rules promulgated thereto.

2. In the case of negligence: of the magnitude and scope of the project and the damage inflicted upon the general public by the licensee's misfeasance.

3. Evidence of violation of professional practice acts in other jurisdictions wherein the licensee has been disciplined by the appropriate regulatory authority.

4. Violation of the provision of the practice act wherein a letter of guidance as provided in F.S. 455. 225(3) has previously been issued to the licensee.

(b) Mitigating circumstances; circumstances which may justify deviating from the above set forth disciplinary guidelines and cause the lessening of a penalty beyond the minimum level of discipline in the guidelines shall include but not be limited to the following:

1. In cases of negligence, the minor nature of the project in question and lack of danger to the public health, safety and welfare resulting from the licensee's misfeasance.

2. Lack of previous disciplinary history in this or any other jurisdiction wherein the licensee practices his profession.

3. Restitution of any damages suffered by the licensee's client.

4. The licensee's professional standing among his peers including continuing education.

5. Steps taken by the licensee or his firm to insure the non-occurrence of similar violations in the future.

Specific Authority § 2, Chapter 86-90, Laws of Florida. **Law Implemented** § 2, Chapter 86-90, Laws of Florida.
History—New 1-7-87

21H-19.005 Citations

(1) As used in this rule, "citation" means an instrument which meets the requirements set forth in Section 455.224, FS., and which is served upon a licensee or certificateholder for the purpose of assessing a penalty in an amount established by this rule.

(2) In lieu of the disciplinary procedures contained in Section 455.225, FS., the Department is hereby authorized to dispose of any violation designated herein by issuing a citation to the subject within six months after the filing of the complaint that is the basis for the citation. If a violation for which a citation may be issued is discovered during the course of an investigation for an unrelated violation, the citation must be issued within 6 months from the discovery of the violation and filing of the uniform complaint form by the investigator.

(3) The following violations with accompanying fines may be disposed of by citation:

(a) Practice or offer to practice engineering through a corporation, partnership, or fictitious name which has not been duly certified. The fine shall by $100 for each month or fraction thereof of said activity, up to a maximum of $1,000. (See Section 471.033(1)(a), F.S.)

(b) Failure to date documents when affixing signature and seal. The fine shall be $200. (See Section 471.033(1)(a), F.S.)

(c) Practice with an inactive license less than six months. The fine shall be $100 for each month or fraction thereof. (See Section 471.033(1)(i), F.S.)

(4) If the subject does not dispute the matter in the citation in writing within 30 days after the citation is served by the personal service or within 30 days after receipt by certified mail, the citation shall become a final order of the Board of Professional Engineers. The subject has 30 days from the date the citation becomes a final order to pay the fine and costs. Failure to pay the fine and costs within the prescribed time period constitutes a violation of Section 471.033(1)(k), FS., which will result in further disciplinary action. All fines and costs are to be made payable to "Department of Professional Regulation — Citation."

(5) Prior to issuance of the citation, the investigator must confirm that the violation has been corrected or is in the process of being corrected. If the violation is a substantial threat to the public health, safety, and welfare, such potential for harm must be removed prior to issuance of the citation.

(6) Once the citation becomes a final order, the citation and complaint become a public record pursuant to Chapter 119, FS., unless otherwise exempt from the provisions of Chapter 119, FS. The citation and complaint may be considered as aggravating circumstances in future disciplinary actions pursuant to Rule 21H-19.004, F.A.C.

(7) The procedures described herein apply only for an initial offense of the alleged violation. Subsequent violation(s) of the same rule or statute shall require the procedure of Section 455.225, FS., to be followed. In addition, should an initial offense for which a citation could be issued occur in conjunction with violations not described herein, then the procedures of Section 455.225, FS., shall apply.

Specific Authority 455.224, 455.225 FS. **Law Implemented** 455.224 FS.
History — New 2-2-92, Amended 8-31-92.

CHAPTER 21H-20
EXPERIENCE AND EDUCATION

21H-20.001 Definitions. As used hereinafter in this chapter the following words or phrases shall be defined as follows:

(1) "Year" shall mean 12 months of full-time employment or a full-time academic year of graduate or undergraduate college education.

(2) "Board approved engineering programs" shall mean:

(a) engineering curricula accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET), approved by ABET, approved by the Board of Professional Engineers as equivalent to ABET, or

(b) non-ABET-approved engineering programs for a post-baccalaureate degree in engineering from a school or college in the United States which has an accredited engineering curriculum in a related discipline at the baccalaureate level, or

SYNOPSIS:

Legislation adopted in 1991 at the behest of the architectural profession resulted in municipalities rejecting building design plans that had been sealed by professional engineers. But when engineers in the state protested and teamed up with municipal governments, they convinced the legislature to reverse its earlier action and adopt corrective legislation in 1992.

INTRODUCTION

Engineers in the state describe relations with architects prior to 1991 as cordial, citing the two professions' cooperation on areas of mutual interest such as qualifications-based selection procurement. Unbeknown to engineering leaders in the state at the time, however, as early as 1990 the architectural licensing board initiated an aggressive campaign to curb the illegal practice of architecture. Professional engineers were among those forced by the architectural board (the engineering board was not consulted) to sign consent decrees, promising to discontinue their "illegal practice of architecture." Only later did engineers learn of this pattern and recognize that its actions were in all likelihood a precursor to the legislative battle that followed.

LEGISLATION

In 1991, the State Board for Licensure of Architects and Landscape Architects initiated legislation, "An Act to Provide Better Regulation of the Practice of Architecture and Landscape Architecture" (L.D. 1738) at the request of the Maine chapter of the American Institute of Architects (MAIA). The bill made numerous changes to the state's architectural and landscape architectural practice act. Among the changes that turned out to have the greatest impact on the engineer-architect interprofessional issue that ensued were the following: inserted the qualifier "primarily for human habitation or occupancy" into the definition of the practice of architecture; defined the term "technical submission"; amended the "exceptions" section (however, the amendment did not delete the exception for professional engineers practicing architecture incidental to their practice of engineering); and inserted language requiring code enforcement officials (CEOs) to reject "technical submissions" involving the practice of architecture that did not contain an architectural seal, or for which the applicant did not certify their exception from the act.

The Maine Society of Professional Engineers' (MSPE) legislative tracking service alerted it to the legislation on its date of introduction. MSPE's legislative chairman evaluated the bill and did not perceive any problems. The existing "incidental practice" exemption had not been deleted and the language instructing CEOs to reject plans not bearing the seal of an architect pertained solely to "technical submissions involving the *practice of architecture*" (emphasis added) and did not place any restrictions on technical submissions involving the practice of engineering. In fact, some engineers viewed the seal language as positive, in that it encouraged CEOs to recognize the importance of professional seals.

The bill passed the legislature without floor debate and was signed by the governor in June 1991, becoming P.L. 1991, c. 396 (Attachment A).

INTERPRETING THE NEW LAW

The first indication that, through passage of P.L. 396, the architects had succeeded in accomplishing a "hidden agenda" to curb the activities of engineers and others in the building design field appeared in the September 1991 issue of MAIA's newsletter. Speaking in glowing terms, MAIA's then-president called the new act, "a boon to architectural offices throughout Maine...that will start a trickle and later a flow of projects looking for architects." The president continued, "Now that we have succeeded in

of projects looking for architects." The president continued, "Now that we have succeeded in getting a law passed that has the muscle we have been looking for, we have a critical obligation to service the many clients it spawns promptly, well, and reasonably....I encourage each of you to promote this effort in your community. Some of us have found a wonderful forum in serving on our local planning boards." The president concluded with an optimistic toast: "Here's to bowling alley additions and convenience stores!"

Within days of the article, in a one-two punch that was too closely timed to be anything but orchestrated, the architectural licensing board and MAIA both issued letters on the new law to municipal officials.

First, a member of the architectural licensing board (who was also its complaint officer) sent official correspondence to more than 1,500 municipal officials (including town managers, CEOs, and planning/zoning commissions) throughout the state declaring that significant revisions had been made to the architectural act (Attachment B). He emphasized only three of the many provisions of the new law: 1) It "enlarge[d] as well as specifie[d] the scope of documents that must bear an architect's seal"; 2) It "prohibit[ed] the acceptance or approval of any technical submission...that is not appropriately sealed by a registered architect." (Conveniently, he neglected to explain that this provision specifically stated, "technical submissions *involving the practice of architecture*" [emphasis added]. He also failed to mention that this same section also stipulated that non-architects exempt from the act [under the exceptions section] could also submit technical submissions, provided that they include a statement certifying their exempt status); 3) While he did acknowledge that the new act contained exceptions, he provided only those "exceptions pertinent to [CEOs'] work in code enforcement." Those were single and two-family dwellings; farm buildings; and alterations, renovations, or remodeling, provided the changes neither affect the structure or safety features of the building nor require a building permit. He conveniently excluded from his list the exception for professional engineers practicing architecture incidental to their practice of engineering.

Days later, the MAIA president sent correspondence to the same municipal officials instructing them that "local code officials will need to be able to refer applicants for building permits to an architect before they can issue the permit sought. For your convenience, we have prepared a directory of all the participating firms in MAIA..." (Attachment C). Some architectural firms quickly followed with their own correspondence to these same municipal officials.

Code enforcement officials throughout the state were in turmoil as a result of the correspondence, as they had not been apprised of any of these major changes prior to the law's adoption. The Consulting Engineers of Maine (CEM) quickly attempted to rectify the situation, releasing an alternative interpretation of the act. Unfortunately, its letter was not as forceful as it could have been, with CEM even conceding that they were "in complete agreement with [the law's] language and intent." However, CEM did state that P.L. 396 was "in no way more restrictive with regard to authorizing engineers to stamp [documents] prepared in the course of the practice of engineering. The letters you may have received in September from [the architectural licensing board and MAIA] were not intended to imply that only an architect's seal is now valid for any and all projects."

Despite CEM's clarification, many CEOs began implementing the instructions provided by the architectural board, which carried greater authority than a private association. Immediately they began rejecting any building permit applications that had been prepared by someone other than an architect. One engineer, in a newspaper column, recounted that "virtually all municipalities...immediately adopted a policy to refuse to accept any technical submission which did not carry an architect's seal....The practice

of professional engineering...with the passage of one bill [had] been relegated to the status of architect's assistant." Only when engineers began reporting such instances to the engineering licensing board, MSPE, and their legal counsels, was the true impact of the new architectural act's language and how it would later be interpreted by the architects realized.

In the first of many attempts to clarify the matter, the architectural licensing board sent additional correspondence to CEOs in early October 1991 (Attachment D). But the "administrative interpretation" they offered merely reiterated the original September communication from the board's complaint officer, and did little to resolve the matter.

Facing pressure from engineers, whose practice was adversely impacted by the municipalities' refusal to accept their documents, as well as from frustrated CEOs who were receiving a flood of contradictory information, the engineering licensing board contacted its architectural counterpart and they agreed to jointly issue a memorandum to CEOs (Attachment E). Prior to this experience, the two boards had seldom engaged in joint discussions. Concurrently, the Maine Municipal Association also issued an interpretation to its members (Attachment F). While the basis of the interpretations was consistent, each one addressed the law from a different perspective and thus touched on differing aspects of the law.

Despite this plethora of correspondence, engineers and CEOs remained unconvinced that any interpretative documents would truly put the confusion to rest. Engineers were angry that they were being required to have their work products sealed by a licensed architect in order for them to be found in compliance by the municipalities and, they felt that attaching a "certification of exemption" to be an insult to their professionalism. Code enforcement officials also protested their new responsibilities. Not only were CEOs concerned about the liability implications of their mistakenly rejecting a professional's documents (because of the confusing nature of the law), and later having it determined that they had in fact been acceptable, but they also resented being charged with enforcing the architectural licensing law. Both engineers and CEOs concluded that the architectural statute would have to be changed.

LEGISLATIVE EFFORT

The CEOs approached the Maine Municipal Association and requested that they pursue corrective legislation. At this point, engineering and architectural groups, including MSPE, began working with the CEOs to draft amending legislation. As part of the process, MSPE and MAIA sponsored joint conferences to discuss the issue with their members and other interested parties.

At the same time, engineers met with members of the state legislature to bring the problem to their attention. The legislators were puzzled at the uproar the new law had caused and felt that they had been duped by the architects.

By the commencement of the 1992 legislative session, engineers and CEOs had rounded up enough interest in the issue to have several bills in the hopper. The Joint Committee on Business Legislation, which had overseen the 1991 legislation, agreed to hold a hearing on the bills. It was at this hearing that a member of the architectural licensing board blatantly stated what had heretofore been its "hidden agenda" -- that it wanted exclusive control over building design.

Following the hearing, the key legislators and the majority of affected parties rallied around a consensus bill (L.D. 1997), that while not as comprehensive as some would have liked, met all parties' immediate needs. The legislation was adopted and signed into law in April 1992, becoming, P.L. 1992, c. 874 (Attachment G).

P.L. 874 included two key provisions for engineers. First, it eliminated the requirement that CEOs determine whether or not a technical

submission required a professional seal. As such, engineers would no longer be required to defend to municipal officials why their seal was in fact acceptable under the professional engineering law; second, it substantially expanded the "incidental practice" exemption provided to engineers in the architectural act by specifically inserting the PE act's definition of practice.

CONCLUSION

While passage of the 1992 law greatly eliminated complications for engineers borne out of the 1991 act, engineers continue to report occasional occurrences of their plans being improperly rejected by local planning boards and CEOs, probably the result of lingering confusion over the 1991 amendments. But because of the hard work of engineers in the state, they now can point to a less ambiguous statute when arguing their case with these officials.

Perspectives on how the legislature perceives the engineering and architectural professions as a result of this incident are mixed. Some engineers feel that their image before the legislature has been enhanced, because they became active players in the legislative process and presented their concerns to the legislature honestly and accurately. Others suspect that, despite no complicity on their part, the turf battle has tarnished the credibility of both professions in the eyes of the legislature, and that both groups may have a difficult time receiving a sympathetic ear from legislators in the future.

115th MAINE LEGISLATURE

FIRST REGULAR SESSION-1991

Legislative Document No. 1738

S.P. 662 In Senate, April 29, 1991

Submitted by the Department of Professional and Financial Regulation pursuant to Joint Rule 24.

Reference to the Committee on Business Legislation suggested and ordered printed.

JOY J. O'BRIEN
Secretary of the Senate

Presented by Senator BALDACCI of Penobscot
Cosponsored by Representative REED of Dexter and Senator RICH of Cumberland.

STATE OF MAINE

IN THE YEAR OF OUR LORD
NINETEEN HUNDRED AND NINETY-ONE

An Act to Provide Better Regulation of the Practice of Architecture and Landscape Architecture.

(EMERGENCY)

A. ~~No~~ A person may not practice architecture or ~~hold himself out~~ profess to practice architecture ~~within~~ inside the State or use the title "~~architect~~" or ~~call himself~~ profess to be an "architect," "registered architect" or "architectural designer" or display or use any words, letters, figures, titles, sign, card advertisement or other symbol or device indicating or tending to indicate that the person is an architect or is practicing architecture, or sign ~~drawings or specifications as an architect~~, technical submissions unless ~~he shall be~~ the person is duly licensed by the board.

As used in this chapter, the practice of architecture ~~shall consist~~ consists of rendering or offering to render service to clients by consultations, investigations, ~~preliminary studies, plans, specifications, contract documents~~ technical submissions and a coordination of structural factors concerning the aesthetic or structural design and ~~inspection~~ administration of construction ~~of buildings~~ contracts or any other service in connection with the designing or ~~inspection~~ administration of construction ~~of~~ contracts for buildings located ~~within~~ inside the State that have as their principal purpose human occupancy or habitation, regardless of whether ~~such~~ the persons are performing one or all of these duties, or whether they are performed in person or as the directing head of an office or organization performing them.

As used in this chapter, the term "technical submissions" includes the preliminary studies, plans, designs, drawings, specifications and contract documents, as well as other documents, prepared in the course of practicing architecture or landscape architecture.

The practice of architecture ~~shall~~ does not include the practice of landscape architecture as defined in this chapter. A licensed architect may do ~~such~~ landscape architectural work as is incidental to ~~his~~ the architect's work.

B. Qualifications.

(1) To be qualified for admission to the examination to practice architecture in this State an applicant must submit evidence to the board that:

(a) ~~He~~ The applicant has completed a course of study in a school or college of architecture approved by the board, with graduation ~~therefrom~~ as evidenced by a diploma setting forth a satisfactory degree, and 3 years of practical experience in the office of an experienced

more than 90 days after the license expiration date ~~shall be~~ is subject to all requirements governing new applicants under this chapter, except that the board may in its discretion, giving due consideration to the protection of the public, waive examination if the renewal application is made within 2 years from the date of the expiration.

Sec. 19. 32 MRSA §225, as amended by PL 1987, c. 395, Pt. A, §121, is further amended to read:

§225. Seal

Each licensee shall upon licensure obtain a seal of such design as the board ~~shall authorize~~ authorizes and ~~direct~~ directs and shall submit an impression of the seal to the board. Plans ~~and specifications,~~ Technical submissions prepared by or under the direct supervision of a licensed architect ~~in the case of an architect registrant, and~~ or under the direct supervision of a licensed landscape architect ~~in the case of a landscape architect registrant, shall~~ must be stamped with the seal during the life of the licensee's license, ~~and it shall be~~ . It is unlawful for anyone to stamp or seal any documents with the seal after the license named ~~thereon~~ on the seal has expired or has been revoked, unless the license ~~shall have~~ has been renewed or reissued.

As used in this section, "direct supervision of a technical submission" means that the supervising licensee has personal knowledge of the technical submission and direct knowledge of involvement with and control over preparation of the technical submission, provided that persons consulting with or employed by the licensee who are licensed in this State under any other provision of law may provide direct supervision of portions of the technical submission. Those portions are determined to be under the direct supervision of the licensee if the licensee has reviewed those portions, coordinated their preparation and is responsible for their adequacy.

A public official charged with enforcement duties under Title 5, section 1742, subsection 7; Title 25, section 2448; and Title 30-A, section 3007, subsection 2 may not accept or approve any technical submission involving the practice of architecture unless the technical submission is stamped as required by this section or the applicant certifies on the submission to the applicability of a specific exception under section 226 permitting the preparation of the technical submission by a person not licensed under this chapter. A building permit issued with respect to a technical submission that does not conform with the requirements of this section is invalid.

Sec. 20. 32 MRSA §226, as enacted by PL 1977, c. 463, §3, is repealed and the following enacted in its place:

§226. Exceptions

1. Practices excepted. Nothing in this chapter may be construed to affect or prevent the practice of:

A. Supervision by builders or superintendents employed by those builders of the installation of architectural or landscape architectural projects;

B. Marine or naval architects acting within the scope of their profession or occupation;

C. Officers or employees of the Federal Government engaged inside the State in the practice of architecture or landscape architecture for the Federal Government;

D. Any person in the regular employment of a public utility carrying out work incidental to the person's employment;

E. Any person who is qualified under the law to use the title "professional engineer," provided the person does only architectural or landscape architectural work as is incidental to the person's engineering work;

F. Any arborist, nursery owner, forester, horticulturist or general or landscape contractor acting within the scope of their profession or occupation;

G. Any person from making plans or drawings for the selection, use or placement of plants and improvements incidental to those plans and drawings;

H. Any vendor of landscaping or planting goods or materials from providing drawings or graphic diagrams necessary for the proper layout of those goods or materials;

I. The preparation of details and shop drawings, job-specific interpretations of technical submissions by architects or landscape architects, by persons other than landscape architects or architects, for use in connection with the execution of their work; and

J. Employees of those practicing lawfully as architects or landscape architects under this chapter from acting under the instructions, control or supervision of their employers.

2. Technical submissions; construction or development. Nothing in this chapter may be construed to prevent any person from preparing technical submissions for, or administering construction contracts in, the erection, construction or development of:

A. Single or 2-family dwellings, sheds, storage buildings and garages incidental to the dwellings;

B. Farm buildings, including barns, silos, sheds or housing for farm equipment and machinery, livestock, poultry or storage, if the structures are designed to be occupied by no more than 10 persons; and

C. Alterations, renovations or remodeling of a building when the alteration, renovation or remodeling does not affect structural or other safety features of the building and when the work contemplated by the design does not require the issuance of a permit under applicable building codes or when the work involves those structures as provided in paragraphs A and B.

Sec. 21. Transition clause. The following provisions apply to the transition required by this Act.

1. All liabilities and assets remain with the Maine State Board for Licensure of Architects and Landscape Architects and the Department of Professional and Financial Regulation.

2. All rules and procedures currently in effect and operations pertaining to any unit and that are in compliance with this Act remain in effect until rescinded or amended as provided by state law.

3. Members of the Maine State Board for Licensure of Architects and Landscape Architects who have been appointed to terms extending beyond the effective date of this Act continue to serve in their appointed terms of office under the Board for Licensure of Architects and Landscape Architects.

Emergency clause. In view of the emergency cited in the preamble, this Act takes effect when approved, except as otherwise indicated.

STATEMENT OF FACT

This bill clarifies the practice and the exemptions to the practice of architecture and landscape architecture in order to protect the health, safety and general welfare of the public.

The bill:

1. Defines the membership and the membership term of the Maine State Board for Licensure of Architects and Landscape

Architects, which remains unchanged except for some rewording and clarifies board membership requirements;

2. Clarifies the definition of the terms "architect" and "landscape architect." The inclusion of the term "technical submissions" is designed to describe all activities in the practice of architecture and landscape architecture that are subject to this bill. The applicant, for admission to the examination to practice architecture or landscape architecture, must satisfy the current qualifications;

3. Provides further clarity as to the requirements that corporations and partnerships must meet in order to practice architecture and landscape architecture. In addition, if licensure of an applicant, whether or not a corporation or partnership, by the Maine State Board for Licensure of Architects and Landscape Architects is pending or the applicant is not otherwise able to render architectural or landscape architectural services, the applicant may offer to render those services under limited circumstances. The present law regarding applicability of licensure to currently registered and unregistered landscape architects is retained;

4. Provides for uniform licensure and establishes a uniform licensure fee for both residents and nonresidents. Adjustments to renewal and reissuance fees are also provided;

5. Repeals the present requirements for issuance of certificates of registration without examination;

6. Provides the circumstances in which a license may be issued without examination. If a certification is issued by the National Council of Architectural Registration Boards, licensure by other jurisdictions, certification by the Council of Landscape Architectural Registration Boards and landscape architect licensure from other jurisdictions are acceptable;

7. Provides for the method of issuance of a license by the Maine State Board for Licensure of Architects and Landscape Architects;

8. Requires a licensee to obtain a seal and submit an impression to the Maine State Board for Licensure of Architects and Landscape Architects. All technical submissions prepared by a licensed architect or landscape architect or a person under the direct supervision of a licensed architect or landscape architect must be stamped with the seal. Any official with enforcement duties can not accept any technical submission unless it is stamped with a seal or certified as a specific exception as provided in the Maine Revised Statutes, Title 32, section 225. Building permits so issued are invalid; and

9. Provides exceptions for certain professions and certain employees, and for construction and development of certain structures.

John R. McKernan, Jr.
Governor

Susan M. Collins
Commissioner

Bruce G. Doyle
Administrator

Geraldine L. Betts
Coordinator

State of Maine
Department of Professional and Financial Regulation
Division of Licensing & Enforcement
MAINE STATE BOARD FOR LICENSURE OF ARCHITECTS AND LANDSCAPE ARCHITECTS
Tel: (207) 582-8723 Fax: (207) 582-5415

September 6, 1991

Bruce N. Young
Code Enforcement Officer
P.O. Box 566
Kennebunkport, Maine 04046

Dear Mr. Young:

The Governor has recently signed legislation containing significant revisions in the statute regulating the practice of architecture in Maine. Because some of the changes will significantly affect the responsibilities of Code Enforcement Officers and the permitting process, the Board for Licensure of Architects and Landscape Architects wants to alert you to these changes.

Some important definitional language and two new provisions were added to the section concerning the requirement for an architect's seal. First, in the section on forbidden practices, language relating to plans and specifications was replaced with the term "technical submissions". A technical submission is defined as "preliminary studies, plans, designs, drawings, specifications and contract documents, as well as other documents, prepared in the course of practicing architecture or landscape architecture". (32 M.R.S.A. § 220(1)). This change enlarges as well as specifies the scope of documents that must bear an architect's seal. It also makes clear that even preliminary plans submitted for approval require an architect's seal.

Second, a new statutory provision added to the section concerning the requirement of a seal speaks directly to the duties of a Code Enforcement Officer. This provision prohibits the acceptance or approval of any technical submission, as defined above, that is not appropriately sealed by a registered architect

licensed to practice in Maine. Not only is a Code Enforcement Officer prohibited from accepting or approving unsealed submissions, but any building permit issued with respect to non-conforming technical submissions is deemed to be invalid.

Lastly, the section concerning exceptions has been repealed and new exceptions have been enacted in its place. Generally, technical submissions prepared by anyone seeking acceptance or approval of that technical submission, must be stamped by a licensed architect, unless the person seeking acceptance or approval certifies that the submission falls within a specific exception. The exceptions pertinent to your work in code enforcement are as follows:

1. Single and two-family dwellings are exempt: Technical submissions concerning single and two-family dwellings and structures incidental to those dwellings are now exempt. Incidental structures include sheds, storage buildings, and garages. Previously, only single-family owner occupied dwellings were exempt. However, technical submissions concerning a unit in a complex of single and two-family dwellings located on a single lot, as is found in some types of planned unit developments, and a connected series single family residences located on a single lot, such as a condominium or a townhouse, do not fall within the exception and, therefore, do require an architect's seal prior to approval.

2. Farm buildings are exempt: Technical submissions concerning farm buildings and incidental structures to be occupied by no more than ten persons are exempt. Incidental farm structures include barns, silos, and sheds for storing farm equipment or livestock.

3. Alterations, renovations, or remodeling are exempt: Technical submissions concerning alterations, renovations, or remodeling of a building, are exempt, provided that the changes neither affect the structural or safety features of the building nor require a building permit. If a renovation project, for example, required a building permit or involved the life safety code or handicapped access, then appropriately sealed plans would

be required. This exception includes submissions relating to alterations, renovations, or remodeling of single and two-family dwellings and farm buildings.

It is important to remember that it is the responsibility of the party seeking approval of the technical submission to certify the applicability of any exemption claimed.

If you would like a copy of the revised statute, please contact Sandra Leach at 582-8723 and she will send you a copy. If you have questions regarding the applicability of the statute to a given situation, you may also want to contact Sandra Leach who will see that your inquiry is answered promptly by an appropriate individual from the Board or the Attorney General's office.

Thank you for your attention to and cooperation in this matter.

Sincerely,

Edward D. Leonard III
Member and Complaint Officer for
the Maine State Board for
Licensure of Architects and
Landscape Architects

EDL/sl

ATTACHMENT G

APPROVED APR 9 - 92 BY GOVERNOR | CHAPTER 874 PUBLIC LAW

STATE OF MAINE

IN THE YEAR OF OUR LORD
NINETEEN HUNDRED AND NINETY-TWO

S.P. 798 - L.D. 1997

An Act to Amend the Law Regarding the Responsibilities of Code Enforcement Officers to Approve Plans or Technical Submissions by Architects

Emergency preamble. Whereas, Acts of the Legislature do not become effective until 90 days after adjournment unless enacted as emergencies; and

Whereas, delay in implementing changes in the law will result in undue burden on the citizens of the State and municipal code enforcement officers; and

Whereas, delay in implementing changes in the law will result in unnecessary confusion by people who are attempting to comply with Maine law; and

Whereas, in the judgment of the Legislature, these facts create an emergency within the meaning of the Constitution of Maine and require the following legislation as immediately necessary for the preservation of the public peace, health and safety; now, therefore,

Be it enacted by the People of the State of Maine as follows:

Sec. 1. 32 MRSA §225, last ¶, as enacted by PL 1991, c. 396, §20, is repealed.

Sec. 2. 32 MRSA §226, sub-§1, ¶E, as repealed and replaced by PL 1991, c. 396, §21, is repealed and the following enacted in its place:

E. Any person who is qualified under section 1251 to use the title "professional engineer" from performing any

professional engineering service as authorized in section 1251. Such service includes, but is not limited to consultation, investigation, evaluation, planning, design and responsible supervision and administration of construction contracts in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects, and technical submissions, provided the person does only architectural or landscape architectural work that is incidental to the person's engineering work;

Sec. 3. 32 MRSA §226, sub-§2, ¶¶A to C, as repealed and replaced by PL 1991, c. 396, §21, are amended to read:

A. ~~Single~~ Detached single or 2-family dwellings, including those to be utilized for home occupations, as defined by local ordinances, and sheds, storage buildings and garages incidental to the dwellings;

B. Farm buildings, including barns, silos, sheds or housing for farm equipment and machinery, livestock, poultry or storage, if the structures are designed to be occupied by no more than 10 persons; ~~and~~

C. Alterations, renovations or remodeling of a building when the ~~alteration, renovation or remodeling does not affect structural or other safety features of the building and when the~~ cost of the work contemplated by the design does not exceed 15% of the assessed value of the building or $50,000, whichever is the lesser, or does not require the issuance of a permit under applicable building codes or when the work involves those structures as provided in paragraphs A ~~and~~, B~~,~~, F, G and H; and

Sec. 4. 32 MRSA §226, sub-§2, ¶¶F to H are enacted to read:

F. Buildings that do not have as their principal purpose human occupancy or habitation;

G. Single-story, above-grade buildings of less than 1,000 square feet that are designed to be occupied by no more than 10 persons; and

H. Preengineered manufactured buildings. For the purposes of this section, "preengineered manufactured building" means a structural unit, other than a dwelling, that is designed by a person licensed as an engineer in the State and is constructed in a manufacturing facility.

Emergency clause. In view of the emergency cited in the preamble, this Act takes effect when approved.

HAEL E. CARPENTER
ATTORNEY GENERAL

VENDEAN V. VAFIADES
CHIEF DEPUTY

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BRIAN MACMASTER
DIRECTOR, INVESTIGATIONS

TO: Richard A. Coleman, P.E., Chairman, Board of Registration for Professional Engineers

John Weinrich, Chairman, Board of Licensure for Architects and Landscape Architects

FROM: Lucinda E. White, Assistant Attorney General LEW
Sarah Roberts Walton, Assistant Attorney General SRW

DATE: November 22, 1991

At your request and as the Assistant Attorneys General assigned to represent the Architects and Engineers Boards, we have jointly prepared this legal memorandum to clarify recent changes in statutes governing the licensure of architects.

The recent revisions to the statute regulating the practice of architecture do not require an architect's seal on all technical submissions. The first inquiry under the revised statute is whether the practice of architecture is involved at all (i.e. whether the building's principal purpose is that of human occupancy or habitation and whether the technical submission involves either structural or aesthetic aspects of the building. 32 M.R.S.A. § 220(1)(A)). If the answer is no, no architect's seal is required. If the answer is yes, then the next inquiry is whether any exceptions apply. If they do, then again no architect's seal is required.

The revised law states that code enforcement officers (CEO) may not accept or approve any technical submission involving the practice of architecture unless (1) it is stamped by an architect; or (2) the applicant certifies on the submission to the applicability of a specific exception under section 226 permitting the preparation of the technical submission by a

person not licensed as an architect. 32 M.R.S.A. § 225. We attach copies of sections 225-226 of the law. So long as an applicant makes the certification now required under 32 M.R.S.A. § 225, the code enforcement officer may issue the building permit. Thus, for example, the technical submissions of a professional engineer may be accepted and approved so long as the engineer certifies on his or her submission that any architectural work in the submission is incidental to the engineering work. It is the engineer's responsibility to be accurate in this regard.

In short, if the purpose of the proposed building is other than for human occupancy or habitation or if the building is for human occupancy or habitation but the technical submission does not involve either structural or aesthetic aspects of the building, no architect seal is required. When the practice of architecture is involved but the applicant has made a certification in accordance with section 225, unless a CEO questions the accuracy of the applicant's certification as to the applicability of any one of the exceptions, no architect's seal is required. In such case the CEO may issue a permit if the submission is otherwise in order.

Enclosure

§225. Seal

Each licensee shall upon licensure obtain a seal of such design as the board authorizes and directs and shall submit an impression of the seal to the board. Technical submissions prepared by or under the direct supervision of a licensed architect or under the direct supervision of a licensed landscape architect must be stamped with the seal during the life of the licensee's license. It is unlawful for anyone to stamp or seal any documents with the seal after the license named on the seal has expired or has been revoked, unless the license has been renewed or reissued.

As used in this section, "direct supervision of a technical submission" means that the supervising licensee has personal knowledge of the technical submission and direct knowledge of involvement with and control over preparation of the technical submission, provided that persons consulting with or employed by the licensee who are licensed in this State under any other provision of law may provide direct supervision of portions of the technical submission. Those portions are determined to be under the direct supervision of the licensee if the licensee has reviewed those portions, coordinated their preparation and is responsible for their adequacy.

A public official charged with enforcement duties under Title 5, section 1742, subsection 7; Title 25, section 2448; and Title 30-A, section 3007, subsection 2 may not accept or approve any technical submission involving the practice of architecture unless the technical submission is stamped as required by this section or the applicant certifies on the submission to the applicability of a specific exception under section 226 permitting the preparation of the technical submission by a person not licensed under this chapter. A building permit issued with respect to a technical submission that does not conform with the requirements of this section is invalid.

§226. Exceptions

1. **Practices excepted.** Nothing in this chapter may be construed to affect or prevent the practice of:

A. Supervision by builders or superintendents employed by those builders of the installation of architectural or landscape architectural projects;

B. Marine or naval architects acting within the scope of their profession or occupation;

C. Officers or employees of the Federal Government engaged inside the State in the practice of architecture for the Federal Government;

D. Any person in the regular employment of a public utility carrying out work incidental to the person's employment;

E. Any person who is qualified under the law to use the title "professional engineer," provided the person does only architectural or landscape architectural work as is incidental to the person's engineering work;

F. Officers or employees of the Federal Government or State Government using the title "transportation landscape architect" in the practice of landscape architecture in connection with their governmental employment;

G. The preparation of details and shop drawings, job-specific interpretations of technical submissions by architects, by persons other than architects, for use in connection with the execution of their work; and

H. Employees of those practicing lawfully as architects under this chapter from acting under the instructions, control or supervision of their employers.

2. Technical submissions; construction or development. Nothing in this chapter may be construed to prevent any person from preparing technical submission for, or administering construction contracts in, the erection, construction or development of:

A. Single or 2-family dwellings, sheds, storage buildings and garages incidental to the dwellings;

B. Farm buildings, including barns, silos, sheds or housing for farm equipment and machinery, livestock, poultry or storage, if the structures are designed to be occupied by no more than 10 persons; and

C. Alterations, renovations or remodeling of a building when the alteration, renovation or remodeling does not affect structural or other safety features of the building and when the work contemplated by the design does not require the issuance of a permit under applicable building codes or when the work involves those structures as provided in paragraphs A and B.

SYNOPSIS:

Architects attempted to capitalize on a 1984 state court ruling that identified weaknesses in the state engineering law by aggressively seeking to restrict engineers' authority to provide building design services and to serve as the prime professional. Engineers responded by having legislation enacted that provided them specific authority in the building design field.

INTRODUCTION

A pattern by which architects restricted engineering practice in New Jersey is well documented. Architects had consistently charged engineers who designed any building "for human use" with the illegal practice of architecture and brought them before the New Jersey State Board of Architects. That board, which had authority to establish its own definition of practice through rulemaking (because the state statute governing architecture did not provide a definition of architectural practice), typically disregarded arguments from the accused engineers that the state's engineering licensing law permitted such practice (see Attachment A for the regulatory definition of the practice of architecture in effect at the time). Over the years, it is estimated that hundreds of engineers may have been forced to pay fines for the illegal practice of architecture. In the early 1980s, the issue reached a climax, and by 1984, the architectural licensing board had 76 cases alleging the illegal practice of architecture pending against engineers.

THE NORTH CASE

In 1984, the architectural licensing board brought suit against George North, a licensed professional engineer. North had designed a two-story duplex beach home to be built on pilings. North argued that because the home was on pilings, the architectural work associated with the design was only incidental to an engineering project, and as such, his design was legal. But the architectural licensing board accused North of engaging in the illegal practice of architecture and filed suit. The case, *New Jersey Board of Architects v. North*, was decided in favor of the architects (Attachment B).

But the court admitted that it had issued its ruling reluctantly and that it was sympathetic to the merits of North's argument. Unfortunately, the court continued, weaknesses in the state's engineering statute precluded it from ruling in the engineer's favor. The court did suggest, however, that the architectural and engineering licensing boards work with the attorney general's office to better define the practices of the two professions and also encouraged the legislature to review the statutes.

Although they had won a mixed victory at best, the architects attempted to turn the court decision to their advantage and extrapolate from it that they alone could serve as "prime professional" on most building design projects. The attorney general representative who had been assigned to the issue, seeking a speedy resolution, was all too ready to accede their wishes.

ENGINEERS RESPOND

Upon evaluation of the outcome and ramifications of the *North* decision, the New Jersey Society of Professional Engineers (NJSPE) concluded that a legislative solution was the only course of action remaining. Accordingly, NJSPE leaders made this matter their society priority and prepared to respond accordingly.

First, the society organized a large task force with several committees, each devoted to a different aspect of the upcoming legislative campaign. Those subcommittees were: fundraising; grassroots development, association and industry liaison; and legislative and lobbying (see Attachment C). Task force leaders met at least every month to strategize the course of action to pursue (during crucial periods, there were daily meetings).

A key plank in the society's planning was to raise funds to cover the additional expenses that would be incurred by the society. For example, NJSPE retained the services of a professional lobbying organization with connections to the governor to enhance its efforts. To fund these additional costs, NJSPE members were assessed a mandatory $25 fee in addition to their annual membership fee. In addition, members were asked to voluntarily contribute $80 to the society's political action committee. NJSPE prepared a detailed brochure to educate all of its members on the issue and to minimize adverse reaction to the special assessment (Attachment D). NJSPE's fundraising efforts netted the society an additional $160,000 ($100,000 in PAC contributions and $60,000 through the mandatory assessment). NJSPE lost only 26 members out of 2,500 as a result of the mandatory assessment.

By its fundraising effort, the society also hoped to acquire funds to make campaign contributions to key legislators as well as to the political parties. These contributions assisted the society later on in gaining access to key legislative players.

In addition to raising campaign contributions and employing its lobbying professionals, the society also organized a major grassroots campaign. As a result of this approach, engineers filled the galleries during relevant committee hearings and votes, letters flooded the statehouse, and engineers who had personal connections with key committee members were recruited for face-to-face meetings with them.

NJSPE's effort to enlist other organizations in the cause regrettably did not succeed. NJSPE was generally unsuccessful in building alliances, due to disinterest or fear among other potential coalition partners. Even some engineering firms were reluctant to join in because they feared alienating the architects who hired them for subconsulting work.

LEGISLATIVE EFFORT

NJSPE's legislative push commenced in 1986, with the introduction of a bill (A. 557) that would have substantially strengthened the state's definition of the practice of engineering by replacing the existing text (the weaknesses of which had forced the judge in the *North* case to rule in favor of the architects) with text largely consistent with the National Council of Examiners for Engineering and Surveying (NCEES) Model Law. NJSPE managed to get both chambers of the legislature to pass the bill, but it was "pocket vetoed" in 1987 by the governor, who had been advised that certain passages would conflict with laws already on the books. The governor did, however, instruct the attorney general to assist in drafting compromise legislation for the following session.

The outcome of the compromise, crafted by the attorney general, NJSPE, and the two licensing boards, was a package of three bills, an architecture bill (A. 5047), an engineering bill (A. 5048), and a building design services bill (A. 5049). The three bills contained the following:

- They provided a statutory definition of the practice of architecture -- a significant improvement for engineers because it eliminated the architectural licensing board's ability to constantly manipulate its regulatory definition to suit its own needs;

- They revised the definition of the practice of engineering to be more similar to the NCEES Model Law and to more clearly assert the authority of the engineer in building design;

- They established a joint architect-engineer committee of the two licensing boards to resolve interprofessional disputes; and,

- They established the right of either a qualified professional engineer or a qualified architect to serve as the prime professional.

(See Attachment E for complete summary of the three bills).

By this time, opposition from the state architectural society was intense compared with its level of activity on the 1986 bill. To get the package passed by the legislature and signed by the governor, the engineers did have to concede design authority for the architectural elements (exterior elevation and interior space utilization) of limited types of buildings solely to architects. This was embodied in statutory language that uses the building and structures classifications (use groups) of the BOCA code and indicates which projects by use group may be designed solely by an architect, solely by an engineer or by either profession. This position did not please all the engineers in the state. It did, however, make it possible to reach a compromise that preserved the engineers' authority to serve as prime professional on any building design projects. The package was signed into law in early 1990 (Attachments F-H).

Throughout its interaction with the legislature, NJSPE recognized the necessity of keeping the issue from being depicted as a turf battle between the two professions. If it did that, NJSPE reasoned, the legislature would be unlikely to take action on the issue. Engineers explained that the state's engineering licensing law restricted engineers to practice only in their areas of expertise and stressed that a typical architect's education did not include the in-depth knowledge of structures and HVAC, mechanical, and electrical systems taught in engineering schools. Engineers also made the point that a project owner might wish to hire a technical expert rather than an artist, and therefore the owner should have the right to choose the prime professional.

The New Jersey Society of Architects took a contrary approach, claiming to legislators that "prime professional" rights should be reserved for them because they were more adequately trained (their curricula required five years of college compared with four years for engineering) and they were required to meet continuing professional competency requirements, whereas engineers were not. They also presented misleading examples of buildings designed by engineers in other states and attempted to scare lawmakers with scenarios that featured chemical engineers building private homes.

Most legislators were willing to listen to the engineers once they learned of the disparity between the statutes governing the two professions; the practice of architecture, unlike the practice of engineering, was not defined by statute, but rather left to rulemaking authority of the architectural licensing board itself. Accordingly, engineers were able to persuade the legislature that the architectural licensing board had exceeded the intent of its authorizing legislation.

CONCLUSION

It took several years of lobbying, a strong commitment from the leadership of the New Jersey Society of Professional Engineers, and $160,000, but engineers in the state finally emerged with a set of laws guaranteeing them the right to serve as the prime design professional on any building design project and creating a joint committee to solve disputes between the two professions. The laws, passed in 1990, seem to have brought an end to decades of harassment that the engineering profession had faced from the architectural profession.

N.J.S.A. 45:3-1 et seq., and the professions of engineering and land surveying by the State Board of Professional Engineers and Land Surveyors, under the authority of N.J.S.A. 45:8-27 et seq. These statutory provisions, and regulations adopted by the respective boards pursuant to their statutory authority, define architecture and engineering as separate professions, albeit with limited areas of overlapping expertise, and establish fundamentally different qualifications for licensure for each profession.

While the terms "architect" and "practice of architecture" have not been defined by statute, the New Jersey State Board of Architects has established definitions of those terms by regulation pursuant to the statutory authority of N.J.S.A. 45:3-3. An "architect" is defined by the State Board of Architects with specific reference to the skills and knowledge required for the design of buildings:

> (a) An architect is an individual of good moral character, who after architectural education and after experience on architectural projects developed under the immediate supervision of a licensed architect, with both education and experience acceptable to the State Board of Architects, and who by examination has ~~satisfied the Board as to his~~ satisfied the Board as to his proved competence in:
>
> 1. Architectural administration including the application of codes and laws related to a building, a structure or a group or groups of these units and their environment;
>
> 2. The theory, history, practice and aesthetics and their application to architecture;

> 3. The analysis, planning, design, usage and the inspection of construction of buildings and structures, their component parts, related spaces both internal and external and their environment;
>
> 4. The site development, structural, sanitary, mechanical, electrical, and other components pertaining thereto;
>
> 5. The execution and administration of these disciplines, the related design professions, and other related skills; and
>
> 6. Is currently licensed and in good standing to practice architecture in this State.

N.J.A.C. 13:27-2.1.

The "practice of architecture" is defined by the State Board of Architects with similar emphasis upon the fundamental professional role of the architect in designing buildings:

> (a) The practice of architecture is defined as the professional activities of the registered architect. This includes analysis, calculations, research, graphic presentation, literary expression, and advice concerning and the preparation of necessary documents for the design and construction of buildings and their related environment, <u>with the primary purpose of providing space for human use</u> whether interior or exterior, permanent or temporary, including, but not limited to building and/or structures for social, political and economic service; . . . .

N.J.A.C. 13:27-2.2 (emphasis supplied).

The profession of architecture is further defined by the statutory requirements for licensure as an architect. Pursuant to N.J.S.A. 45:3-5, applicants for an architect's certificate must have completed a full course in architecture, and also have acquired experience in the office of a reputable architect in private practice or in public employ. An applicant must

definition of "the practice of engineering" and engineering project." Money raised will also be used for direct costs such as mailing, printing costs, etc.

Historical Background

Over the years overlapping areas of engineering and architecture in building design have been disputed. Throughout most states, attempts were made to abrogate the engineer's right to design buildings by charging them in court with the illegal practice of architecture. Typically engineers were found legally authorized to design buildings. However, this has not been true in New Jersey due to our somewhat ambiguous statutory definition of our profession. When our statutes were originally enacted, the definition of "engineering" and an "engineering project" was left intentionally vague to allow for the overlapping practice between the two professions. It is this vagueness within our licensing law that is being exploited by other professions.

New Jersey case law in this matter dates back to the Gionti vs. Crown Motor Freight Co., 128 N.J.L. 407, Errors & Appeals, 1942, decision. In this case, Mr. Gionti, a Professional Engineer, who held himself out as an architect and provider of architectural services, was correctly denied recovery of fees for design services. The issue decided here was that it is illegal for an engineer to classify himself as an architect, and not whether an engineer has the legal right to design any building under an engineering design contract, and not whether architects have the exclusive right to design buildings. Nevertheless this Gionti decision has been used to support their view that only architects are legally permitted to design buildings.

Of more recent note in New Jersey is the McCamy case. During the late 1950's, Mr. McCamy, a Professional Engineer, was charged with illegally practicing architecture by designing a residence and a country club. A special joint investigatory board was appointed composed of two architects, two engineers and the Attorney General of New Jersey. The board's decision was to be subject to review by the Appellate Division of the Superior Court of New Jersey. After lengthy hearings the case was discontinued by the Attorney General as against the public interest.During the early 1970's challenges to the Engineering Profession subsided following the McCamy Case and strong benchmark decisions in favor of the engineer's right to design buildings such as Verich vs. Florida State Board of Architects, 239 S. 2d 29 (1970) and Alabama State Board of Registration of Architects vs. Jones, 267 So. 2d 427 (1972).Having now lost the recourse against the Engineering Profession in the court system, the New Jersey Administrative Code was changed to redefine the practice of architecture; viz. "The practice of architecture is defined ... (as the) design and construction of buildings ... with the primary purpose of providing space for human use ..." (emphasis supplied). When this definition was published it was purported to have the effect of changing the law as it applied to the Engineering Profession. With this new regulation actions were taken against engineers by charging that engineers who design buildings "for human use" were illegally practicing architecture.

During 1984 court action 197 NJ Super. 349;484 A.2d 1297, was brought against Mr. North, a Professional Engineer, for the illegal practice of architecture when he designed foundations and sealed plans for a residence. Mr. North lost the case not because he was practicing architecture but because our

licensing statute is vague as to the definition of an "engineering project." Judge Miller (1) urged that "such a change (i.e. the addition to our statute of a clear definition of an "engineering project") should be made at the .. Legislative level ..." and (2) clearly indicated that preceding case law (i.e. Gionti) was incorrectly drawn but that he could not alter it because it was decided at a higher court level. In addition, Judge Miller addressed the differences between architect and engineer; viz. "Moreover, this court is persuaded that since the controlling differences between architect and engineer seems to be aesthetics and space utilization, such differences appear to be more apparent than real" (emphasis supplied).

SYNOPSIS:

Architects challenged engineers' authority to provide building design services, following passage of an architectural practice act in 1989. As part of their efforts, architects threatened to sue school boards that selected engineers to design facilities, sought an attorney general's opinion that recognized the architectural profession's position and drafted a misleading handbook to code enforcement officials. However, the architectural profession was successfully challenged each time by the facts of the state's engineering and architectural licensing laws and by the vigilance of the state PE society. To resolve differences between the two professions, the engineering and architectural licensing boards jointly established a procedure for handling interprofessional disputes.

INTRODUCTION

Prior to the elevation of the Texas statute governing architecture from a title act to a practice act in 1989, the authority of professional engineers to design buildings had gone unchallenged. Even after the upgrade, engineers were confident that there would be no interference in their authority to practice, as the engineering practice act spoke clearly on behalf of their authority to design buildings. In fact, the enactment of the Texas engineering law in 1937 was a direct response to a building design failure. The legislature rushed to adopt the engineering statute within 60 days of an explosion at a public school in New London, Texas, that had killed nearly 300 children. The explosion was caused by the defective installation and inspection of a gas regulator.

Providing an additional assurance to engineers, the architectural statute included a specific paragraph exempting professional engineers from the provisions of the act. The exemption was inserted as a result of successful lobbying by the Texas Society of Professional Engineers (TSPE) when the 1989 architectural practice act was under consideration by the state legislatures. In addition, the TSPE executive director was assured many times that the architectural practice act would have no effect on the engineering profession. The exemption was further clarified in 1991 revisions and currently reads as follows: "Nothing in [the architectural practice act] or any such rule or regulation, heretofore or hereafter adopted, shall be construed or given effect in any manner whatsoever so as to prevent, limit, or restrict any professional engineer licensed under the laws of this state from performing any act, service or work within the definition of the practice of professional engineering as defined by the Texas Engineering Practice Act." TSPE also succeeded in having language included permitting building owners to select either a licensed architect or engineer as the prime professional on building projects (Attachments A,B,C).

FIRST CHALLENGE

Despite the clarity of the statutes, architects quickly used the authority of the new practice act to challenge engineers' right to provide building design services. Architects across the state falsely asserted to municipal government officials, especially school districts, that their practice act required certain building designs to have an architect's seal. The Texas Association of School Boards and school districts throughout the state were told that if they hired a professional engineer as the prime professional, the architects would file suit.

The most notable of these challenges occurred in 1990 in Laredo, when its United Independent School Board selected Zuniga Engineering Co. to lead the construction of a $3 million elementary school building. The Texas Society of Architects (TSA) levied a special assessment of $15 on each of its members to finance possible litigation against the school board and Zuniga. Despite the architects' threats, Zuniga constructed the school. While the threatened lawsuit

never materialized, the episode nevertheless communicated to engineers the lengths to which architects were willing to go to assert an exclusive domain over building design.

FIRST JOINT BOARD AGREEMENT

In an effort to diffuse the tension, the executive directors of the Texas State Board of Registration for Professional Engineers and the Texas Board of Architectural Examiners issued a joint policy statement directed to public officials (Attachment D). This policy statement was drafted and signed by the chairs and two members of each board. Most importantly, the February 1991 statement declared that "both Boards [recognize] that clients, both public and private, have the option to choose a member of either profession as the prime professional on their building projects." Unfortunately, the joint statement did little to prevent architects from continuing their campaign to curb engineers' design authority. Having failed to convince school officials that the architecture act prohibited putting engineers in charge of their projects, the architects turned to the state's attorney general to back their claim.

ATTORNEY GENERAL OPINION

The architectural licensing board asked the attorney general to issue an opinion on whether engineers had the authority to seal certain building design plans under the Architect Practice Act. The board had hoped to establish that under their practice act, only licensed architects were authorized to design public buildings used for education, assembly, or office occupancy, and which cost more than $100,000.

The attorney general's conclusion was a victory for engineers. His August 1992 opinion stated that the practices of architecture and engineering overlap and that the Texas Engineering Practice Act also permits building design (Attachment E). The opinion explained that a 1965 amendment to the Texas Engineering Practice Act that had deleted the word "buildings" from the definition of the "practice of engineering" was intended to broaden that definition to prevent unqualified persons from practicing engineering and "not to omit engineering services already covered by the act." The opinion also asserted that the engineering statute permits clients the freedom to select either a licensed professional engineer or a licensed architect to serve as the prime design professional.

Engineers viewed the opinion as a vindication of their long-standing position and an opportunity to clarify in public officials' minds the authority of the two professions. TSPE and the Consulting Engineers Council of Texas jointly distributed copies of the opinion to city and county attorneys and to school boards in an educational effort. The Texas Society of Architects, on the other hand, was disappointed with the opinion and encouraged its members to contact the attorney general and urge him to reverse it.

HANDBOOK FOR CODE ENFORCEMENT OFFICIALS

The next round occurred six months later, when the architectural licensing board prepared a "Reference Handbook for Building Officials and Design Professionals" (Attachment F). The state handbook was similar to a national version prepared by the National Council of Architectural Registration Boards (NCARB). The national version was the subject of dispute between national engineering and architectural associations. TSPE caught wind of the handbook shortly before it became final, and through vocal protest to the engineering and architectural licensing boards, succeeded in preventing its distribution. The handbook was billed by the architectural licensing board to be a joint publication of both boards when neither the engineering licensing board nor TSPE had been contacted. TSPE's executive director pronounced the handbook "full of misleading information that

gives exclusive rights to architects over engineers in the design of buildings for assembly, educational, institutional, business, factory, hazardous, mercantile, or storage purposes." TSPE also criticized the handbook for distorting the depiction of engineers to the point that "when one reads the description given [engineers and architects], it is obvious who would be hired" to serve as the prime design professional. TSPE also enlisted the support of the state municipal league in alerting its members that any copies of the handbook they may have received were inconsistent with the attorney general's opinion.

SECOND JOINT BOARD AGREEMENT

The handbook fiasco, as well as lingering challenges to the attorney general's opinion from the state architectural society, demonstrated to both professions that little progress had been made on bridging differences between the two groups.

In addition, pressure from other politically powerful groups, including the Texas Association of Counties, Texas Municipal League, Texas Association of School Boards, Texas Association of Business, and private companies such as Phillips Petroleum Co., encouraged the architects to come to the negotiating table. TSPE actively recruited these owners and clients to support its position, characterizing the dispute not as a turf battle, but rather as an effort to ensure that consumers would retain the right to choose either an engineer or an architect.

Engineering and architectural board leaders met in August 1993 with a mediator appointed by the attorney general. Each side had previously visited individually with the mediator and had participated in a year-long review of the issue. As a result of these negotiations, both boards unanimously adopted an agreement that reaffirmed the attorney general's 1992 ruling, and the policy statement adopted by the two boards in 1991, and established a procedure to resolve disputes concerning interprofessional practice (Attachment G). The accord established a joint committee composed of one member and former member of each board, appointed by the chairmen of the respective boards; the executive director of each board; and one member each from TSPE and TSA, appointed by the president of each society.

Also as part of the agreement, the architectural licensing board agreed to drop its motion for the attorney general to reconsider his August 1992 decision. A joint letter reporting the outcome of the mediation was sent to state, county, and municipal governments to erase any confusion that still existed. In addition, the two boards agreed to hold annual joint meetings, beginning in 1994.

CONCLUSION

Engineers in the state are hopeful the 1993 joint agreement will put to rest the engineer-architect conflict in Texas. But given the past pattern of persistence demonstrated by the architectural profession, some engineers remain skeptical that peace will last.

(c) Not later than the 30th day after the date on which a registration examination is administered under this Act, the Board shall notify each examinee of the results of the examination. However, if an examination is graded or reviewed by a national testing service, the Board shall notify each examinee of the results of the examination not later than the 30th day after the date on which the Board receives the results from the testing service. If the notice of examination results graded or reviewed by a national testing service will be delayed for longer that 90 days after the examination date, the Board shall notify each examinee of the reason for the delay before the 90th day.

(d) If requested in writing by a person who fails a registration examination administered under this Act, the Board shall furnish the person with an analysis of the person's performance on the examination.

Section 7. QUALIFICATIONS OF APPLICANTS FOR REGISTRATION.

(a) An applicant for examination for registration as an architect in this State shall present a diploma from and be a graduate of a recognized university or college of architecture approved by the Board and shall also present evidence acceptable to the Board of such applicant's having had satisfactory experience in architecture, in the office or offices of one or more legally practicing architects, as prescribed in the rules and regulations adopted by the Board.

(b) Repealed.

(c) The Board shall also accept for examination, an applicant, although not a graduate as above required, who possesses all of the other qualifications and furnishes evidence acceptable to the Board of his or her having completed not less than eight years' satisfactory experience in architecture in the office or offices of one or more legally practicing architects, or any combination of architectural schooling and experience acceptable to the Board totaling eight years.

Section 8. LICENSEES FROM OTHER STATES OR COUNTRIES; FEES.

(a) The Texas Board of Architectural Examiners may waive any registration requirement for an applicant with a valid license or certificate of registration from another state having licensing or registration requirements substantially equivalent to those of this State. An applicant for a certificate under this section shall make application in the same manner and form as any other applicant; and such applicant shall furnish the Board such documents and other evidence concerning his application and qualifications as will substantiate his qualifications.

(b) All applications under this Section shall be accompanied by a fee of $150 payable to the Texas Board of Architectural Examiners for the processing and investigating of the application so filed and for the issuance of the certificate herein provided for. The provisions of this Section shall apply only where the laws, legal requirements and regulations of such other jurisdiction extend like or similar privileges to practice architecture in such other jurisdiction to registered architects of this State.

Section 9. SEAL; RESTRICTED USE; PENALTY.

Every registered architect shall obtain and keep a seal, such as is authorized, prescribed, and approved by the Texas Board of Architectural Examiners, with which he or she shall stamp or impress all drawings or specifications issued from his or her office for use in this State. The design of the seal shall be the same as that to be used by the Texas Board of Architectural Examiners, except that it shall bear the words "Registered Architect, State of Texas" instead of "Texas Board of Architectural Examiners." No person, firm, partnership, corporation or any other group or combination of persons shall use or attempt to use such prescribed seal, or any similar seal, or replica thereof unless the use is by and through an architect duly registered under the provisions of this Act. No architect duly registered under this Act shall authorize or permit the use of his seal by an unregistered person, firm, corporation, partnership or any other group or combination of persons without his personal supervision, and a violation hereof shall be grounds for cancellation of the registration certificate of any such offending architect.

Section 10. PRACTICE OF ARCHITECTURE DEFINED; EXCEPTIONS.

(a) "Practice of Architecture" shall mean any service or creative work, either public or private, applying the art and science of developing design concepts, planning for functional relationships and intended uses, and establishing the form, appearance, aesthetics, and construction details, for any building or buildings, or environs, to be constructed, enlarged or altered, the proper application of which requires architectural education, training and experience. "Practice architecture" or "practicing architecture" shall mean performing or doing, or offering or attempting to do or perform any service, work, act or thing within the scope of the practice of architecture.

(b) Notwithstanding any other provision of this Act or any rule or regulation of the Board of Architectural Examiners, it is the intent of this Act to acknowledge the necessity of professional inter-relations and cooperation between the professions for the benefit of the public and to achieve the highest standards in design, planning, and building. Therefore, nothing in this Act or any such rule or regulation, heretofore or hereafter adopted, shall be construed

(c) Not later than the 30th day after the date on which a registration examination is administered under this Act, the Board shall notify each examinee of the results of the examination. However, if an examination is graded or reviewed by a national testing service, the Board shall notify each examinee of the results of the examination not later than the 30th day after the date on which the Board receives the results from the testing service. If the notice of examination results graded or reviewed by a national testing service will be delayed for longer that 90 days after the examination date, the Board shall notify each examinee of the reason for the delay before the 90th day.

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(b) Notwithstanding any other provision of this Act or any rule or regulation of the Board of Architectural Examiners, it is the intent of this Act to acknowledge the necessity of professional inter-relations and cooperation between the professions for the benefit of the public and to achieve the highest standards in design, planning, and building. Therefore, nothing in this Act or any such rule or regulation, heretofore or hereafter adopted, shall be construed

or given effect in any manner whatsoever so as to prevent, limit or restrict any professional engineer licensed under the laws of this State from performing any act, service or work within the definition of the practice of professional engineering as defined by the Texas Engineering Practice Act.

(c) Nothing in this Act shall be construed as curtailing draftsmen, clerks of the works, superintendents and other employees of registered architects or engineers, under provisions of this Act from acting under the instructions, control or supervision of such architect or engineer employers.

(d) Nothing in this Act may be construed as curtailing any regular full time employee of a privately owned public utility or cooperative utility and/or affiliates who is engaged solely and exclusively in performing services for such utility and/or its affiliates. This exemption includes the use of job titles and personnel classifications by such persons not in connection with any offer of architectural services to the public, providing that no name, title, or words are used which tend to convey the impression that an unlicensed person is offering architectural services to the public.

(e) Nothing in this Act shall be construed to prohibit the use of the title "Landscape Architect" by qualified persons or to limit the practice of landscape architecture.

(f) Nothing in this Act shall be construed to prohibit the use of the title "Interior Designer" or "Interior Decorator" by qualified persons or to limit the practice of interior designing or interior decorating.

(g) Nothing in this Act shall prevent registered professional engineers licensed under the laws of this State from planning and supervising work, such as railroad, hydroelectric work, industrial plants, or other construction primarily intended for engineering use or structures incidental thereto, nor prevent said engineers from planning, designing, or supervising the mechanical, electrical, or structural features of any building.

(h) A firm, partnership, association or corporation, including firms, partnerships, corporations and joint stock associations carrying on the practice of engineering under Section 17 of the Texas Engineering Practice Act, may engage in the practice of architecture and may hold itself out to the public as offering architectural services, provided that the actual practice of architecture on behalf of such firms, partnerships or corporations is carried on, conducted and performed only by architects registered in this State.

(i) No firm, partnership, association, or corporation may engage in the practice of architecture, or hold itself out to the public as being engaged in the practice of architecture or use the word "architect" or "architecture" in its name in any manner unless all architectural services are rendered by and through persons to whom registration certificates have been duly issued, and which certificates are in full force and effect.

(j) Nothing in this Act shall be construed to prohibit a registered professional engineer who has an architectural engineering degree from a public or private college or university from using the title "architectural engineer."

Section 11. REVOCATION OR CANCELLATION OF CERTIFICATE.

(a) Registration certificates of architects issued in accordance with this Act shall remain in full force and effect until expiration date unless revoked or suspended for cause as herein provided.

(b) The Board may revoke or suspend a registration certificate, place on probation a person whose registration certificate has been suspended, reprimand a person registered under this Act, or assess an administrative penalty against a person registered under this Act in an amount not to exceed $1,000 on the following grounds:

(1) a violation of this Act or of a rule of the Board adopted under this Act;

(2) a cause for which the Board is authorized to refuse to grant a registration certificate;

(3) gross incompetency;

(4) recklessness in the construction or alteration of a building by an architect designing, planning, or observing the construction or alteration; or

(5) dishonest practice by one holding a registration certificate.

(c) If a registration suspension is probated, the Board may require a person holding a registration certificate:

(1) to report regularly to the Board on matters that are the basis of the probation;

(2) to limit the person's practice to areas prescribed by the Board; or

(3) to continue or renew professional education until the person attains a degree of skill satisfactory to the Board in those areas that are the basis of the probation.

(d) If the Board proposes to suspend or revoke a person's registration, the person is entitled to a hearing before the Board or a hearings officer appointed by the Board. The Board shall prescribe procedures by which all decisions to suspend or revoke are made by or are appealable to the Board.

(e) If, after investigation of the facts surrounding an allegation of a ground for a sanction provided by this section, the executive director determines that a ground exists for a

use as an institutional residential facility, regardless of the number of stories or square footage of the building, shall be prepared by a person who is registered in accordance with this Act. An institutional residential facility shall mean any building intended for occupancy of persons on a twenty-four-hour (24-hour) basis who are receiving custodial care from the proprietors or operators of the building.

Section 16. PUBLIC WORK.

(a) To protect the public health, safety, and welfare of the citizens of the State of Texas, an architect registered in accordance with this Act must prepare the architectural plans and specifications for:

(1) a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000; or

(2) any alteration or addition to an existing building that is owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building is used or will be used for education, assembly, or office occupancy, the construction costs of the alteration or addition exceed $50,000, and the alteration or addition requires the removal, relocation, or addition of any walls or partitions or the alteration or addition of an exit.

(b) This section does not prohibit an owner of a building from choosing a registered architect or a registered professional engineer as the prime design professional for a building construction, alteration, or addition project.

(c) This section does not prevent, limit, or restrict a registered professional engineer from performing any act, performance, or work that is the practice of engineering as defined by the Texas Engineering Practice Act (Article 3271a, Vernon's Texas Civil Statutes).

Section 17. ENFORCEMENT.

(a) This Act applies to all architecture practiced in this State that is not exempted by this Act. A public official of this State or of a political subdivision of this State who is charged with the enforcement of laws, ordinances, codes, or regulations that affect the practice of architecture may only accept architectural plans, specifications, and other related documents prepared by registered architects, as evidenced by the seal of the architect, unless exempted by this Act.

(b) This Act shall not be construed to preempt the provisions of any ordinance adopted by a municipality of this State or to restrict or expand the powers of any municipality of this State.

(c) Violations of this Act shall be reported to the Board.

Acts 1937, 45th Leg., p. 1279, ch. 478; Acts 1941, 47th Leg., p. 478, ch. 301, § 1; Acts 1943, 48th Leg., p. 254, ch. 155 § 1; Acts 1951, 52nd Leg., p. 413, ch. 259, § 1; Acts 1951, 52nd Leg., p. 835, ch. 473, §§ 2-11; Acts 1955, 54th Leg., p. 1303, ch. 515, § 1; Acts 1969, 61st Leg., R.S., H.B. 516; Acts 1973, 63rd Leg., R.S.H.B. 1204; Acts 1975, 64th Leg., R.S., H.B. 1098; Acts 1979, 66th Leg., R.S., S.B. 551; Acts 1983, 68th Leg., R.S., H.B. 64, S.B. 288; Acts 1985, 69th Leg., R.S., S.B. 273; Acts 1989, 71st Leg., R.S., S.B. 743; Acts 1991, 72nd Leg., R.S., S.B. 429, S.S.H.B. 11.

SENATE BILL No. 429, which was passed in 1991 during the 72nd Regular Session of the Legislature, provides the following in Sections 7 and 8 of the Bill:

Section 7.

(a) The changes in law made by this Act in the qualifications of a person appointed to the Texas Board of Architectural Examiners apply only to a member appointed on or after September 1, 1991.

(b) The first policy statement required to be filed under Subsection (b), Section 5A, Chapter 478, Acts of the 45th Legislature, Regular Session, 1937 (Article 249a, Vernon's Texas Civil Statutes), as added by this Act, must be filed before November 1, 1991.

(c) The name of the fund established by Subsection (a), Section 4, Chapter 478, Acts of the 45th Legislature, Regular Session, 1937 (Article 249a, Vernon's Texas Civil Statutes), as that law existed on August 31, 1991, known as the Architects Registration Fund, is changed to the Architectural Examiners Fund.

(d) The money on deposit to the credit of the fund established by Section 10, Chapter 457, Acts of the 61st Legislature, Regular Session, 1969 (Article 249c, Vernon's Texas Civil Statutes), as that law existed on August 31, 1991, is transferred to the credit of the Architectural Examiners Fund, to be used for any purpose authorized by law for that fund.

(e) To achieve the membership scheme prescribed by Section 2, Chapter 478, Acts of the 45th Legislature, Regular Session, 1937 (Article 249a, Vernon's Texas Civil Statutes), as amended by this Act, the Governor shall appoint an interior designer to fill the position first vacated by a member who is a landscape architect or public member, whichever vacancy occurs earlier. If the position is vacated by a landscape architect or public member before that member's term expires, the Governor shall appoint an interior designer to the membership position for the remainder of the term. If the Governor appoints an interior designer to a membership position previously held by a public member, the Governor

TEXAS BOARD OF
ARCHITECTURAL EXAMINERS

TEXAS STATE BOARD OF REGISTRATION
FOR PROFESSIONAL ENGINEERS

February 15, 1991

Dear Public Officials:

In order to clarify and define the relationships between the practices of engineering and architecture, the two Boards which regulate these respective professions have officially adopted the following Joint Policy Statement:

"The Texas Board of Registration for Professional Engineers and the Texas Board of Architectural Examiners were both created by the Legislature to protect the health, safety and welfare of the public.

"Questions have arisen which indicate there is a need to define the relationship between the practices of engineering and architecture.

"It is the policy of both Boards that clients, both public and private, have the option to choose a member of either profession as the prime professional on their building projects.

"The professionals in each profession are enjoined by their respective practice acts to practice only in the area of their expertise and if the particular project requires the services of another professional, that professional's services shall be obtained.

"It is, therefore, the sole responsibility of both professional engineers and professional architects to obtain whatever additional professional services they need for the project at hand.

"It shall be the responsibility of each respective Board, to regulate the practice of engineering and architecture in Texas to protect the health, safety and welfare of the public. If either Board determines that a member of the profession other than the one they regulate is practicing outside the area of his or her expertise, the Board shall immediately notify the Board regulating the offending member and supply information to support their allegation. Each Board has the responsibility to pursue any appropriate action to cause an unqualified person to cease and desist from practicing in violation of its respective statute. If either Board determines that one of its registered professionals is practicing outside the area of his or her expertise, it shall be the duty of that Board to appropriately discipline the offender."

If you have any questions concerning this Statement, please contact either board for assistance.

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Texas Board of Architectural Examiners
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Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

August 27, 1992

Mr. Robert H. Norris
Executive Director
Texas Board of Architectural Examiners
8213 Shoal Creek Blvd., Suite 107
Austin, Texas 78758-7589

Opinion No. DM-161

Re: Construction of section 16 of article 249a, V.T.C.S., the act regulating the practice of architecture (RQ-186)

Dear Mr. Norris:

You ask whether section 16 of article 249a, V.T.C.S., which regulates the practice of architecture, prohibits an individual, other than one licensed as an architect, from preparing the plans and specifications for the public buildings described by that section. Section 16 was adopted in 1989 and amended in 1991. *See* Acts 1989, 71st Leg., ch. 858, § 8, at 3836; Acts 1991, 72d Leg., ch. 579, § 2. When first adopted, section 16 read as follows:

> To protect the public health, safety, and welfare of the citizens of the State of Texas, an architect registered in accordance with this Act must prepare the architectural plans and specifications for a new building intended for education, assembly, or office occupancy whose construction costs exceed One Hundred Thousand Dollars ($100,000.00) which is to be constructed by a State agency, a political subdivision of this State, or any other public entity in this State.

In 1991 the Texas Board of Architectural Examiners (the "board") was reestablished after going through sunset review.[1] *See generally* Acts 1991, 72d Leg., ch. 579. Section 16 was revised to provide as follows:

> (a) To protect the public health, safety, and welfare of the citizens of the State of Texas, an architect registered in

[1]The Sunset Advisory Committee, established by chapter 325 of the Government Code, reviews the state agencies scheduled for abolition in each legislative session and makes recommendations on the abolition or continuation of the agency. Gov't Code § 325.012.

accordance with this Act must prepare the architectural plans and specifications for:

(1) a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000; or

(2) any alteration or addition to an existing building that is owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building is used or will be used for education, assembly, or office occupancy, the construction costs of the alteration or addition exceed $50,000, and the alteration or addition requires the removal, relocation, or addition of any walls or partitions or the alteration or addition of an exit.

(b) This section does not prohibit an owner of a building from choosing a registered architect or a registered professional engineer as the prime design professional for a building construction, alteration, or addition project.

(c) This section does not prevent, limit, or restrict a registered professional engineer from performing any act, performance, or work that is the practice of engineering as defined by The Texas Engineering Practice Act (Article 3271a, Vernon's Texas Civil Statutes).

V.T.C.S. art. 249a, § 16.[2]

Article 249a, V.T.C.S., defines the "practice of architecture" as follows:

"Practice of Architecture" shall mean any service or creative work, either public or private, applying the art and science of developing design concepts, planning for functional relationships and intended uses, and establishing the form, appearance,

[2]We address both the 1989 and 1991 versions of article 249a, V.T.C.S., because the legislative history of the 1989 amendment is relevant to your question. Citations in the text to article 249a, V.T.C.S., will refer to the 1991 version of this statute unless otherwise specified.

> aesthetics, and construction details, for any building or buildings, or environs, to be constructed . . . the proper application of which requires architectural education, training and experience.

V.T.C.S. art. 249a, § 10(a).

Briefs submitted in connection with this request argue that professional engineers registered pursuant to the Texas Engineering Practice Act, V.T.C.S. art. 3271a, are authorized to design buildings under their licensing statute and need not be licensed as architects to do so. Cases from other states have determined that the professions of architect and engineer overlap in the area of designing buildings, so that some building designs may be prepared by a person with either license. *See Smith v. American Packing & Provision Co.*, 130 P.2d 951 (Utah 1942); *see also* Annot., 82 A.L.R.2d 1013, 1026 (1962) (architectural and engineering services within license requirements). Section 10(b) of article 249a, V.T.C.S., suggests that the professions of architect and engineer overlap in Texas as well. This provision states in part:

> [I]t is the intent of this Act to acknowledge the necessity of professional inter-relations and cooperation between the professions for the benefit of the public and to achieve the highest standards in design, planning, and building. Therefore, nothing in this Act . . . shall . . . prevent, limit or restrict any professional engineer licensed under the laws of this State from performing any act, service or work within the definition of the practice of professional engineering as defined by the Texas Engineering Practice Act.

V.T.C.S. art. 249a, § 10(b) (footnote deleted).

An examination of the Texas Engineering Practice Act shows that the practice of engineering includes building design. The State Board of Registration for Professional Engineers licenses persons to engage in the practice of engineering, defined as follows:

> "Practice of engineering," or "practice of professional engineering" shall mean any service or creative work, either public or private, the performance of which requires engineering education, training and experience in the application of special

> knowledge of the mathematical, physical, or engineering sciences to such services or creative work.

V.C.T.S. art. 3271a, § 2(4). A rule promulgated by the Board of Registration for Professional Engineers (BRPE) defines professional engineering as follows:

> Professional engineering-Professional service which may include . . . *planning, designing, or direct supervision of construction, in connection with any public or private utilities, structures, buildings*, . . . when such professional service requires the application of engineering principles and the interpretation of engineering data.

22 T.A.C. § 131.18 (emphasis added). When the Texas Engineering Practice Act was first adopted in 1937, it defined the practice of professional engineering as "any professional service, such as consultation, investigation, evaluation, planning, *designing*, or responsible supervision of construction in connection with any public or private utilities, structures, *buildings*, . . . when such professional service requires the application of engineering principles and interpretation of engineering data." Acts 1937, 44th Leg, ch. 404, § 2 (emphases added). Like the BRPE's rule quoted above, the definition expressly included building design. In 1965 the definition of the "practice of professional engineering" was amended to read as it does today. Acts 1965, 59th Leg., ch. 85, at 209. The amending legislation was adopted to prevent unqualified persons from practicing engineering. *Id.* § 10 (emergency clause). The definition of the "practice of professional engineering" was amended to broaden the coverage of the Engineering Practice Act, and not to omit engineering services already covered by the act.

Section 19(a) of article 3271a, V.T.C.S., makes it unlawful for the state or any of its political subdivisions to engage in the construction of certain public works "unless the engineering plans and specifications and estimates have been prepared by . . . a registered professional engineer." Section 20 exempts certain persons from the registration provisions of the statute, provided that they are not represented as being legally qualified to engage in the practice of engineering. Among other persons, section 20 exempts the following:

> A person, firm, partnership, joint stock association or private corporation . . . *drawing plans and specifications for*: (1) any private dwelling, or apartments not exceeding eight units per building for one story buildings, or apartments not exceeding

> four units per building and having a maximum height of two stories, or garages or other structures pertinent to such buildings; or (2) private buildings which are to be used exclusively for farm, ranch or agricultural purposes ... or (3) other buildings, except public buildings included under Section 19 of this Act, having no more than one story ... [further describing building]; provided that no representation is made or implied that engineering services have been or will be offered to the public.

V.T.C.S. art. 3271a, § 20(f) (emphasis added); *see also* V.T.C.S. art. 249a, § 14 (similar exemption for licensing requirement for architects).

Thus, there is an exemption for persons who draw plans and specifications for the described buildings. Since these persons would be engaging in the practice of engineering if they did not have the benefit of this exception, the legislature understood that the drawing of plans and specifications for buildings ordinarily constituted the practice of engineering. The practice of engineering includes preparing building plans and designs when that service requires the application of engineering principles and the interpretation of engineering data.

A report prepared to assist the sunset review process reviewed the authority of the Board of Architectural Examiners, and in doing so, recognized that licensed engineers were authorized to prepare building designs under the engineer's licensing statute. TEXAS SUNSET ADVISORY COMMISSION, TEXAS BOARD OF ARCHITECTURAL EXAMINERS, STAFF REPORT TO SUNSET ADVISORY COMMISSION (1991). Until article 249a, V.T.C.S., was amended in 1989, the Board of Architectural Examiners enforced a "title act," which restricted the use of the title of architect and the ability to offer services entitled architectural services to individuals who had been registered by the board.[3] *Id.* at 1; *see also* House Comm. on Bus. and

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[3]A "title act" requires individuals who use an occupational or professional title to register with the appropriate licensing agency and become subject to its regulation. It does not authorize the agency to regulate persons who do the work of the occupation or profession without using the title. For example, when article 249a, V.T.C.S., was adopted in 1937, it exempted persons and firms that prepared plans and specifications for a building, as long as they did not represent themselves to be architects. Acts 1937, 45th Leg., ch. 478, § 16(3), at 1279.

A "practice statute," in contrast, authorizes a state agency to regulate the practice of a profession or occupation, and prohibits individuals who are not licensed by the agency from providing

Com., Bill Analysis, S.B. 743, 71st Leg. (1989). Thus, the board could not restrict an individual from providing building design services as long as he used a title other than architect, such as building designer. TEXAS SUNSET ADVISORY COMMISSION, *supra*, at 1. The 1989 amendments authorized the board to regulate the practice of architecture and prohibited individuals who were not registered architects from providing architectural services for certain types of buildings. *Id.*

In discussing the exemptions from the registration requirements of article 249a, V.T.C.S., as amended in 1989, the report indicates that the engineer's license still allowed the licensee to design buildings, despite the adoption of section 16:

> The statute [V.T.C.S. art. 249a] contains two different kinds of exemptions from the registration requirements for architects. One set of exemptions concerns activities that are exempt because they are not considered architectural practices. For example, *engineers or interior designers may perform building design services as part of their work, but may not hold themselves out as architects.*

TEXAS SUNSET ADVISORY COMMISSION, *supra*, at 7 (emphasis added).

The second set of exemptions covers architectural activities that are exempt from the practice provisions of the act. *Id.* at 8. These include an exemption for persons who prepare architectural plans and specifications for a privately owned building used as a single-family or two-family home. *See* V.T.C.S. art. 249a, § 14. In addition, the report states the architects' law "also exempts persons who perform design work for new public buildings that cost less that $100,000." TEXAS SUNSET ADVISORY COMMISSION, *supra*, at 8. This reference to section 16 of article 249a, V.T.C.S., informs us that section 16 concerns building design work. An engineer's license confers authority to perform building design services requiring the application of engineering principles and the interpretation of engineering data for public buildings described by section 16.

(footnote continued)
the kind of professional services it regulates. TEXAS SUNSET ADVISORY COMMISSION, TEXAS BOARD OF ARCHITECTURAL EXAMINERS, STAFF REPORT TO SUNSET ADVISORY COMMISSION (1991), at 1; House Comm. on Gov't Org., Bill Analysis, S.B. 429, 72d Leg. (1991).

The licensed engineer's authority to prepare building plans for public buildings described in section 16 of article 249a, V.T.C.S., has been made even more clear by the 1991 addition of subsections 16(b) and (c) to that section. House Comm. on Gov't Org., Bill Analysis, S.B. 429, 72d Leg. (1991). Section 16(a) provides that a registered architect must prepare the architectural plans for new buildings of a certain description.[4] Subsection 16(b) qualifies subsection (a) by authorizing the owner of a building to choose "a registered professional engineer as the prime design professional for a building construction, alteration, or addition project." V.T.C.S. art. 249a, § 16(b). Section 16(c) preserves the authority of registered engineers to design buildings pursuant to the Texas Engineering Practice Act. Subsection 10(j), also enacted in 1991, provides that a registered professional engineer who has an architectural engineering degree is not prohibited from using the title "architectural engineer."

The 1991 amendments to section 16 of article 249a, V.T.C.S., as well as subsection 10(j) of that statute, recognize the overlap between the work of an architect and an engineer in the area of building design. Section 16 does not bar a registered professional engineer from preparing plans and specifications. Such preparation requires the application of engineering principles and the interpretation of engineering data for "a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000." *Id.* § 16(a)(1). Licensed engineers continue to have the authority to prepare building designs and specifications that they had prior to the adoption of section 16 in 1989.

S U M M A R Y

Section 16 of article 249a, V.T.C.S., the statute regulating the practice of architecture, does not bar a professional engineer licensed under article 3271a, V.T.C.S., from preparing plans and specifications, the preparation of which requires the application of engineering principles and the interpretation of engineering data, for "a new building that is to be constructed and owned by

[4]The preparation of "architectural plans" presumably would require the application of "architectural education, training, and experience." V.T.C.S. art. 249a, § 10(a).

a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000."

Very truly yours,

Dan Morales

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Attorney General of Texas

WILL PRYOR
First Assistant Attorney General

MARY KELLER
Deputy Assistant Attorney General

RENEA HICKS
Special Assistant Attorney General

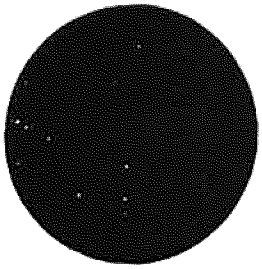
MADELEINE B. JOHNSON
Chair, Opinion Committee

Prepared by Susan L. Garrison
Assistant Attorney General

Reference Handbook

for

Building officials and Design Professionals



Prepared by:

The Texas Board of Architectural Examiners

1993 Edition

Reference Manual for Building Officials and Design Professionals

Table of Contents:

Forward:

This manual has been published by the Texas Board of Architecture Examiners to aid building officials and design professionals in understanding the laws governing architecture and engineering in the State of Texas.

This manual is a guildeline intended as a source of basic information and does not attempt to address all of the questions concerning the practices of architecture and engineering. Section V of this handbook addresses the questions most often asked by building officials. If you need further information or assistance concerning the requirements of the state board, please write or telephone:

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Introduction:

Building codes and professional registration laws are meant to work together. Building officials and architectural and engineering registration boards each exist to protect the public against unsafe structures. Registration officials protect by ensuring that all design professionals have proper education and training, and pass a rigorous examination on technical and practical issues. Building officials promulgate and enforce building code requirements that are intended to protect the public's health and safety.

While our state has limited exemptions permitting unregistered persons to prepare plans for single-family houses, farm buildings and other structures of limited scope, it is clear public policy in our state, and indeed in all states, that structures of significant size or complexity must be designed by registered professionals.

In the early 1980s the National Council of Architectural Registration Boards (NCARB) organized a roundtable discussion, inviting representatives of organizations of building officials, other government officials, engineers, architects and professional liability insurers. Building officials attending said that while the public may assume that state or municipal building officials are an effective means of ensuring the protection of the public health, safety and welfare, in practice this is rarely the case. Several participants suggested that some building departments have insufficient staff to carry out their responsibilities, and that all departments must depend heavily on licenced design professionals to deliver structures that meet code standards. As a practical matter, building officials cannot "second-guess" designs – they must rely on the design professional. While substantiating statistics were not available, all roundtable participants agreed that in their experience, assuring safe buildings meant requiring that licensed professionals alone design any significant structures.

At the same time, NCARB distributed a questionaire to 3,300 members of the Council of American Building Officials. Eighty-nine percent of the respondents agreed that a registered design professional is essential on any "substantial" building project. Eighty-two percent agreed that even well-staffed building departments must rely on registered design professionals to ensure that building designs meet the increasingly complex standards of modern codes.

If building officials require all plans for non-exempt structures to bear the appropriate seal of a registered architect or engineer, then the registration system will share responsibility for protecting the public. This document has been prepared in the spirit of service to the public and to assist building officials and the professions in better understanding the professional authorship requirements of our law and codes.

I. Definition of Architecture and Engineering.

Presented in this section are descriptions of the general areas of responsibility for architects and engineers, including interior designers and landscape architects. The descriptions are not exclusive and are not intended to unduly restrict the practice of the professional who is properly registered in the State of Texas.

A. Architecture.

Section 10(a) of Article 249a, Vernon's Texas Civil Statutes Regulation of the Practice of Architecture, states:

"Practice of Architecture" shall mean any service or creative work, either public or private, applying the art and science of developing design concepts, planning for functional relationships and intended uses, and establishing the form, appearance, aesthetics, and construction details, for any building or buildings, or environs, to be constructed, enlarged or altered, the proper application of which requires architectural education, training and experience. "Practice architecture" or "practicing architecture" shall mean performing or doing, or offering or attempting to do or perform any service, work, act or thing within the scope of the practice of architecture.

B. Engineering.

Section 131.18. under Practice and Procedure Bylaws and Definitions from The State of Texas Law and Rules Concerning the Practice of Engineering and Professional Engineering Registration states:

Professional engineering services -- Services which must be performed by or under the direct supervision of a registered engineer and which require the application of engineering principles, or the interpretation of engineering data. These engineering services may be in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects including: consultation; planning; designing; construction; alteration or repair of real property; or other engineering or incidental services which engineering professionals (and individuals in their employ) may logically or justifiably perform, such as studies, investigations, mapping, testing, evaluations, program management, conceptual designs, plans and specifications, value engineering, soils engineering, drawing reviews, preparation of operating and maintenance manuals, and other related services.

C. Landscape Architecture.

Section 1 part b of Article 249c of Vernon's Texas Civil Statutes Regulation of the Practice of Landscape Architecture, states:

"Landscape architecture" means the performance of professional services such as consultation, investigation, research, preparation of general development and detailed design plans, studies, specifications, and responsible supervision in connection with the development of land areas where, and to the extent that, the principle purpose of such service is to arrange and modify the effects of natural scenery for aesthetic effect, considering the use to which the land is to be put. Such services concern the arrangement of natural forms, features, and plantings, including the ground and water forms, vegetation, circulation, walks and other landscape features to fulfill aesthetic and functional requirements but shall not include any services or functions within the

definition of the practice of engineering, public surveying, or architecture as defined by the laws of this State.

D. Interior Design.

Section 1 part 2 of Vernon's Texas Civil Statutes Regulation of the Practice of Interior Design, states:

"Interior design" means the:

(A) identification, research, or development of creative solutions to problems relating to the functions or quality of the interior environment

(B) performance of sevices relating to interior spaces, including programming, design analysis, space planning of non-load-bearing interior construction, and application of aesthetic principles, by using specialized knowledge of interior construction, building codes, equipment, materials, or furnishings; or

(C) preparation of interior design plans, specifications, or related documents about the design of non-load-bearing interior spaces.

II. Professionals Required by Building Type.

Assembly:

SBC Requires:	-Design by professional architect or engineer.
State Requires:	-all structures occupied by 50 or more people must be designed by an architect. -all buildings occupied by 50 or more people or requires an engineer must be designed by an architect.
EPA Requires:	-see note A below.

Educational:

SBC Requires:	-Design by professional architect or engineer.
State Requires:	-all structures occupied by 6 or more students must be designed by an architect. -all buildings occupied by 50 or more people or requires an engineer must be designed by an architect.
EPA Requires:	-see note A below.

Institutional:

SBC Requires:	-design by professional architect or engineer.
State Requires:	-design by an architect. -all remodeling, additions, and alterations must be designed by an architect.
EPA Requires:	-see note A below.

Business:

SBC Requires: -all structures over 2 stories or greater than 5000 square feet must be designed by a professional architect or engineer.

State Requires: -all public owned structures whose cost exceeds $100,000 or any private building over 2 stories and greater than 20,000 square feet must be designed by an architect.
-all buildings occupied by 50 or more people or requires an engineer must be designed by an architect.

EPA Requires: -see note A below.

Factory, Hazardous, Mercantile, or Storage:

SBC Requires: -all structures over 2 stories or greater than 5000 square feet must be designed by a professional architect or engineer.

State Requires: -all buildings occupied by 50 or more people or requires an engineer must be designed by an architect.

EPA Requires: -see note A below.

Multi-family Residential:

SBC Requires: -all structures over 2 stories or greater than 5000 square feet must be designed by a professional architect or engineer.

State Requires: -all structures over 2 stories and more than 16 units must be designed by an architect.

EPA Requires: -any 1 story structure with more than 8 units, or 2 stories with more than 4 units must be designed by a professional engineer.

Farm Buildings:

SBC Requires: -all structures over 2 stories or greater than 5000 square feet must be designed by a professional architect or engineer.

State Requires: -none.

EPA Requires: -none.

1 and 2 Family Dwellings:

SBC Requires: -all structures over 2 stories or greater than 5000 square feet must be designed by a professional architect or engineer.

State Requires: -none.

EPA Requires: -none.

Spans over 25 Feet:

SBC Requires: -none.

State Requires: -none.

EPA Requires: -spans in excess of 24 feet must be designed by a professional engineer.

NOTE A: EPA requires (other than residential, farm, and single family residences) that all buildings over 1 story in height or greater than 5000 square feet have engineer designed:
(1) Structural, plumbing, HVAC, and electrical systems.
(2) All public works projects in excess of $3000 must be designed by a professional engineer.

III. The Architect and the Engineer.

Presented in this section are descriptions of the general areas of responsibility for architects and engineers which elaborate on the statutory definitions of architecture and engineering mentioned above. The descriptions are not all inclusive, but are intended to give general guidance on the practice of the two professions.

The Principal Design Professional.

A principal design professional will be required for any project submitted to the building official which requires multiple disciplines (e.g., architectural, structural, mechanical, electrical, etc.) The principal design professional is charged with the responsibility of coordination of each and every aspect of the design package. Either an Architect or Engineer registered in the State of Texas can serve as the principal design professional. The role of the principal design professional includes but is not limited to:

1. Point of contact for the design team during the design phase to ensure dialog among all participants, including owners, contractors, developers, engineers, architects, and government bodies and building officials.
2. Ensuring all elements of the submittal to the building official are compatable and provide a logical and comprehensive document.
3. Verifying all elements of the design submitted are complete, and all requirements for calculations are complete and accurately deliniated for plans and related documents.
4. Serve as point of contact during the governmental review process with the building official. To ensure proper application for plan and permit reviewal, and to provide for timely response to any questions, corrections, or requests for additional information on any element of the design package.
5. Act as point of contact for the design team, following permit issuance, during construction to respond to any changes, clarifications, or additional information that may be required from members of the design team to owners, developers, contractors or building officials and to provide responses in a timely manner.

A. Architects.

Architects must be concerned with the basic concepts of the full spectrum of design considerations. Architects develop a comprehensive package of design documents for submittal to the building department, taking all aspects of the project into account and coordinating various submissions prepared by other team

members. Listed below are examples of the matters architects typically address:

1. Site Layout (e.g., parking, zoning requirements, grading, landscaping, building layout).
2. Aesthetics and overall design.
3. Building classification (e.g., occupancy, type of construction).
4. Building circulation and exiting (e.g., stairway, exit width, travel distances, corridors).
5. Life safety considerations (e.g., requirements for sprinklers, fire rating, fire walls, separations, fire alarms, smoke control).
6. Interior space planning.
7. Interior and exterior finish materials (e.g., durability, function, aesthetics, fire ratings).
8. Environmental impacts (e.g., sound attenuation, quality of living, impact on natural surroundings).
9. Physically handicapped criteria.
10. Overall project coordination.

NOTE A: Interior designers are regulated by the TBAE Rules and Regulations of the Board Regulating the Practice of Interior Design. Documents submitted by these parties for review and approval for permit must bear the appropriate stamp, signature and date of the appropriate design professional.

NOTE B: Landscape Architects are regulated by the TBAE Rules and Regulations of the Board Regulating the Practice of Landscape Architecture.

NOTE C: Refer to section II of this Handbook for building types and sizes that require an engineer.

B. Engineers.

Engineers are concerned with the planning, analysis and design of particular building systems. Through education and training they have detailed knowledge of how specialized components of a building system must work. Listed below are examples of matters engineers typically address.

1. Structural systems (e.g., framing, structural connections, foundations).
2. Electrical systems (e.g., power distribution, security, fire alarm and smoke detection).
3. Mechanical systems (e.g., drains and venting, water distribution systems, HVAC, fire protection systems).
4. Soils analysis (e.g., soils reports, soils stabilization, geotechnical investigations).
5. Civil works (e.g., site work, site drainage, grading, utilities, circulation).
6. Coordination of engineering works (e.g., power stations, dams, bridges, sewage treatment facilities).

NOTE A: Refer to section II of this Handbook for building types and sizes that require and architect.

IV. Sealing Professional Work.

Registered architects, engineers, and interior designers are, and should be, responsible for their professional design services. The public as well as building officials rely on their design expertise. As a result, professional submissions such as plans, specifications, and calculations should clearly show the identity of the professional who prepared them by having affixed a seal and otherwise complying with the requirements of state law. Without proper identification, ultimate responsibility for any deficiencies may not be clear.

The law and applicable codes in the State of Texas have requirements that professional submissions must be sealed by the professional who prepared them or supervised their preparation. These laws and codes are found in Chapter VI of the TBAE Rules and Regulations of the Board Regulating the Practice of Architecture, Chapter VI of the TBAE Rules and Regulations of the Board Regulating the Practice of Interior Design, and section 131.138 under Registration of the State of Texas Law and Rules Concerning the Practice of Engineering and Professional Engineering Registration.

SEAL REQUIRED.

Every person authorized to practice architecture, engineering or interior design in Texas by a Certificate of Registration shall procure a seal with which to identify his or her work issued from the professional's office for use in this State.

TYPE AND DESIGN.

(a) The seal required for use on opaque origional contract documents not intended for duplication shall be of a type which will produce and impression facsimile of the seal, or a rubber stamp which will produce and ink facsimile of the seal. The seal required for use on transparent origional contract documents intended for duplication shall be of a type which will produce an ink facsimile of the seal such as a rubber stamp, decal, or computer generated type. The use of pre-printed documents bearing a pre-printed facsimile of the seal is prohibited.

(b) The design of the seal must bear the words, "Registered Architect"," Registered Interior Designer" or "Registered Professional Engineer" as appropriate, "State of Texas", the name of the professional and his/her registration number.

This state has specific laws requiring that plans submitted to governmental agencies bear the seal of a registered architect or engineer as appropriate. The Three national building codes currently have the following requirements:

(Building code summary to be added)

As a general rule, building officials should require that all plans have the seal of an architect, engineer or interior designer as appropriate, or have a notation on the plans or building permit application noting the state law exemption from the general rule requiring that all plans be prepared by registered professionals. Building officials facing litigation after a building failure should not have to explain why they could have required plans to be prepared and sealed by a registered architect or engineer, but chose to accept plans from an unregistered designer when the law or codes may not have allowed that designer to prepare the plans in the first place.

V. Common Questions and Answers.

I have a set of plans stamped and signed by an architect registered in a state other than Texas. Does the plan submittal meet the requirements in Texas?

No. Only design professionals currently registered with the appropriate board have authority to practice in Texas. Professional registered in other states must obtain registration in Texas in order to practice in this state.

Can an owner/builder/contractor make changes to an architect's or engineer's plans?

No. When plans are prepared by a Texas licenced professional, no changes may be made exept by that professional (or under certain conditions by another appropriately licenced professional).

May a Texas registered engineer prepare and stamp architectural plans?

No.

May a Texas registered architect prepare and stamp engineering documents?

No.

May anyone other than a licenced architect or engineer prepare and submit plans to building officials?

Yes, in limited instances where exeptions in state law noted above permit submission of plans not sealed by a registered professional. Building officials should document for the record at the time a permit is granted based on unsealed plans the exeption in the law that allows design of the structure by an unlicenced person.

Do shop drawings have to be sealed by a registered engineer and submitted to the building official for approval?

No, typically shop drawings are intended as contractor or fabricator details. These are not part of the filed plans.

What are examples of component designs which are required to be sealed by an appropriate design professional when submitted to the building official for approval?

Component, or "manufactured," buildings are treated no differently than other buildings. The plans must be prepared and sealed by an appropriate professional registered in the state. Examples of such designs are: prefabricated metal buildings, roof truss systems, post tension or pre stress designs and precast concrete building components.

Can a contractor sign the cover sheet of a set of plans prepared by an out-of-state architect of engineer and comply with the law?

No.

If an unregistered designer or owner prepares plans for a non-exempt building and applies for a building permit, should the building official suggest the designer or owner contact an architect or engineer, whichever is appropriate, and have the drawings and specifications reviewed and sealed?

No. Such action on the part of the architect or engineer would be contrary to law and would put the professional's licence in jeopardy. A registered architect or engineer may seal only plans prepared by him or her under his or her direct supervision.

Who may issue change orders and/or addenda to building permit construction documents which have been filed for non-exempt structures?

Change orders, additional drawings and/or addenda that alter documents required to be filed with the building department for non-exempt structures must bear the seal of the registered architect or engineer responsible for the modifications.

Who can be the applicant for a building permit?

The applicant can be the owner, contractor, or the architect or engineer as appropriate. However, the registered professional's name shall be listed on the application. All modifications or revisions to the sealed plans required by the building official shall be issued to the registered professional by the building offical.

VI. Minimum Standards for Code Submissions.

Plans and specifications submitted to the building official must be of sufficient nature to clearly show the project in its entirety with emphasis on the following:

1. Structural integrity
2. Life safety
3. Architectural barriers
4. Building code compliance
5. Definition of scope of work

The required drawings will depend upon the size, nature and complexity of the project. Following is a suggested standard of minimum required drawings for review by building officals. Additions and remodels may not require all of the following for plan submittal and review.

Cover sheet

1. Project identification
2. Project address and a location map
3. All design professionals identified
4. The principle design professional (the professional responsible for project coordination) shall be identified. All communications should be directed through this individual.
5. Design Citeria list
   - i. Occupancy group
   - ii. Type construction
   - iii. Location of property
   - iv. Seismic zone
   - v. Square Footage/Allowable area
   - vi. Fire sprinklers
   - vii. Height and number of stories
   - viii. Occupant load
   - ix. Land use zone

Site Plan

Show proposed new structure and any existing buildings or structures, all property lines with dimensions, all streets, easements and setbacks. Show all water, sewer, electrical points of connection, proposed service routes and existing utilities on the site. Show all required parking, drainage and grading information. Indicate drainage inflow and outflow locations and specify areas required to be maintained for drainage purposes. When appropriate include a topographical survey. Show north arrow.

Foundation Plan

Show all foundations and footings. Indicate size, locations, thicknesses, materials and strengths and reinforcing. Show all imbedded anchoring such as anchor bolts, hold-downs, post bases, etc. Provide a geotechnical report for the proposed structure at that site.

Floor Plan

Show all floors including basements. Show all rooms, with their use, overall dimensions and locations of all structural elements and openings. Show all doors and windows. Provide door and window schedules. All fire assemblies, area and occupancy separations and draft stops shall be shown.

Framing Plans and Roof Framing Plans

Show all structural members, their size, methods of attachment, location and materials for floors and roofs. Show roof plan.

Exterior Elevations

Show all views. Show all vertical dimensions and heights. Show all openings and identify all materials and show lateral bracing system, where applicable.

Building Sections and Wall Sections

Show materials of construction, non-rated and fire rated assemblies and fire rated penetrations. Show dimensions of all heights.

Mechanical System

Show the entire mechanical system. Include all units, their sizes, mounting details, all duct work and duct sizes. Indicate all fire dampers where required. Provide equipment schedules. Submit energy conservation calculations per State of Texas.

Plumbing System

Show all fixtures, piping, slopes, materials and sizes. Show point of connections to utilities, septic tanks, pre-treatment sewer systems and water wells.

Electrical System

Show all electrical fixtures (interior, exterior and site) wiring sizes and circuiting, grounding, panel schedules, single line diagrams, load calculations and fixture schedules. Show point of connection to utility.

Structural Calculations

Where required, provide structural calculations for the entire structural system of the project.

Specifications

Either on the drawings or in booklet form, further define construction components, covering materials and methods of construction, wall finishes and all pertinent equipment. Schedules may be incorporated in project manual in lieu of drawings.

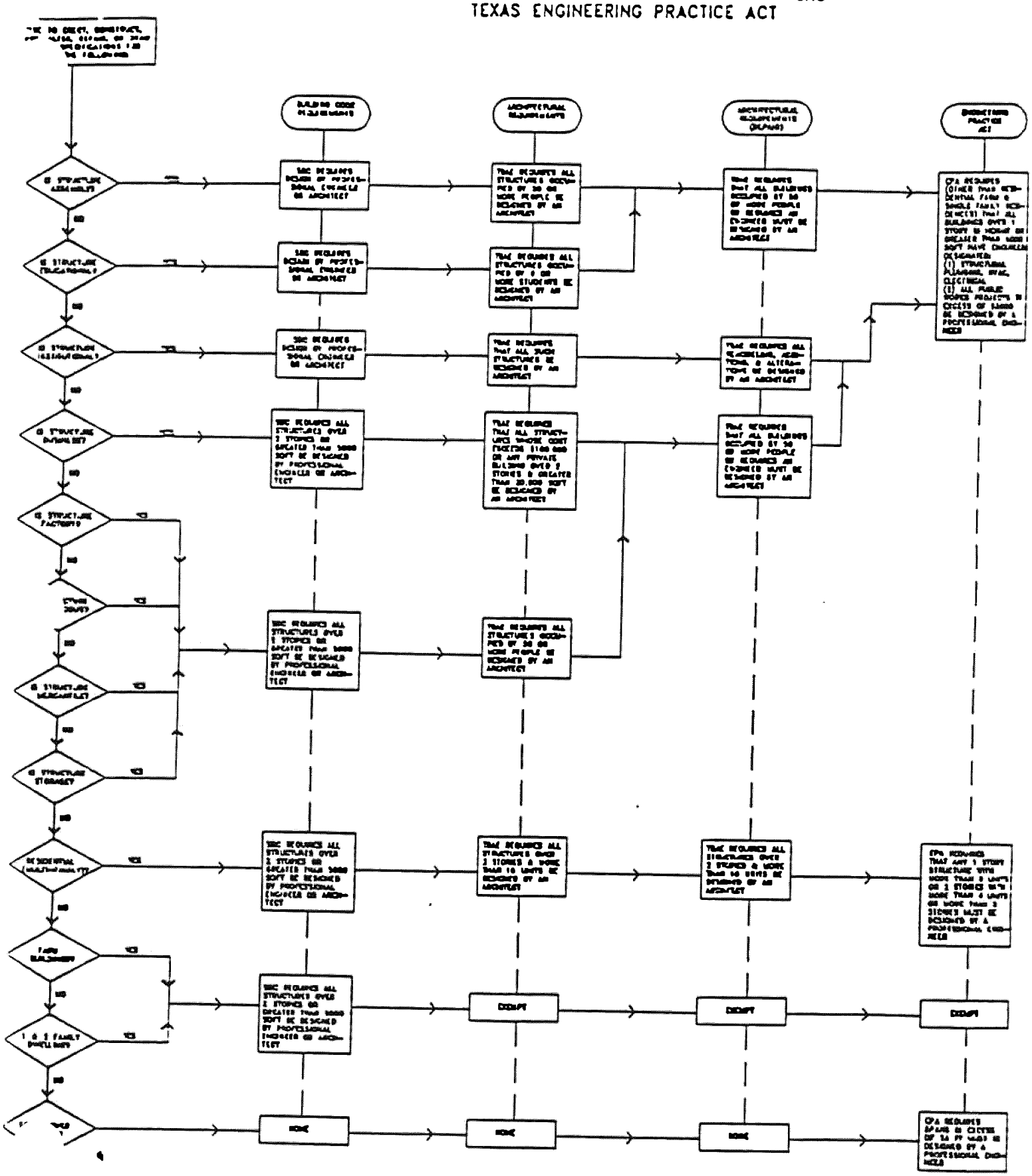
Addenda and Changes

It shall be the responsibility of the individual identified on the cover sheet as the principle design professional to notify the building offical of any and all changes throughout the project and provide revised plans, calculations or other appropriate documents prior to actual construction.

Revisions

For clarity, all revisions should be identified with a delta symbol and clouded on the drawings or resubmitted as a new plan set.

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
TEXAS ENGINEERING PRACTICE ACT



TEXAS BOARD OF ARCHITECTURAL EXAMINERS

TEXAS STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

August 5, 1993

Dear Public Officials:

In order to further clarify and define the relationships between the practices of architecture and engineering the Texas Board of Architectural Examiners and the Texas State Board of Registration for Professional Engineers have unanimously ratified an agreement which:

(a) reaffirmed their commitment to the Joint Policy Statement contained in a letter to public officials dated February 15th, 1991, a copy of which is enclosed. Furthermore, professionals must practice only in the area of their qualifications and each regulatory Board is exclusively charged with regulating its own licensees.

(b) established a procedure through which questions concerning professional practice can be resolved as follows:

"The Executive Directors of each respective Board will review and attempt to resolve any questions concerning professional practice. Any questions concerning professional practice which cannot be resolved by the Executive Directors will be referred to a joint committee. The joint committee will be composed of one member of each respective Board, to be appointed by the Chairman of the Board; one former member of each respective Board, to be appointed by the Chairman of the Board; the Executive Director of each Board; and one member of the Texas Society of Architects and the Texas Society of Professional Engineers, to be appointed by the President of each respective society. The committee findings will be reported to the respective Boards."

(c) pursuant to the ratification of this agreement by the two Boards all requests for reconsideration of opinions on this question by the Attorney General have been withdrawn.

We are pleased to be able to finally clarify this policy and process for the benefit of owners of buildings to be designed and the health and safety of all Texans. Any further questions about this issue should be addressed to the undersigned.

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Earnest F. Gloyna, P.E.
Chairman
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AGREEMENT

This agreement is made between Dr. Earnest Gloyna, Chair, Texas State Board of Registration for Professional Engineers; Charles Nemir, Executive Director, Texas State Board of Registration for Professional Engineers; Theodore Maffitt, Chair, Texas Board of Architectural Examiners; and Robert Norris, Executive Director, Texas Board of Architectural Examiners, hereinafter "the parties," this 14th day of July, 1993. The parties agree as follows:

1. This agreement is subject to approval by the Texas State Board of Registration for Professional Engineers and the Texas Board of Architectural Examiners.

2. The parties reaffirm their commitment to the Joint Policy Statement contained in a letter to public officials dated February 15, 1991.

3. The Executive Directors of each respective Board will review and attempt to resolve any questions concerning professional practice. Any questions concerning professional practice which cannot be resolved by the Executive Directors will be referred to a joint committee. The joint committee will be composed of one member of each respective Board, to be appointed by the Chairman of the Board; one former member of each respective Board, to be appointed by the Chairman of the Board; the Executive Director of each Board; and one member of the Texas Society of Architects and the Texas Society of Professional Engineers, to the appointed by the President of each respective society. The committee findings will be reported to the respective Boards.

4. The parties agree that this Agreement resolves any remaining questions concerning DM-161, and that therefore the motion for reconsideration filed by the Board of Architectural Examiners is no longer necessary and should be withdrawn.

Dr. Earnest Gloyna, Chair

Theodore Maffitt, Chair

Charles Nemir, Executive Director

Robert Norris, Executive Director

Texas State Board of Registration for Professional Engineers

Texas Board of Architectural Examiners

TEXAS BOARD OF
ARCHITECTURAL EXAMINERS

TEXAS STATE BOARD OF REGISTRATION
FOR PROFESSIONAL ENGINEERS

February 15, 1991

Dear Public Officials:

In order to clarify and define the relationships between the practices of engineering and architecture, the two Boards which regulate these respective professions have officially adopted the following Joint Policy Statement:

"The Texas Board of Registration for Professional Engineers and the Texas Board of Architectural Examiners were both created by the Legislature to protect the health, safety and welfare of the public.

"Questions have arisen which indicate there is a need to define the relationship between the practices of engineering and architecture.

"It is the policy of both Boards that clients, both public and private, have the option to choose a member of either profession as the prime professional on their building projects.

"The professionals in each profession are enjoined by their respective practice acts to practice only in the area of their expertise and if the particular project requires the services of another professional, that professional's services shall be obtained.

"It is, therefore, the sole responsibility of both professional engineers and professional architects to obtain whatever additional professional services they need for the project at hand.

"It shall be the responsibility of each respective Board, to regulate the practice of engineering and architecture in Texas to protect the health, safety and welfare of the public. If either Board determines that a member of the profession other than the one they regulate is practicing outside the area of his or her expertise, the Board shall immediately notify the Board regulating the offending member and supply information to support their allegation. Each Board has the responsibility to pursue any appropriate action to cause an unqualified person to cease and desist from practicing in violation of its respective statute. If either Board determines that one of its registered professionals is practicing outside the area of his or her expertise, it shall be the duty of that Board to appropriately discipline the offender."

If you have any questions concerning this Statement, please contact either board for assistance.

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August 27, 1992

Mr. Robert H. Norris
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Opinion No. DM-161

Re: Construction of section 16 of article 249a, V.T.C.S., the act regulating the practice of architecture (RQ-186)

Dear Mr. Norris:

You ask whether section 16 of article 249a, V.T.C.S., which regulates the practice of architecture, prohibits an individual, other than one licensed as an architect, from preparing the plans and specifications for the public buildings described by that section. Section 16 was adopted in 1989 and amended in 1991. *See* Acts 1989, 71st Leg., ch. 858, § 8, at 3836; Acts 1991, 72d Leg., ch. 579, § 2. When first adopted, section 16 read as follows:

> To protect the public health, safety, and welfare of the citizens of the State of Texas, an architect registered in accordance with this Act must prepare the architectural plans and specifications for a new building intended for education, assembly, or office occupancy whose construction costs exceed One Hundred Thousand Dollars ($100,000.00) which is to be constructed by a State agency, a political subdivision of this State, or any other public entity in this State.

In 1991 the Texas Board of Architectural Examiners (the "board") was reestablished after going through sunset review.[1] *See generally* Acts 1991, 72d Leg., ch. 579. Section 16 was revised to provide as follows:

> (a) To protect the public health, safety, and welfare of the citizens of the State of Texas, an architect registered in

[1]The Sunset Advisory Committee, established by chapter 325 of the Government Code, reviews the state agencies scheduled for abolition in each legislative session and makes recommendations on the abolition or continuation of the agency. Gov't Code § 325.012.

accordance with this Act must prepare the architectural plans and specifications for:

(1) a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000; or

(2) any alteration or addition to an existing building that is owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building is used or will be used for education, assembly, or office occupancy, the construction costs of the alteration or addition exceed $50,000, and the alteration or addition requires the removal, relocation, or addition of any walls or partitions or the alteration or addition of an exit.

(b) This section does not prohibit an owner of a building from choosing a registered architect or a registered professional engineer as the prime design professional for a building construction, alteration, or addition project.

(c) This section does not prevent, limit, or restrict a registered professional engineer from performing any act, performance, or work that is the practice of engineering as defined by The Texas Engineering Practice Act (Article 3271a, Vernon's Texas Civil Statutes).

V.T.C.S. art. 249a, § 16.[2]

Article 249a, V.T.C.S., defines the "practice of architecture" as follows:

"Practice of Architecture" shall mean any service or creative work, either public or private, applying the art and science of developing design concepts, planning for functional relationships and intended uses, and establishing the form, appearance,

[2]We address both the 1989 and 1991 versions of article 249a, V.T.C.S., because the legislative history of the 1989 amendment is relevant to your question. Citations in the text to article 249a, V.T.C.S., will refer to the 1991 version of this statute unless otherwise specified.

> aesthetics, and construction details, for any building or buildings, or environs, to be constructed... the proper application of which requires architectural education, training and experience.

V.T.C.S. art. 249a, § 10(a).

Briefs submitted in connection with this request argue that professional engineers registered pursuant to the Texas Engineering Practice Act, V.T.C.S. art. 3271a, are authorized to design buildings under their licensing statute and need not be licensed as architects to do so. Cases from other states have determined that the professions of architect and engineer overlap in the area of designing buildings, so that some building designs may be prepared by a person with either license. *See Smith v. American Packing & Provision Co.*, 130 P.2d 951 (Utah 1942); *see also* Annot., 82 A.L.R.2d 1013, 1026 (1962) (architectural and engineering services within license requirements). Section 10(b) of article 249a, V.T.C.S., suggests that the professions of architect and engineer overlap in Texas as well. This provision states in part:

> [I]t is the intent of this Act to acknowledge the necessity of professional inter-relations and cooperation between the professions for the benefit of the public and to achieve the highest standards in design, planning, and building. Therefore, nothing in this Act... shall... prevent, limit or restrict any professional engineer licensed under the laws of this State from performing any act, service or work within the definition of the practice of professional engineering as defined by the Texas Engineering Practice Act.

V.T.C.S. art. 249a, § 10(b) (footnote deleted).

An examination of the Texas Engineering Practice Act shows that the practice of engineering includes building design. The State Board of Registration for Professional Engineers licenses persons to engage in the practice of engineering, defined as follows:

> "Practice of engineering," or "practice of professional engineering" shall mean any service or creative work, either public or private, the performance of which requires engineering education, training and experience in the application of special

> knowledge of the mathematical, physical, or engineering sciences to such services or creative work.

V.C.T.S. art. 3271a, § 2(4). A rule promulgated by the Board of Registration for Professional Engineers (BRPE) defines professional engineering as follows:

> Professional engineering-Professional service which may include . . . *planning, designing, or direct supervision of construction, in connection with any public or private utilities, structures, buildings*, . . . when such professional service requires the application of engineering principles and the interpretation of engineering data.

22 T.A.C. § 131.18 (emphasis added). When the Texas Engineering Practice Act was first adopted in 1937, it defined the practice of professional engineering as "any professional service, such as consultation, investigation, evaluation, planning, *designing*, or responsible supervision of construction in connection with any public or private utilities, structures, *buildings*, . . . when such professional service requires the application of engineering principles and interpretation of engineering data." Acts 1937, 44th Leg, ch. 404, § 2 (emphases added). Like the BRPE's rule quoted above, the definition expressly included building design. In 1965 the definition of the "practice of professional engineering" was amended to read as it does today. Acts 1965, 59th Leg., ch. 85, at 209. The amending legislation was adopted to prevent unqualified persons from practicing engineering. *Id.* § 10 (emergency clause). The definition of the "practice of professional engineering" was amended to broaden the coverage of the Engineering Practice Act, and not to omit engineering services already covered by the act.

Section 19(a) of article 3271a, V.T.C.S., makes it unlawful for the state or any of its political subdivisions to engage in the construction of certain public works "unless the engineering plans and specifications and estimates have been prepared by . . . a registered professional engineer." Section 20 exempts certain persons from the registration provisions of the statute, provided that they are not represented as being legally qualified to engage in the practice of engineering. Among other persons, section 20 exempts the following:

> A person, firm, partnership, joint stock association or private corporation . . . *drawing plans and specifications for*: (1) any private dwelling, or apartments not exceeding eight units per building for one story buildings, or apartments not exceeding

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> four units per building and having a maximum height of two stories, or garages or other structures pertinent to such buildings; or (2) private buildings which are to be used exclusively for farm, ranch or agricultural purposes . . . or (3) other buildings, except public buildings included under Section 19 of this Act, having no more than one story . . . [further describing building]; provided that no representation is made or implied that engineering services have been or will be offered to the public.

V.T.C.S. art. 3271a, § 20(f) (emphasis added); *see also* V.T.C.S. art. 249a, § 14 (similar exemption for licensing requirement for architects).

Thus, there is an exemption for persons who draw plans and specifications for the described buildings. Since these persons would be engaging in the practice of engineering if they did not have the benefit of this exception, the legislature understood that the drawing of plans and specifications for buildings ordinarily constituted the practice of engineering. The practice of engineering includes preparing building plans and designs when that service requires the application of engineering principles and the interpretation of engineering data.

A report prepared to assist the sunset review process reviewed the authority of the Board of Architectural Examiners, and in doing so, recognized that licensed engineers were authorized to prepare building designs under the engineer's licensing statute. TEXAS SUNSET ADVISORY COMMISSION, TEXAS BOARD OF ARCHITECTURAL EXAMINERS, STAFF REPORT TO SUNSET ADVISORY COMMISSION (1991). Until article 249a, V.T.C.S., was amended in 1989, the Board of Architectural Examiners enforced a "title act," which restricted the use of the title of architect and the ability to offer services entitled architectural services to individuals who had been registered by the board.[3] *Id.* at 1; *see also* House Comm. on Bus. and

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[3]A "title act" requires individuals who use an occupational or professional title to register with the appropriate licensing agency and become subject to its regulation. It does not authorize the agency to regulate persons who do the work of the occupation or profession without using the title. For example, when article 249a, V.T.C.S., was adopted in 1937, it exempted persons and firms that prepared plans and specifications for a building, as long as they did not represent themselves to be architects. Acts 1937, 45th Leg., ch. 478, § 16(3), at 1279.

A "practice statute," in contrast, authorizes a state agency to regulate the practice of a profession or occupation, and prohibits individuals who are not licensed by the agency from providing

Com., Bill Analysis, S.B. 743, 71st Leg. (1989). Thus, the board could not restrict an individual from providing building design services as long as he used a title other than architect, such as building designer. TEXAS SUNSET ADVISORY COMMISSION, *supra*, at 1. The 1989 amendments authorized the board to regulate the practice of architecture and prohibited individuals who were not registered architects from providing architectural services for certain types of buildings. *Id.*

In discussing the exemptions from the registration requirements of article 249a, V.T.C.S., as amended in 1989, the report indicates that the engineer's license still allowed the licensee to design buildings, despite the adoption of section 16:

> The statute [V.T.C.S. art. 249a] contains two different kinds of exemptions from the registration requirements for architects. One set of exemptions concerns activities that are exempt because they are not considered architectural practices. For example, *engineers or interior designers may perform building design services as part of their work, but may not hold themselves out as architects.*

TEXAS SUNSET ADVISORY COMMISSION, *supra*, at 7 (emphasis added).

The second set of exemptions covers architectural activities that are exempt from the practice provisions of the act. *Id.* at 8. These include an exemption for persons who prepare architectural plans and specifications for a privately owned building used as a single-family or two-family home. *See* V.T.C.S. art. 249a, § 14. In addition, the report states the architects' law "also exempts persons who perform design work for new public buildings that cost less that $100,000." TEXAS SUNSET ADVISORY COMMISSION, *supra*, at 8. This reference to section 16 of article 249a, V.T.C.S., informs us that section 16 concerns building design work. An engineer's license confers authority to perform building design services requiring the application of engineering principles and the interpretation of engineering data for public buildings described by section 16.

(footnote continued)
the kind of professional services it regulates. TEXAS SUNSET ADVISORY COMMISSION, TEXAS BOARD OF ARCHITECTURAL EXAMINERS, STAFF REPORT TO SUNSET ADVISORY COMMISSION (1991), at 1; House Comm. on Gov't Org., Bill Analysis, S.B. 429, 72d Leg. (1991).

The licensed engineer's authority to prepare building plans for public buildings described in section 16 of article 249a, V.T.C.S., has been made even more clear by the 1991 addition of subsections 16(b) and (c) to that section. House Comm. on Gov't Org., Bill Analysis, S.B. 429, 72d Leg. (1991). Section 16(a) provides that a registered architect must prepare the architectural plans for new buildings of a certain description.[4] Subsection 16(b) qualifies subsection (a) by authorizing the owner of a building to choose "a registered professional engineer as the prime design professional for a building construction, alteration, or addition project." V.T.C.S. art. 249a, § 16(b). Section 16(c) preserves the authority of registered engineers to design buildings pursuant to the Texas Engineering Practice Act. Subsection 10(j), also enacted in 1991, provides that a registered professional engineer who has an architectural engineering degree is not prohibited from using the title "architectural engineer."

The 1991 amendments to section 16 of article 249a, V.T.C.S., as well as subsection 10(j) of that statute, recognize the overlap between the work of an architect and an engineer in the area of building design. Section 16 does not bar a registered professional engineer from preparing plans and specifications. Such preparation requires the application of engineering principles and the interpretation of engineering data for "a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000." *Id.* § 16(a)(1). Licensed engineers continue to have the authority to prepare building designs and specifications that they had prior to the adoption of section 16 in 1989.

SUMMARY

Section 16 of article 249a, V.T.C.S., the statute regulating the practice of architecture, does not bar a professional engineer licensed under article 3271a, V.T.C.S., from preparing plans and specifications, the preparation of which requires the application of engineering principles and the interpretation of engineering data, for "a new building that is to be constructed and owned by

[4]The preparation of "architectural plans" presumably would require the application of "architectural education, training, and experience." V.T.C.S. art. 249a, § 10(a).

a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000."

Very truly yours,

Dan Morales

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Assistant Attorney General

RQ-156

BEFORE THE

ATTORNEY GENERAL

OF THE

STATE OF TEXAS

RE: AUTHORITY OF TEXAS BOARD OF ARCHITECTURAL EXAMINERS

TO PROHIBIT PROFESSIONAL ENGINEERS

FROM DESIGNING PUBLIC BUILDINGS

BRIEF OF

THE TEXAS SOCIETY OF PROFESSIONAL ENGINEERS

AND

THE CONSULTING ENGINEERS COUNCIL OF TEXAS

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Date: July 21, 1992

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BEFORE THE
ATTORNEY GENERAL
OF THE
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RE: AUTHORITY OF TEXAS BOARD OF ARCHITECTURAL EXAMINERS
TO PROHIBIT PROFESSIONAL ENGINEERS
FROM DESIGNING PUBLIC BUILDINGS

BRIEF OF
THE TEXAS SOCIETY OF PROFESSIONAL ENGINEERS
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TO THE HONORABLE ATTORNEY GENERAL OF TEXAS:

The Texas Society of Professional Engineers (TSPE) and the Consulting Engineers Council of Texas (CEC-T) appreciate this opportunity to be heard on a matter so vital to engineers and consulting engineer firms throughout this State.

TSPE is a professional association of Texas engineers representative of all segments of the profession: engineers in private practice (consulting engineers), industry, government (federal, state and local) and education. Among its membership are many engineers who have been for many years and are now engaged in the preparation of plans and specifications for and supervising the construction of public buildings and improvements used for education, assembly or office occupancy: primarily, architectural engineers, civil engineers and structural engineers.

The Consulting Engineers Council of Texas is a statewide association composed of 220 of the major independent, private practice consulting engineering firms in Texas. Its primary mission is to improve professional management techniques and methods, develop professional standards consistent with the ideals of the engineering profession to the end that they might best serve the public interest.

The Texas Board of Architectural Examiners (architect's board) now seeks an official opinion of the Attorney General that the Texas legislature's recent amendment to the architect's act in effect forbids professional engineers from designing public buildings to be used for education, assembly or office occupancy costing in excess of $100,000. Since this would include most design work in the public sector, what the architects really seek is a monopoly in the design of public improvements in Texas. The Attorney General's response to the questions presented by the architect's board will have a vital impact not only on the economic and professional welfare of Texas engineers and consulting engineering firms but, more importantly, on the state, counties, cities and political subdivisions faced with a limited market of professionals to serve their needs in designing and constructing public buildings.

Questions Presented

Two questions have been submitted to the Attorney General by the architect's board. On August 15, 1991, the question was stated:

> Is an architect's seal required on construction documents for a new building intended for education occupancy whose construction cost exceeds One Hundred Thousand Dollars ($100,000) which is to be constructed by a public entity of the State of Texas?

On September 20, 1991, the question was stated:

> At issue is whether the plain language of sec. 16 prohibits an individual, other than one licensed as an architect, from preparing the plans and specifications for the type of public works covered by sec. 16.

As posed to the Attorney General, these questions are inherently misleading. Sec. 16 of the architect's act does not even mention "construction documents" nor does the phrase "plans and specifications" appear unmodified. Sec. 16 addresses only "*architectural* plans and specifications." Stating the questions in the words of the statute would make them easier to answer. So far as we know it is undisputed that architectural plans and specifications must be prepared by an architect. It is, however, vigorously disputed that public education, assembly and office buildings must be constructed only on *architectural* plans and specifications. Long before the architect's statute was ever enacted and for more than half a century since then professional engineers and consulting engineering firms have been preparing engineering plans and specifications for public buildings of every nature and performing the overall design of such buildings without any public outcry from the State of Texas or the general public.

Pertinent Provisions Of Architect's And Engineering Practice Acts [1]

ARCHITECTURE	PROFESSIONAL ENGINEERING
Definitions	
". . .any service or creative work, either public or private, applying the art and science of developing design concepts, planning for functional relationships and intended uses, and establishing the form, appearance, aesthetics, and construction details, for any building or buildings, or environs, to be constructed, enlarged or altered, the proper application of which requires architectural education, training and experience." Sec. 10(a)(1), art. 249a.	". . .any service or creative work, either public or private, the performance of which requires engineering education, training and experience in the application of special knowledge of the mathematical, physical, or engineering sciences to such services or creative work." Sec. 2.4, art. 3271a.
". . .'Practice architecture' or 'practicing architecture' shall mean performing or doing, or offering or attempting to do or perform any service, work, act or thing within the scope of the practice of architecture." Sec. 10(a)(1), art. 249a.	". . .'practice engineering' or 'practicing engineering' shall mean performing or doing, or offering or attempting to do or perform any service, work, act or thing within the scope of the practice of engineering." Sec. 2.5, art. 3271a.
Legislative Intent	
"In order to safeguard life, health, and property, and the public welfare, and in order to protect the public against the irresponsible practice of the profession of architecture, . . .no person shall practice architecture . . .unless he or she be a registered architect, as provided by this Act." Sec. 1, art. 249a.	". . .it is the intent of the Legislature, in order to protect the public health, safety and welfare, that the privilege of practicing engineering be entrusted only to those persons duly licensed, registered and practicing under the provisions of this Act . . . ." Sec. 1.1, art. 3271a.
". . .It is the *intent of this Act* to acknowledge the necessity of *professional inter-relations and cooperation between the professions* [of architecture and professional engineering] for the benefit of the public and to achieve the highest standards in design, planning, and building, ..." Sec. 10(b), art. 249a.	

[1] Unless otherwise indicated all statutes cited or quoted in this brief are from Vernon's Annotated Texas Statutes.

ARCHITECTURE	PROFESSIONAL ENGINEERING
Exemptions	
". . .*nothing in this Act* or any such rule or regulation [of the Board of Architecture], heretofore or hereafter adopted, *shall be construed or given effect in any manner whatsoever so as to prevent, limit or restrict any professional engineer licensed under the laws of this State from performing any act, service or work* within the definition of the practice of professional engineering as defined by The Texas Engineering Practice Act." Sec. 10(b), art. 249a.	"(f) A person, firm, joint stock association or private corporation, erecting, constructing, enlarging, altering or repairing, or drawing plans for: (1) any private dwelling or apartments. . .; (2) private buildings. . .; or (3) other buildings, *except public buildings included under Section 19 of this Act*, . . ." Sec. 20(f), art. 3271a.
"Nothing in this Act shall prevent registered professional engineers licensed under the laws of this State from planning and supervising work, such as railroad, hydroelectric work, industrial plants, or other construction primarily intended for engineering use or structures incidental thereto, nor prevent said engineers from planning, designing, or supervising the mechanical, electrical, or structural features of any building." Sec. 10(g), art. 249a.	*(There are no exemptions or exceptions for architects under The Texas Engineering Practice Act).*
"A firm. . .carrying on the practice of engineering under Section 17 of The Texas Engineering Practice Act, may engage in the practice of architecture and may hold itself out to the public as offering architectural services, provided that the actual practice of architecture of behalf of such firms . . . is carried on, conducted and performed only by architects registered in this State." Sec. 10(h), art. 249a.	
"Nothing in this Act shall be construed to prohibit a registered professional engineer who has an architectural engineering degree from a public or private college or university from using the title 'architectural engineer'." Sec. 10(j), art. 249a.	
Public Work	
"To protect the public health, safety, and welfare of the citizens of the State of Texas, an architect registered in accordance with this Act must prepare *the architectural plans and specifications* for: (1) a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000;	

Public Work (Cont'd.)

or;

(2) any alteration or addition to an existing building that is owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building is used or will be used for education, assembly, or office occupancy, the construction costs of the alteration or addition exceed $50,000, and the alteration or addition requires the removal, relocation, or addition of any walls or partitions or the alteration or addition of an exit.

(b) This section does not prohibit an owner of a building from choosing a registered architect or a registered professional engineer as the prime design professional for a building construction, alteration, or addition project.

(c) This section does not prevent, limit, or restrict a registered professional engineer from performing any act, performance, or work that is the practice of engineering as defined by the Texas Engineering Practice Act (Article 3271a, Vernon's Texas Civil Statutes). Sec. 16, art. 249a.

"It is unlawful for this State or for any of its political subdivisions, including any county, city, or town, to engage in the *construction of any public work involving professional engineering*, where public health, public welfare or public safety is involved, unless the engineering plans and specifications and estimates have been prepared by, and the engineering construction is to be executed under the direct supervision of a registered professional engineer. However nothing in this Act shall be held to apply to any public work wherein the contemplated expenditure for the completed project does not exceed Eight Thousand ($8,000.00) Dollars." Sec. 19, art. 3271a.

Need For Resolution

It is indeed regrettable that the Attorney General should be disturbed with this issue. Architecture and Engineering are respected but separate disciplines with their beginnings reaching back into antiquity. Both have long histories of service to both the public and private sectors. The public interest is best served by cooperation between them. That was the hope of the 72nd Legislature expressed as recently as last year: ". . .It is the intent of the [architect's] act to acknowledge the necessity of professional inter-relations and cooperation between the professions [architecture and engineering] for the benefit of the public and to achieve the highest standards in design, planning and building. . ." Sec. 10(b), art. 249a.

Following the amendment to the architect's act in 1989 adding sec. 16, the architect's board started a campaign to eliminate professional engineers from the design of public buildings. Since that time it has continued its efforts through communication to school boards, cities and counties. As a result, professional engineers have been denied contracts, had their professional competency to design public buildings questioned and applications for building permits denied.

The "professional inter-relations and cooperation between the professions" desired by the Texas legislature is being thwarted solely by activities of the architect's board. Accordingly, there is need for resolution of the matter as a first step toward achieving the Legislature's goal.

Legislative Intent

As the Texas Supreme Court has held many times, ". . .the *intention of the Legislature* in enacting a law *is the law itself*; and hence the aim and object of construction is to ascertain and enforce the legislative intent and not to defeat, nullify or thwart it." *City of Mason v. West Texas Utilities Co.*, 237 S.W. 2d 273, 278 (Tex. 1951).[2] Again, in *Texas & N.O. Ry. Co. v. Railroad Commission of Texas*, 200 S.W. 2d 626, 629 (Tex. 1947), the Texas Supreme Court put it this way: ". . .whenever the legislative purpose is ascertained, the significance of words used may be restricted or enlarged in order to effectuate that purpose and to *give the act the meaning which the lawmakers manifestly intended.*"

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[2] Unless otherwise indicated, emphasis throughout this brief is supplied.

To determine legislative intent (the law itself) Texas courts look first to the words used by the legislature, and then to legislative history and debate, the purposes sought to be achieved by the legislature and related statutes.

Turning first to legislative purposes and objectives -- just what were the purposes of the legislature in enacting the architect's practice act or the engineering practice act? Obviously, the only interest the state has in regulating either profession is protection of the public safety, health and welfare.[3] To fully understand the legislature's intent requires some understanding of the legislative history of these laws regulating engineering and architecture.

Legislative History
Texas Engineering Practice Act

It is ironic that the architect's board should question the right of professional engineers to design school buildings. It was a school building which triggered enactment of the first Texas Engineering Practice Act.

On March 18, 1937, almost three hundred school children were buried under tons of rock and steel resulting from an explosion at a public school in New London, Texas, known historically as the "New London School Disaster." There was an immediate investigation which revealed that the explosion resulted from defective installation and inspection of a gas

[3] Certainly, the legislature has no interest in providing architects a competitive advantage over engineers or *vice versa*.

regulator.[4]

The New London School Disaster also got the immediate attention of the Texas legislature. Within sixty-one days of the disaster the legislature enacted as an emergency measure to go into effect immediately, May 18, 1937, the first Texas Engineering Practice Act.[5] It was a true practice act. It was made unlawful for anyone to practice engineering unless authorized by the State Board of Registration for Professional Engineers. Civil and criminal penalties were prescribed for violation. The Attorney General was specifically directed to provide the legal assistance necessary to enforce it, but such assistance was not to relieve local prosecutors from performing their duties. (Sec. 23, Original Act).

It should also be noted that the original 1937 act in defining the "practice of professional engineering" included any professional service "such as consultation, investigation, evaluation, planning, *designing, or responsible supervision of construction in connection with. . .structures, buildings,. . .or projects*, wherein the public welfare or the safeguarding of life, health or property is concerned or involved." (Sec. 2, Original Act).

This original Texas Engineering Practice Act also included sec. 19 dealing with Public Work worded substantially the same as sec. 19 appears today. Clearly the 45th Texas Legislature, acting only sixty days after the New London School Disaster, had school buildings in mind when it provided:

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[4] Military Court of Inquiry Statement of Facts, Texas State Architects, Austin, Texas, Granberry (Collier Read) Papers.

[5] Acts of 1937, 45th Texas Legislature, Regular Session, Ch. 404, p. 816

> Sec. 19. Public Work. . . .it shall be unlawful for this State, or for any of its political subdivisions, for any county, city or town, to engage *in the construction of any public work involving professional engineering*. . . . unless the engineering plans and specifications and estimates have been prepared by, and the engineering construction is to be executed under the direct supervision of a registered professional engineer. . . ." (Sec. 19. Original Act)

This public work provision is in the same original act which by definition made it clear that professional engineering included "*designing, or responsible supervision of construction in connection with . . .structures, buildings*. . .or projects wherein the public welfare or the safeguarding of life, health or property is concerned or involved."

That the design of buildings was contemplated by the 45th Texas Legislature in 1937 as within the practice of engineering is further supported by its exempting from the act "persons erecting or building private dwellings." Original Act, Sec. 20(f). No exemption for public dwellings or buildings, only private ones.

This "public work" provision has remained substantially unchanged in the Texas Engineering Practice Act for fifty-five years. While today the term "public improvement" is more commonly used in place of "public work" the old term is still found in the cases. A project for construction of a public school was determined to be a "public work" by the Alabama Supreme Court in *Mobile, Alabama - Pensacola, Florida Bldg. and Const. Trades Council v. Williams*, 331 So. 2d 647, 649 (Ala. 1967). Also, in *Housing by Vogue, Inc. v. Department of Revenue*, 422 So. 2d 3, 4 (Fla. 1971) fabrication and installation of portable classrooms for a public school was considered "public work" for revenue purposes. In *Wallace Stevens, Inc. v. Lafaurche Parish Hospital Dist. No. 3*, 323 So. 2d 796, 81 A.L.R. 3d 974 (La. 1978) "public

work" was interpreted to include a building, physical improvement or other fixed construction of a hospital district.

In 1965 the Texas legislature broadened the definition of professional engineering to the language as it is today:

> "any service or creative work, either public or private, the performance of which requires engineering education, training and experience in the application of special knowledge of the mathematical, physical, or engineering sciences to such services or creative work."
> Sec. 2.4, art. 3271a.

It was the intent of the 59th Texas Legislature in 1965 to broaden the definition of engineering to include all its many branches rather than enumerating specific services such as the design or supervision of construction, buildings or projects as it had done in the original act. When the 45th Texas Legislature first defined professional engineering in 1937 the New London School Disaster was uppermost in the minds of legislators and they wanted to make certain that public structures and buildings were specifically mentioned. By 1965, however, Texas had moved well into an age of advanced technology. While design and construction of buildings was still an important branch of engineering, engineers were also designing space stations, into biomedical engineering and many other areas making advances in science work for the benefit of man.

It is also clear that the 59th Texas Legislature in broadening the definition of professional engineering did not have it in mind to eliminate the design of public buildings by engineers. Had it so intended it would not have been necessary to enact sec. 20(f), art. 3271a, which sets forth as exempt from the Act private buildings of a certain size and then to except from the

exemption "*public buildings* included in sec. 19 of this Act," which makes it unlawful for the State of Texas, any county, city, town or any political subdivision to build "any public work involving professional engineering" unless such plans and specifications have been prepared by a professional engineer. The only explanation of such language is that when the legislature broadened the definition of engineering it intended the design of public buildings to be within its broadened definition of engineering.

We respectfully submit that the legislative history of the Texas Engineering Practices Act from 1937 to 1992 reveals a legislative intent that professional engineers design public buildings.

Legislative History
Texas Architect's Practice Act

There was no law regulating architects in the true sense of a practice act until the 71st Session of the Texas Legislature in 1989. The original act was enacted in 1937 but in no sense of the word was it a practice act. It was primarily an exclusive right to use the title "architect" -- a truth in advertising or labeling law. Only those licensed by the architect's board could call themselves architects. The emphasis of the law wasn't so much on what services they could perform but on what they called themselves. The practice of architecture was defined as follows:

> Any person or firm who for a fee or other direct compensation therefore, shall engage in the planning, or designing, or supervising the construction of buildings. . . .***and shall represent or advertise themselves as architects***, architectural designees, or other title of profession or business using some form of the word "architecture," shall be considered as practicing the profession of architecture in this State, and *shall be required to comply with the provisions of this Act*. . . . Sec. 11, Original Act.

Again, in sec. 15 of the original architect's act it is provided:

> If any person, or firm, shall for a fee or other direct compensation, pursue the practice of the profession of architecture in this State as herein defined, or shall engage in this State in the profession or business of planning, or designing or supervising the construction of buildings. . . . *and shall advertise, or put out any sign, card or drawings in this State designating himself, herself or themselves as an architect, architectural designer, or other title of profession or business using some form of the work "architect"* without first having complied with the provisions of this Act, such person. . . .shall be deemed guilty of a misdemeanor. . . . Sec. 15, Original Act.

The 1937 act also provided that it would not apply:

> to any person, or firm, who prepares plans and specifications for the erection or alteration of a building. . . .*but does not in any manner represent himself, herself, or themselves to be an architect, architectural designer, or other title of profession or business using some form of the word "architect."* Sec. 16(3), Original Act.

From 1937 to 1989 the architect's law remained primarily a truth in advertising law. Anyone was free to do anything an architect did so long as he didn't call himself an architect. During that fifty-two years the legislature amended the architect's act fifteen times without finding it necessary for a person, who didn't represent himself as an architect, to be licensed in order to practice architecture. It was not until 1989 that a legislature removed the exception from the act for those who did what architects were authorized to do but didn't call themselves architects. It for the first time made it clear that if a person was to practice *architecture* or prepare *architectural* plans for buildings a license was required.

The authority of professional engineers to design and supervise construction of public buildings rested during those fifty-two years in the Texas Engineering Practice Act without ever

being questioned by the legislature, the courts, counties, cities or any other political subdivision or any department of the State of Texas.

It was not until the addition of sec. 16 to the architect's act in 1989 that the architect's board began to take the position that *only* architects may design public buildings and that professional engineers could not design such buildings. However, nowhere in the architect's law is there any such provision. To restate the section so heavily relied on by the architect's board:

> "To protect the public health, safety, and welfare of the citizens of the State of Texas, *an architect* registered in accordance with this Act must prepare the *architectural plans and specifications* for:
>
> (1) a new building that is to be constructed and owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building will be used for education, assembly, or office occupancy and the construction costs exceed $100,000; or
>
> (2) any alteration or addition to an existing building that is owned by a State agency, a political subdivision of this State, or any other public entity in this State if the building is used or will be used for education, assembly, or office occupancy, the construction costs of the alteration or addition exceed $50,000, and the alteration or addition requires the removal, relocation, or addition of any walls or partitions or the alteration or addition of an exit.
>
> (b) This section does not prohibit an owner of a building from choosing a registered architect or a registered professional engineer as the prime design professional for a building construction, alteration, or addition project.
>
> (c) This section does not prevent, limit, or restrict a registered professional engineer from performing any act, performance, or work that is the practice of engineering as defined by the Texas Engineering Practice Act (Article 3271a, Vernon's Texas Civil Statutes). Sec. 16, art. 249a.

It does not say that an architect must prepare "contract documents" or "plans and specifications" for public buildings used "for education, assembly or office occupancy and the construction costs exceed $100,000." It refers *only* to "*architectural* plans and specifications."

Also, there are repeated exemptions stated for professional engineers, and it is expressly provided that sec. 16 "does not *prevent, limit, or restrict* a registered professional engineer from performing any act, performance, or work that is the practice of engineering." As erroneously interpreted by the architect's board sec. 16 does prevent, limit and restrict professional engineers in their designing and supervising construction of any "public work involving professional engineering." Sec. 19, art. 3271a. It is difficult to find any public building or any other public work which does not involve professional engineering.

Much of the debate over sec. 16 of the architect's law has centered around the definitions, exemptions and public work sections of both the architect and engineering laws. The best analysis on this matter has been written by Charles E. Nemir, P.E., Executive Director of the Texas Engineering Board. For convenience in reference, Mr. Nemir's analysis is set forth as Appendix A and incorporated herein by reference.

Related Statutes

If wording of the architect's law and engineer's law and consideration of the legislative history of those laws leaves doubt as to what the legislature intended, it is appropriate to consider related statutes. It is well settled in Texas law that statutes relating to the same subject matter are to be given weight in determining legislative intent and great weight if the related statute is enacted at the same session of the legislature.

The well established rule is set forth in a much quoted opinion:

> The two Acts. . .were enacted at the same session of the Legislature, and consequently, under well established principles of law, they are in "pari materia," and it is presumed that they were actuated by the same policy and imbued with the same spirit; and accordingly in ascertaining the legislative intent, they will be read together, each in the light of the other, as though they were embraced in one Act or were supplemental to each other. (citing cases).
> *Garrett v. Mercantile Nat. Bank*, 168 S.W. 2d 636, 637 (Tex. 1943).

Sec. 16 of the architect's act, which the architect's board now claims grants architects a statutory monopoly over the design of public education, assembly and office buildings, was enacted at the Regular Session of the 72nd Texas Legislature. In its present form sec. 16 was enacted on May 20, 1991, approved June 15, 1991 and became effective September 1, 1991.

The Second Called Session of the same 72nd Texas Legislature enacted H.B. 39 which among other things enacted what has now been codified as art. 9102 of the Texas statutes. This law also dealt with the subject of architects and professional engineers in connection with the design of public buildings. The purpose of the statute was to encourage and promote the rehabilitation of persons with disabilities and assure compliance with the Americans With Disabilities Act (ADA) of 1990 (P.L. 101-336). This act was enacted by the Texas legislature, shorty after the architect's act. Art. 9102 was enacted on August 25, 1991, approved August 29, 1992 and became effective September 1, 1991, the same date the architect's act went into effect. Courts will credit the legislature with knowledge of sec. 16 of the architect's act when it enacted art. 9102.

Part 4 of art. 9102 deals with "Architectural Barriers." It defines an "Architect" as one licensed under the architect's act and "Engineer" means a person licensed under the Engineer's act. The act applies to "all buildings and facilities used by the public which are constructed in whole or in part by the use of state, county, or municipal funds, or the funds of any political subdivision of the state." Sec. 2, art. 9102.

It also directs the Department of Licensing and Regulation, "from time to time inform professional organizations and others, including persons with disabilities, *architects, engineers and other building professionals* of the law and its application." Sec. 5(a), art. 9102. Under the act, "all plans and specifications for construction or for the substantial renovation, modification, or alteration of buildings" are to be submitted to the Department of Licensing and Regulation for approval. Such plans and specifications are to be submitted to the department "by the architect or *engineer who has overall responsibility for the design* of the constructed or reconstructed building." It is further provided:

> If an architect or engineer required to submit or resubmit plans and specifications to the department fails to do so in a timely manner, the commissioner shall report the fact to the Texas Board of Architectural Examiners or the State Board of Registration for Professional Engineers, as appropriate. Sec. 5(d), art. 9102.

The clear intent of the legislature is that engineers and architects may have "overall responsibility for the design of the constructed or reconstructed building." Would the legislature which had just amended sec. 16 of the architect's act assign statutory duties to the "engineer who has overall responsibility for the design" of public buildings, unless it intended that professional engineers were authorized to perform the overall design of such buildings? Applying rules of

construction well established by Texas courts, part 4 of art. 9102 and sec. 16 of the architect's act must be read together "as though embraced in one act or were supplemental to each other." *Garrett v. Mercantile Nat. Bank, supra.* It would be ridiculous to ascribe to the legislature an intent to impose on engineers a duty to perform something the legislature prohibited them from doing, especially when failure to perform that duty may result in a penalty involving their license.

While art. 9102 is not necessary to establish the right of engineers to design buildings, it makes it abundantly clear that professional engineers are authorized to design public buildings of any kind, and that sec. 16 of the architect's act was not intended by the legislature as a grant of a statutory monopoly of the design of public buildings to architects.

Engineering Plans And Specifications *Vis-A-Vis* Architectural Plans And Specifications

Courts and legislatures have been attempting, for more than a century, to define and distinguish between the practice of engineering and the practice of architecture. Thus far none has done it successfully so as to avoid interprofessional disputes, especially in the area of designing plans and specifications for buildings, public and private.

Architecture and engineering are definitely separate and distinct professions; however, in the area of designing buildings they frequently overlap. Most state laws make it clear that *architects* are to prepare *architectural plans* and *engineers* are to prepare *engineering plans*. A review of excerpts from the definitions, exemptions and public work provisions of the Texas

architectural and engineering acts set forth on pages 4 and 5 of this brief show that Texas has this statutory plan.

Frustrations arise for legislatures and courts when a dispute gets down to the issue of whether a specific set of plans and specifications are architectural plans or engineering plans. Scholars and courts have solved the problem by saying that as far as the public safety, health and welfare are concerned it doesn't make any difference. Both disciplines are well trained by education and experience to design buildings.

There is one area in which, throughout the United States, architects have an exclusive right -- use of the title of architect. Most of the cases brought successfully by architects against engineers have been those in which the engineer in one way or another held himself or his firm out to the public as an architect.

While it is almost impossible to reconcile all the architect/engineer licensing statute cases nationwide because of differences in definitions and exemption provisions from state to state, it is clear that courts refuse to be drawn into distinguishing between *architectural* plans and specifications and *engineering* plans and specifications.

In 1955 the State of Wisconsin enacted a statute attempting to clarify the right of professional engineers to design all types of buildings and not just industrial related buildings. Attempts to resolve the ensuing dispute between the two professional organizations failed. A registered architect brought suit for a declaratory judgment that the statute was unconstitutional because it discriminated against architects. In dismissing the complaint the circuit judge wrote:

> The amendment did increase and enlarge the activities of the professional engineer, but a very important distinction remained. That distinction is one of title and not ability to perform. *It is probable that the legislature considered the professions equally qualified to design buildings, insofar as the health, safety and welfare of the public is concerned.*
> Opinion by Circuit Judge Sachtjen, *Purcell v. Limke*, (Wis.) Circuit Court (1956).

In the case of *Alabama v. Jones*, 267 So. 2d 427, 429, 430 (Ala. 1972) the architect's board sought to enjoin a professional engineer from practicing architecture. The engineers had designed a number of buildings of various types including churches, medical offices, store buildings, etc. The engineer admitted designing the buildings but had stamped them with his engineer's seal and had in no way represented himself as an architect. At the trial testimony got down to conflicting experts as to the issue of architectural or engineering plans. The Supreme Court of Alabama noted:

> Several expert witnesses, after examining the plans introduced in evidence, testified on behalf of the complainant [architect's board] or of the respondent [professional engineer]. We have carefully read this testimony. On direct examination, their testimony was conclusionary to the effect that the plans were architectural in nature (witness for complainant) or that the plans were in the field of professional engineering (witness for respondent).
>
> *Cross examination of these witnesses revealed the difficulty, if not impossibility, of demonstrating the demarcation between the practice of architecture and engineering. . . .*
>
> We do not think any useful purpose would be served by setting out in detail the testimony of the witnesses in regard to the differences between architects and engineers. It is to a large degree esoteric. Cross examination, we think, showed that *the functions of the two professions so overlap that neither can be satisfactorily defined in a way to draw a clear line of demarcation between the two*. Certainly our statutes do not do so.

* * *

> At the outset, it is to be noted that the Codal provisions regulating the professions of architecture and engineering are overlapping, and while attempting to distinguish practice of the two professions, have, by wording of the statutes defining the practice of the two professions, created only distinctions without differences.
>
> Each profession was regulated for the purpose of safeguarding life, health and property. Each relates to the applications of professional knowledge to the planning and designing of structures, and supervising the erection thereof.

The court ruled that the Alabama architect board's application for injunction against the engineer should be denied and dismissed with prejudice. *Alabama v. Jones*, 267 So. 2d 427, 429, 430 (Ala. 1972).

In the case of *Vehrich v. Florida*, 239 So. 2d 29, 31 (D.C. of Appeals, Fla. 1970) the court was faced with a conflict requiring judicial consideration of the distinction between architecture and engineering. The trial court found that the professional engineer, Vehrich, was practicing architecture by preparing plans and specifications for a shopping mall. At no time did Vehrich represent himself as an architect. In reversing the trial court the Florida appellate court resolved the conflict with these words:

> Thus, the apparent conflict can only be resolved by concluding that the statutes mean *a registered architect can plan and design and supervise construction of a building as the practice of architecture and a registered professional engineer can plan and design and supervise construction of a building as a professional engineer.* Of course, the professional engineer cannot represent himself as being an architect nor can the architect represent himself as being a professional engineer.
> *Vehrich v. Florida, supra.* p. 31.

While the text of the statutes and legislative histories of architects and engineering laws vary from state to state the weight of authority on the subject is to the effect that, "The overlapping nature of the two professions is well recognized." 82 A.L.R. 2d 1026.

In January, 1972, after several years of ernest effort, the Interprofessional Council On Environmental Design, a coordinating body of seven professional societies in the design field,[6] adopted a *Statement On Litigation Involving the Practice of Architecture, Landscape Architecture and Engineering*. The Statement notes that the interprofessional dispute cases, ". . .*often involve only questions of practice, and have little or no bearing upon the public safety, health or welfare.*"

The federal government and most state governments have long since abandoned any effort to distinguish architectural *vis-a-vis* engineering services for contracting purposes. The standard and practice of all the major federal agencies is to designate contracts for all kinds of buildings or facilities as architect/engineer contracts. *Federal Property and Administrative Services Act of 1949*, as amended, Title IX, "Selection of Architects and Engineers. 40 U.S.C. 541, *et. seq.*, and *Federal Acquisition Regulations*, 48 C.F.R. 36.6 *et. seq.*, "Architect/Engineer Services."

Conclusion

A review of the Texas statutes, those of other states and court decisions make it clear that the only concern states have in architecture or engineering is to make sure that the health, safety

[6] American Institute of Architects, American Institute of Planners, American Society of Civil Engineers, American Society of Consulting Engineers, American Society of Landscape Architects, Consulting Engineers Council and National Society of Professional Engineers.

and welfare of the public is safeguarded. Neither the Texas legislature nor the legislature of any of the states have any interest in providing architects or engineers any competitive advantage over the other in the design of public buildings. There has been no public outcry or any evidence presented to the Texas legislature that the public is being endangered by engineers designing school buildings or any other public buildings.

Regardless of how legislators define architecture or engineering, there is no such thing as an all inclusive definition of either discipline. It is impossible to specifically define the functions of either profession without embracing some of the functions of the other. Courts of many states have held that professional engineers, because of their education, training and experience, are entitled to prepare plans and specifications for public buildings of all kinds and to supervise their construction so long as in dealing with the public they do not misrepresent their professional identification. This is undoubtedly due in part to the underlying purposes and objectives of their respective licensing acts -- to assure protection of the public health, safety and welfare.

We respectfully suggest that it would come as a great shock to the legislators of the 72nd Session of the Texas Legislature to learn that by amending sec. 16 of the architect's act they disenfranchised engineers from preparing plans and specifications for public buildings to be used for education, assembly or office occupancy.

The first question propounded to the Attorney General by the architect's board is whether or not an architect's seal is required on construction documents for a new building for education purposes.

We respectfully suggest that this question should be answered: "Only if the contract documents are *architectural* plans and specifications but an architect's seal is not required if the contract documents are prepared and sealed by a professional engineer."

The second question posed by the architect's board is more specific: Does sec. 16 of the architect's law prohibit an individual, other than one licensed as an architect, from preparing the plans and specifications for the type of work covered by sec. 16.

The answer to this is "no." Only *architectural* plans and specifications must be prepared by an architect. Engineers are authorized to prepare engineering plans and specifications for public buildings and sec. 16(c) provides that sec. 16 does not prevent, limit or restrict an engineer from performing any act or work that is the practice of engineering. As previously documented in this brief it is the intent of the Texas legislature that the design and supervision of construction of public buildings is within the definition of engineering practice.

Respectfully submitted,

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By: 
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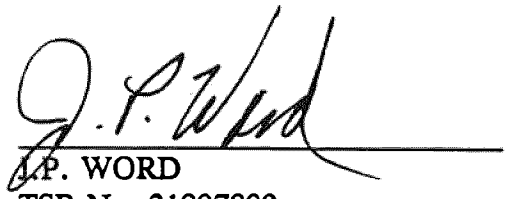
By: 
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ATTORNEY FOR THE CONSULTING ENGINEERS COUNCIL OF TEXAS

Certificate of Service

I hereby certify that a true and correct copy of the foregoing instrument has been furnished by first-class mail on this the 21st day of July, 1992, as follows:

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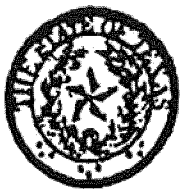

TEXAS STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

September 6, 1991

The Honorable Dan Morales
Attorney General of Texas
P.O. Box 12548
Austin, TX 78711

RE: Brief Pertaining to Opinion Request from Texas Board of Architectural Examiners

Dear General Morales:

The Texas Board of Architectural Examiners has requested your opinion on the following question: "Is an architect's seal required on construction documents for a new building intended for education occupancy whose construction cost exceeds One Hundred Thousand Dollars ($100,000) which is to be constructed by a public entity of the State of Texas?"

This agency is taking the liberty of submitting what are believed to be relevant comments on the instant request for your consideration in rendering an opinion.

As a matter of background information, a controversy exists over the legal right of professional engineers to perform what architects consider as the "architectural" design aspects of buildings. The position of properly educated and experienced engineers is that they are statutorily excepted from architectural registration to perform building designs within the accepted practice of engineering. The architects' position, however, is that the engineers are improperly relying on an expanded definition of the practice of engineering which does not include the term "buildings."

Since 1937, the Architects Registration Law, article 249a, V.T.C.S., has provided in § 10(b) a specific exception for professional engineers to perform

> "any act, service or work within the definition of the practice of professional engineering as defined by the Texas Engineering Practice Act."

The Texas Engineering Practice Act, article 3271a, V.T.C.S., provides in § 2(4) as follows:

> "(4) 'Practice of engineering' or 'practice of professional engineering' shall mean any service or creative work, either public or private, the performance of which requires engineering education, training or experience in the application of special knowledge of the mathematical, physical, or engineering sciences to such services or creative work."

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In 1989, the 71st Texas Legislature amended article 249a to be construed as an architectural "practice act," significantly modifying § 14, and adding §§ 15 and 16, all as thresholds for the engagement of registered architects to prepare architectural plans and specifications for specified buildings. In 1991 § 16 was amended by the 72nd Texas Legislature (S.B. 429); however, those enactments left intact the exception for professional engineers in § 10(b), and even reiterated the exception for registered engineers in § 16(c).

Because there is an obvious overlap of some building design functions between the practices of architecture and engineering, the proper interpretation to be given § 10(b) is in question where the designs and sealing of plans and specifications for certain buildings are concerned. This of course includes educational buildings to be constructed by public entities as stipulated in § 16.

The first issue of contention is the fact that this Board and various practicing engineers are applying the Board-adopted definition of "professional engineering services" to the § 10(b) exception. Irrespective of article 249a, this Board has had to clarify the general definition found in § 2(4), article 3271a; albeit this tends to exempt qualified engineers from the building design restrictions of article 249a. The Board of Architectural Examiners, however, opines that the only definition applicable to the § 10(b) exception for engineers in article 249a is the generalized definition currently appearing in § 2(4), article 3271a, supra, wherein the word "building" does not appear.

By rule-making authority in § 8(a), article 3271a, and of necessity to adequately regulate the practice of engineering, this agency has adopted a definition of "professional engineering services" in 22 TAC 131.18:

> "Professional engineering services - Services which must be performed by or under the direct supervision of a registered engineer and which require the application of engineering principles, or the interpretation of engineering data. These engineering services may be in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects including: consultation; planning; designing; construction; alteration or repair of real property; or other engineering or incidental services which engineering professionals (and individuals in their employ)may logically or justifiably perform, such as studies, investigations, mapping, testing, evaluations, program management, conceptual designs, plans and specifications, value engineering, soils engineering, drawing reviews, preparation of operating and maintenance manuals, and other related services."

See 16 TexReg 2524, May 7, 1991.

The second issue of contention involves professional engineers, who, for the most part hold BS and/or higher degrees in Architectural Engineering. They have heretofore been designing the types of buildings referenced in §§ 14-16, article 249a, complying with appropriate building and safety codes and regulations, as the practice of engineering. Many such buildings have been successfully designed and constructed by these engineers for many years in the past and have stood without problems. This has been without engaging an architect, relying on the exemptions in §§ 10(b), 10(g), and the former 14(5) of article 249a (1987). Such practice was approved by this Board as long as the individual engineer had the proper education and/or experience as dictated in 22 TAC 131.151 pertaining to public endangerment, and 131.153 pertaining to professional competence. The Board of Architectural Examiners opines, however, that some of the functions which had been performed by those engineers, under the aegis of "engineering," were actually the practice of architecture now governed by the new practice act. Article 249a, §§ 10(a), 10(b), 14, 15, and 16 (1991).

In Opinion Number JM-795, the Attorney General addressed the functional overlap of state licensed plumbers and air conditioning contractors. JM-795 concluded that the two regulated trades were not mutually exclusive, in that the Legislature considered some aspects of air conditioning contracting to also constitute the practice of plumbing, else there would be no necessity for the plumbers' exemption in the air conditioning contractors law. It would therefore appear to follow, that the § 10(b) exception for engineers in article 249a is a similar recognition by the Legislature that activities which might otherwise be characterized as architectural are also encompassed in professional engineering. There are no reciprocal exemptions in the Engineering Practice Act for architects or, any incidental practice of engineering beyond the general exemptions enumerated in §§ 19 and 20(f) of that Act.

Therefore, to summarize: (1) for the general definition of "practice of professional engineering" appearing in § 2(4), article 3271a, V.T.C.S., to have any meaning and practical use for the lay public, public officials, and engineering practitioners, this Board, by the authority of § 8(a) of the same Act, has defined "professional engineering services" (22 TAC 131.18); and (2) for the exception for professional engineers in §§ 10(b) and 16(c), article 249a, V.T.C.S., to be effective, it requires this Board to adequately define the practice of professional engineering.

Under the above circumstances, and in the ultimate interest of public health, safety and welfare, it would be the contention of this agency that if an owner/client chose to engage a registered engineer as his prime design professional [§16(b), article 249a] for an educational building construction project of any given cost, that a qualified registered engineer could design the building and seal the related plans and specifications. The seal of an architect would only be required on his own design drawings if the owner/client or his engineer engaged the architect to perform certain architectural services.

If you have any questions about this submittal, please contact me at your convenience.

Very truly yours,

Charles E. Nemir, P.E.
Executive Director

CEN:smg
cc: Members of the Board
Texas Society of Professional Engineers

ADDITIONAL CASES

Ponderosa Center Partners v. McClennan/Cruz/Gaylord & Associates, 53 California Reporter 2d 64 (1996): California Court of Appeals, citing earlier precedent, noted that "architectural services and engineering services frequently overlap and may be rendered by a licensed architect or a registered engineer (see also *Lehmann v. Dalis*, 119 Cal. App.2d 152 (1953). California's Business and Professional Code § 6737 provides that a licensed architect may perform many services that are considered as the practice of civil engineering (46 Ops.Cal.Atty.Gen.(1965)). In addition, a structural engineer may perform architectural services but may not use the title "architect." To the extent that architectural services and civil engineering services overlap, they may be rendered either by a licensed architect or by a registered civil engineer. To attempt to precisely define and delineate the practice of architecture as distinguished from the practice of engineering would be of doubtful assistance. *Barondon Corp. v. Nakawatase*, 196 Cal.App.2d 392 (1961).

In *Johnson v. Delane*, 290 P.2d 213 (1955), the Idaho Supreme Court, citing with favor *Lehmann v. Dalis*, concluded that to the extent that architectural services and civil engineering services overlap, they may be rendered either by a licensed architect or a registered civil engineer and that under the Idaho engineering licensure statute, the services rendered in preparing the plans and specifications for a commercial building might be properly rendered by a professional engineer rather than an architect.

State of New Hampshire
Inter-Department Communication

DATE: August 27, 1996

FROM: Douglas N. Jones
Assistant Attorney General

AT (OFFICE) Department of Justice

SUBJECT: **Scope of Engineering Practice**

TO: N.H. Board of Licensure for Professional Engineers
57 Regional Drive
Concord, NH 03301

PRIVILEGED & CONFIDENTIAL

On May 17, 1996 the Board requested legal advice on the subject of whether licensed engineers may engage in building design activities which are also performed by licensed architects. Although no specific issues or facts were presented, certain communications from the National Society of Professional Engineers were included which helped to identify the Board's general concern.

The Board, and this office should focus on New Hampshire law as it now exists and not the law in other states or on possible statutory amendments being advocated by national trade associations.

The principle New Hampshire statute is RSA 310-A:2, III (supp. 1996), which provides that:

> "Practice of Engineering" means any professional service or creative work requiring education, training, experience, and the application of advanced knowledge of mathematics and physical services, involving the constant exercise of discretion and judgment to such services at work as consultation, investigation, evaluation, planning, design, responsible oversight of construction, responsible oversight of operation, in connection with any public or private, utilities, structures, buildings, machines, equipment, processes, works or projects, wherein the

> public welfare, or the safeguarding of life, health or property is concerned. [Emphasis supplied.]

RSA 310-A:27 IV, also provides that nothing in the Professional Engineering Act shall be construed to prevent the practice of architecture by a duly licensed architect. The definition of "architecture" in RSA 310-A:28, II includes building "design" and the "responsible supervision of construction."

Under this statutory scheme, engineers and architects both have authority to design buildings and to "oversee" the construction of buildings. The use of the word "design" in RSA 310-A:27, II (exempting employees of licensed engineers who do not perform final designs from the licensure requirement RSA 310-A:25), further supports the conclusion that both engineers and architects may do such work.

The amendment of RSA 310-A:2, III by Laws of 1995, Chapter 284 which substituted the work "oversight" for the word "supervision" has no material effect on the basic question of whether engineers may design and construct buildings for human habitation, as these words are essentially synonymous and no legislative history suggests that the word "oversee" was being used in other than its ordinary meaning.

When two statutes overlap, the preferred construction is to give effect to both if such a result would not produce illogical or absurd results. There is nothing illogical or absurd about allowing both engineers and architects to design buildings. If the legislature had intended a different result, it could have readily said so. The exemption of work done on certain smaller structures from the requirement that persons who practice architecture be licensed architects, RSA 310-A:52, IV, is not inconsistent with the conclusion that persons doing such work must have an engineering license.

New Jersey Board of Architect v. North, 484 A.2d 297 (N.J. Superior Court 1984), is based on different statutory language, and does not warrant a different result.

The exact scope of the "design" and "construction oversight" functions performed by each profession are matters best determined by the rules of the respective Boards.

DNJ/cg
11501_1.DOC

MSC

Atty Gen. Op. No. 95 . IB33

f: 1-Occ.-Misc

M. JANE BRADY
ATTORNEY GENERAL

STATE OF DELAWARE
DEPARTMENT OF JUSTICE

NEW CASTLE COUNTY
Carvel State Building
820 N. French Street
Wilmington, DE 19801
Criminal Division (302) 577-2055
Civil Division (302) 577-2500
Fax: (302) 577-6630

KENT COUNTY
Sykes Building
45 The Green
Dover, DE 19901
(302) 739-4211
Fax: (302) 739-6727

SUSSEX COUNTY
114 E. Market Street
Georgetown, DE 19947
(302) 856-5352
Fax: (302) 856-5369

PLEASE REPLY TO: Civil Division--New Castle County

October 20, 1995

J.G.S. Billingsley, P.E., Chairman
External Affairs Committee
Delaware Association of Professional Engineers
2005 Concord Pike
Wilmington, DE 19803-2982

Re: Practice of Architecture and Engineering

Dear Mr. Billingsley:

You have asked whether a license to practice engineering under 24 Del. C. ch. 28 allows an engineer to render services in connection with structures which have, "as their principal purpose human habitation or use." You have also asked the related question; whether the definition of the practice of architecture in 24 Del. C. § 302(b), which defines the architects' practice as relating to structure or structures "which have as their principal purpose human habitation or use," precludes engineers from

("DAPE") to seek legislative clarification. We still encourage such action and note that a bill has passed the Senate but is yet to be considered in the House of Representatives. Fourth, we have considered all of the material sent to us by both DAPE and the Board. Unfortunately, most of it is of little assistance as the issue before us is the interpretation of the definitions of the practice of architecture and the practice of engineering as defined by the Delaware statutes.[1]

---

[1] Twenty-four Del. C. § 302(5) states:

> "Practice of architecture" shall mean the rendering or offering to render those services, hereinafter described, in connection with the design and construction of a structure or group of structures which have as their principal purpose human habitation or use, and the utilization of space within and surrounding such structures; the services referred to include planning, preparing studies, designs, drawings and specifications and furnishing administration of construction contracts.

Twenty-four Del. C. § 2803(7) states:

> "Practice of engineering" or "to practice engineering" or "practice engineering" includes any professional service performed for the general public such as consultation, investigation, evaluation, planning, design or responsible supervision of construction or operation in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects wherein the public welfare or the safeguarding of life, health or property is

> Co., supra. However, it is undisputed that when a statute is ambiguous and its meaning may not be clearly ascertained, the Court must rely upon its methods of statutory interpretation and construction to arrive at what the Legislature meant. Carper v. New Castle County Board of Education, Del. Supr., 432 A.2d 1202, 1205 (1981).

The Court went on to state,

> [i]f a statute is reasonably susceptible of different conclusions or interpretations, it is ambiguous." 2 Sutherland, Statutes & Statutory Construction § 4502 (4th ed. 1984). Ambiguity may also rise from the fact that giving a literal interpretation to words of the statute would lead to such unreasonable or absurd consequences as to compel a conviction that they could not have been intended by the legislature. (Citations omitted.)

Id.

Giving the phrase at issue in the definition of practice of architecture its plain meaning does not settle the question. It only leads to an ambiguity. The definition of the practice of engineering contained in 24 Del. C. § 2803(7) including the part; "consultation, investigation, evaluation, planning, design or responsible supervision of construction or operation in connection with any public or private utilities, structures, buildings..." pre-dates the insertion of "principal purpose human habitation or use" in the definition of architecture in 24 Del. C. § 302(5).

definition of the practice of engineering as including "building" and had they intended to limit the practice of engineering they could have done so expressly. They did not and we should not imply such an intent given the absence of any legislative history to suggest otherwise.

As stated, an analysis of the cases decided around the country is of little value given the differences in definitions and the manner in which the statutes were enacted. This was expressly noted by the Attorney General of Arkansas in his opinion to the President of the Arkansas State Board of Architects. In that opinion the Attorney General differentiated the practice of architecture and the practice of engineering under the Arkansas statutes, but noted the differences between the Arkansas statute and the Georgia statute which includes "planning, designing, or responsible supervision of construction or operation, in connection with any...buildings.... See Ga. Code Ann. § 84-203(b)." Ark. Att'y Gen. No. 94-378. Based on a lack of legislative history, we decline to find an implied limitation in Delaware's statute. Since, however, it is apparent that this controversy will not abate, and our opinion is unlikely to prevent disputes from arising

ADDITIONAL NOTES

1. Florida engineering licensure, much like the laws in most other jurisdictions, defines the practice of engineering to include the "design of buildings, structures". On that basis alone, engineers in Florida have the statutory authority to perform building design as the "practice of engineering". The language in the Florida engineering licensure statute regarding civil and structural engineers performing "architecture" only relates to those aspects of arcnitectural practice (interior design, color, fabric selection, and other architectural services) which do not overlap with the practice of engineering. Since the definition of the "practice of engineering" specifically includes the "design of buildings", then the "design of buildings" is clearly not exclusive to "architecture."

2. The "human habitation and use" provision is a limitation on architectural building design authority and not a proscription against professional engineers performing designing buildings for human habitation and use. Had the Florida legislature intended to limit the authority of professional engineers in connection with the design of buildings for human habitation and use, the legislature would have specifically stated that the building design authority of professional engineers does not include the authority to design buildings for human habitation and use. Instead, the Florida legislature left the long-standing definition of the practice of engineering broad -- to include the design of buildings of all types.

3. A recent attorney general opinion in Delaware made the important point that the mere fact that an architectural licensing statute is amended to include the words "principal purpose of human habitation" or similar language within the definition of the practice of architecture has no bearing upon the scope of the practice of engineering unless there is some legislative expression that the existing definition of the practice of engineering is somehow being limited or modified. In rejecting the Delaware Architect's Board's contention that changes in the definition of the practice of architecture in 1983 changed or limited the scope of engineering practice, the Delaware Attorney General noted that to the contrary "we

While the cases below are supportive of the architect's position, FAIA has presented an incomplete description in some instances.

State Board of Technical Registration v. McDaniels, 326 F.2d 348 (1958). The court noted that the professions of engineering and architecture are distinct but are also very similar.

State v. Beck, 165 A.2d 433 (1960). The Maine Supreme Court held that the architecture licensing statute prescribing use of the title "architect" by one not registered as such was not unconstitutional. The facts in this case address the use of the title "architect" which has nothing to do with the issues under consideration in Florida which involve the design of buildings as the practice of engineering.

Fanning v. College of Steubenville, 197 N.E.2d. 422 (1961). This case involved a professional engineer who entered into contact calling primarily for architectural services in connection with the design and construction of a college building. When the college learned that the professional engineer was not also an architect, the college refused to pay the engineer his fee. The court ruled that the engineer could not enforce the contract.

Dahlem v. State Board of Examiners and Registration of Architects, 459 S.W.2d 169. A Kentucky appeals court ruled that the preparation of drawings and preliminary plans and specifications for a nursing home by a construction company and its principal owners who were licensed professional engineers were not functions incidental to the practice of engineering but the illegal practice of architecture. The court appeared in part to base its decision on specific legislative language in the architect's licensure statute which explicitly required architectural skill as relates to any "nursing home, hospital, nursing or convalescent home, or home for the aged, regardless of capacity."

New Jersey Board of Architects v. North, 484 A.2d 1297 (1984). A New Jersey appeals court ruled that an engineer's conduct in designing a duplex was outside the exception to the licensing statute which permitted licensed engineers to design certain structures but that in light of the absence of a statutory definition or the term "engineering project," and engineer's good faith belief that the duplex qualified as such a project, only a nominal penalty of $25 was warranted.

National Society of Architectural Engineers
700 SW Jackson, Ste. 702
Topeka, KS 66603-3758

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NSAE Times is published for the National Society of Architectural Engineers by Barbee & Associates, Topeka, Kansas

New Utah Law Gives P.E.s More Design Authority

The governor of Utah has signed legislation from the 1996 general session (S. 295) that makes several significant changes to the state's engineering law. The new law took effect July 1, 1996.

The law takes several steps to strengthen the authority of P.E.s to provide building design services and to serve as prime professionals on building design projects.

For example, the legislature inserted into the P.E. law a definition of "building" as "a structure which has human occupancy or habitation as its principal purpose, and includes structural, mechanical, and electrical systems, utility services, and other facilities required for the building..." This definition will help engineers assert their claim that the P.E. law provides them authority to design buildings for human habitation or occupancy.

The new definition of "practice" also includes "design coordination...of engineering works and systems." This change in the Utah law makes it one of only a handful of states that have adopted the "design coordination" language.

The new law also added to the exemptions section the design of certain size residences and the alteration of certain size buildings. These exemptions parallel exemption changes in the architectural statute, again reflecting the equal authority of the two professions.

The new law also establishes "professional structural engineering" (emphasis added) as a practice separate from "professional engineering." Professional structural engineering is defined as "the design analysis of complex buildings and structures and includes the definition of professional engineering..." P.E.s will not be restricted from also providing structural engineering services, but merely prohibited from calling themselves "structural engineers" unless so licensed.

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National Society of Professional Engineers

125 S. GADSDEN ST. • P.O. BOX 750 • TALLAHASSEE, FL 32302-0750 • (904) 224-7121 • FAX (904) 222-4349
e-mail: fes@FLENG.ORG

MEMORANDUM

DATE: April 28, 1997

TO: Florida Board of Professional Engineers

FROM: Carol Brittain, Executive Director

RE: Engineer/Architect Practice Issues

Attached is additional information to be added to the submittal presented on the Engineer/Architect Practice Issues. Please add this information to the binders as follows:

Tab I. C. Please insert new information following NSPE Issue Brief #4037.

Tab II. A. Please replace the stapled section "Florida Board of Professional Engineers Education, Experience and Examination Requirements for Licensure" currently in the binder with the attached copy with the same title. The other information under Tab II remains the same as initially distributed.

Tab VI. F, G. Please insert the attached information at the end of material under Tab VI.

Thank you for your assistance. If you have any questions please do not hesitate to call me.

CB/kar

Wendy Anderson

From: Wendy Anderson
Sent: Friday, November 14, 2014 9:39 AM
To: 'dhains@murrayna.com'
Subject: Alpha Marine Surveyors
Attachments: 20141114103250.pdf

Mr. Hains:

Attached is a letter regarding your complaint against Alpha Marine Surveyors. If you have any questions, please give me a call.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

November 14, 2014

By Email

Drew B. Hains, P.E.
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC
4101 Ravenswood Road, Suite 210
Ft. Lauderdale, Florida 33312

Re: Case #2014037302 - Alpha Marine Surveyors

Dear Mr. Hains:

Your complaint against Alpha Marine Surveyors was presented to the Board's Probable Cause Panel for review. The Panel directed that no action be taken with regard to this complaint at this time. Further, the Panel directed that the question of protected titles, such as Marine Engineer, be discussed at a full FBPE Board Meeting. During discussion by the full Board, it was decided that the question of protected titles be discussed at the next Rules Committee Meeting. The next Rules Committee meets on November 19, 2014 at the Board offices in Tallahassee.

The complaint against Alpha Marine Surveyors has been closed pending a resolution by the Board. While the complaint is in closed status, it will remain in my active files until such resolution occurs.

If you have any questions, please contact me.

Sincerely,

Wendy Anderson
Investigator

/wsa

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
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Tallahassee, Florida 32303
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www.fbpe.org

Close & re-open after Board Discussion to be taken to board.

September 8, 2014

Drew B. Hains, P.E.
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC
4101 Ravenswood Road, Suite 210
Ft. Lauderdale, Florida 33312

Re: Case #2014037302 - Alpha Marine Surveyors

Dear Mr. Hains:

This letter is to acknowledge receipt of the complaint you filed against Alpha Marine Surveyors. The complaint has been assigned the number referenced above. This matter will be analyzed by the undersigned for a determination of legal sufficiency. As complaints vary in complexity, no definite time frame can be given as to when the analysis will be completed. You will be advised in writing of the outcome of this analysis.

Please note that the Florida Board of Professional Engineers' jurisdiction is statutorily restricted to the investigation of matters involving possible violations by licensees or allegations of unlicensed practice of professions regulated by the Board. For a complaint to be deemed legally sufficient for investigation, the allegation must constitute a possible violation of a licensee's practice act or governing rules and must contain adequate documentation to support the allegation. Complaints involving services fees or monetary recovery are not covered by statute or rules and therefore should be addressed in civil court.

Sincerely,

Wendy Anderson
Investigator

/wsa

Domain **09 - Board of Professional Engineers** Logged in as: **wgregory**

System Messages

- Complaint created. New Complaint # 2014037302.

Lic Type **0902 - Certificate of Authorization** Status **10 Initial Review** Status Date **09/08/2014**

Complaint # **2014037302** Case Type **CMP - Complaint** Disposition Disposition Date

Docket# Respondent **ALPHA MARINE SURVEYORS** Responsible **wgregory - GREGORY, WENDY** **Private Case**

Complaint | Respondent | Complainant | Addt'l Info

Source **LIC - Licensee** Security Level **1**

Form **EMAL - Email** Priority

Class'n **UNLC - Unlicensed Activity** Complexity **R - Regular**

Security **STND - Standard** Incident

Region Received **09/06/2014**

Reference

Entered **09/08/2014** Entered By **wgregory**

Summary **Allegations that subject is offering engineering services in the State of Florida without a Certificate of Authorization.**

Updated **09/08/2014 10:44:37** By **wgregory**

Parties | Activities | Allegations | Discipline | Violations | Compliance | Related | Disposition | Inspection | Costs | Time Tracking | Auto Assign | Attachments | History | Work Notes | Print Report

Change | Save | OK | Cancel | Back

Wendy Anderson

From: Drew Hains <dhains@murrayna.com>
Sent: Monday, September 08, 2014 10:46 AM
To: Wendy Anderson
Subject: RE: Rolando R. Santos

Wendy:

That was my error, I am not sure how I missed it as I always check before send the complaint in. But I do see it now and also see that "Alpha Marine Surveyors" does not have C/A.

Best,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Monday, September 08, 2014 10:40 AM
To: Drew Hains
Subject: RE: Rolando R. Santos

Mr. Hains:

In the process of opening this complaint, I came across PE License Number 12627 for Rolando R. Santos, P.E. Because I was able to locate a Professional Engineer License for Mr. Santos, he is not in violation of any Statute or Rule by utilizing that title. However, the company, Alpha Marine Surveyors, does not hold a Certificate of Authorization in the State of Florida, and this will be reviewed.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, September 08, 2014 10:25 AM
To: Wendy Anderson
Subject: RE: Rolando R. Santos

Wendy

Many thanks for the below. As I was in attendance in 2008, I am aware of the board's position to selectively enforce the laws and rules.

Kind Regards,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Monday, September 08, 2014 10:20 AM
To: dhains@murrayna.com
Subject: Rolando R. Santos

Mr. Hains:

Thank you for your email. This complaint will be processed and you will be notified of the complaint number assigned.

Please be aware that in April 2008, at a regularly scheduled FBPE Board Meeting, it was determined:

Upon a motion by Mr. Rebane, seconded by Dr. Bauer, it was moved uphold the laws and rules dealing with protective titles and to refrain attempting to regulate naval architecture and marine engineering in Florida

If you have additional questions, please let me know.

Wendy Anderson
Investigator &
Public Records Requests

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FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, July 28, 2014 3:20 PM
To: John Rimes
Subject: Complaint 20080022965 - Robert A. Schofield

Mr. Rimes:

I hope this message find you well. I am following up on very old matter where I have recently discovered new information. Specifically, I am in receipt of a letter from Mr. Jack Beamish dated Feb 4, 2008 (see attached email transmitting the subject letter me), whereby I was notified that a Notice to Cease & Desist from identifying himself as "marine structural engineer" was issued to Mr. Robert A. Schofield . Further, I am in receipt of the attached recent report of Mr. Schofield whereby on page 9 he states:

> All of the structure is marine grade and suitable for years of immersion in sea water. This is one of those categories of structural details where using the class rules verbatim without disgression can border on the ludicrous. As a naval structural engineer, I can see that the beam cut thus is just fine structurally, and the cutout is nicely finished. The beam obviously is grossly oversized, and might even be structurally redundant. The deck plating there is heavy thick-cored fiberglass

I note the slight change in the wording from "**marine** structural engineer" to "**naval** structural engineer." I further note the wording of FS 471.031 (1) which states (bold emphasis added):

(1) A person may not:
(a) Practice engineering unless the person is licensed or exempt from licensure under this chapter.
(b)1. Except as provided in subparagraph 2. or subparagraph 3., use the name or title "professional engineer" **or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer when the person is not licensed under this chapter**, including, but not limited to, the following titles: "agricultural engineer," "air-conditioning engineer," "architectural engineer," "building engineer," "chemical engineer," "civil engineer," "control systems engineer," "electrical engineer," "environmental engineer," "fire protection engineer," "industrial engineer," "manufacturing engineer," "mechanical engineer," "metallurgical engineer," "mining engineer," "minerals engineer," "**marine engineer**," "nuclear engineer," "petroleum engineer," "plumbing engineer," "**structural engineer**,"

"transportation engineer," "software engineer," "computer hardware engineer," or "systems engineer."

Considering the wording of the above and specifically the language I have placed in bold type, it would appear, at least to me, that Mr. Schofield has not only violated the aforementioned Florida State Statue but also the intent of your organization's January 25, 2008 Notice to Cease and Desist. Therefore, I kindly ask you to review the attached, take appropriate action and advise me of your findings and the outcome accordingly. If Mr. Schofield, sought and received permission to use the term, "**naval** structural engineer," my apologies as I have been unable to obtain an public record of such action.

In the interest of public safety,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
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Switchboard 954-527-5505 EXT 42
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Investigator &
Public Records Requests

FBPE
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2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

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Sent: Monday, September 08, 2014 10:25 AM
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Subject: RE: Rolando R. Santos

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Drew B. Hains, PE
Vice President, Engineering

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Sent: Monday, September 08, 2014 10:20 AM
To: dhains@murrayna.com
Subject: Rolando R. Santos

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Wendy Anderson
Investigator &
Public Records Requests

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If you have additional questions, please let me know.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, July 28, 2014 3:20 PM
To: John Rimes
Subject: Complaint 20080022965 - Robert A. Schofield

Mr. Rimes:

I hope this message find you well. I am following up on very old matter where I have recently discovered new information. Specifically, I am in receipt of a letter from Mr. Jack Beamish dated Feb 4, 2008 (see attached email transmitting the subject letter me), whereby I was notified that a Notice to Cease & Desist from identifying himself as "marine structural engineer" was issued to Mr. Robert A. Schofield . Further, I am in receipt of the attached recent report of Mr. Schofield whereby on page 9 he states:

> All of the structure is marine grade and suitable for years of immersion in sea water. This is one of those categories of structural details where using the class rules verbatim without disgression can border on the ludicrous. As a naval structural engineer, I can see that the beam cut thus is just fine structurally, and the cutout is nicely finished. The beam obviously is grossly oversized, and might even be structurally redundant. The deck plating there is heavy thick-cored fiberglass

I note the slight change in the wording from "**marine** structural engineer" to "**naval** structural engineer." I further note the wording of FS 471.031 (1) which states (bold emphasis added):

(1) A person may not:
(a) Practice engineering unless the person is licensed or exempt from licensure under this chapter.
(b)1. Except as provided in subparagraph 2. or subparagraph 3., use the name or title "professional engineer" **or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer when the person is not licensed under this chapter**, including, but not limited to, the following titles: "agricultural engineer," "air-conditioning engineer," "architectural engineer," "building engineer," "chemical engineer," "civil engineer," "control systems engineer," "electrical engineer," "environmental engineer," "fire protection engineer," "industrial engineer," "manufacturing engineer," "mechanical engineer," "metallurgical engineer," "mining engineer," "minerals engineer," "**marine engineer**," "nuclear engineer," "petroleum engineer," "plumbing engineer," "**structural engineer**,"

"transportation engineer," "software engineer," "computer hardware engineer," or "systems engineer."

Considering the wording of the above and specifically the language I have placed in bold type, it would appear, at least to me, that Mr. Schofield has not only violated the aforementioned Florida State Statue but also the intent of your organization's January 25, 2008 Notice to Cease and Desist. Therefore, I kindly ask you to review the attached, take appropriate action and advise me of your findings and the outcome accordingly. If Mr. Schofield, sought and received permission to use the term, "**naval** structural engineer," my apologies as I have been unable to obtain an public record of such action.

In the interest of public safety,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

Wendy Anderson

From: Wendy Anderson
Sent: Monday, September 08, 2014 10:20 AM
To: 'dhains@murrayna.com'
Subject: Rolando R. Santos

Mr. Hains:

Thank you for your email. This complaint will be processed and you will be notified of the complaint number assigned.

Please be aware that in April 2008, at a regularly scheduled FBPE Board Meeting, it was determined:

Upon a motion by Mr. Rebane, seconded by Dr. Bauer, it was moved uphold the laws and rules dealing with protective titles and to refrain attempting to regulate naval architecture and marine engineering in Florida

If you have additional questions, please let me know.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

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Sent: Monday, July 28, 2014 3:20 PM
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In the interest of public safety,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
Fax 954-527-5504

Wendy Anderson

From: Drew Hains <dhains@murrayna.com>
Sent: Saturday, September 06, 2014 3:21 PM
To: John Rimes
Cc: Wendy Anderson
Subject: 1187 Complaint -- Rolando R Santos - Possible violation of FS 471.031 (1) use of the title "Marine Engineer"
Attachments: Preliminary Report.pdf

John

Attached please find in PDF report of a Mr. Rolando R. Santos in which he identifies himself as a "Marine Engineer." I believe this might be a possible violation of FS 471.031 (1) (b)1. I researched www.myfloridalicense.com and was not able to locate a professional engineering license for Mr. Santos or any indication that he would be entitled to use "marine engineer" on the basis of the exemption provided in 471.031 (1) (b) 3. (for example as a subordinate of a professional engineer) as I found no record of a certificate of authorization for the firm indicated.

I also note that http://alphamarine.com/ indicates that:

> Alpha Marine Surveyors is a professional organization comprised of Marine Engineers, Port Captains, USCG Merchant Marine Officers, Retired USNR Officers, and Hull & Cargo Surveyors.

Please review the above and the attached and take appropriate action.

Kind Regards,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
Switchboard 954-527-5505 EXT 42
Direct 954-331-2574
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ALPHA MARINE SURVEYORS

Corporate Office
1330 N.W. 7th Street Miami, Florida 33125
Local Phones: (305)324-1555 / Fax: (305)324-1525
Toll Free - Phone: (866)812-5742 / Fax: (866)512-5742
Main Email - MarineSurveys@AlphaMarine.com

Miami, FL	Savannah, GA	Chicago, IL	Fort Worth, TX	Philadelphia, PA
Pt. Everglades, FL	Charleston, SC	Mentor, OH	Dallas, TX	Norfolk, VA
West Palm Bch, FL	Raleigh, NC	Houston, TX	Medford, NJ	Baltimore, MD
Jacksonville, FL	Mobile, AL	Nashville, TN	Galveston, TX	Newark, NJ
Tampa, FL	Anderson, AL	Freeport, TX	Long Island, NY	Hampton, NH
Key Largo, FL	Gulfport, MS	Saint Louis, MO	New Haven, CT	Bronx, NY
Tavernier, FL	New Orleans, LA	Louisville, KY	Wilmington, DE	Boston, MA
Republic of Panama	Baton Rouge, LA	Southaven, MS	Shawnee, KS	Humacao, P.R.

ESTABLISHED IN 1982

August 12, 2014

Law Offices of Peter M. Commette, P.A.
1323 S.E. 3rd Avenue
Fort Lauderdale, FL 33316

Attn: Peter Commette, P.A.
Email: pmc@commettelaw.com

From: Rolando R. Santos, Marine Engineer
Email: Roland_Santos@AlphaMarine.com

Reference:

PRELIMINARY REPORT # 1
Our File No.: 0514/038RRS
US Court Case No.: 14-CV-61057-WPD
Insured/ Owner: Michael Triggiano
Claim Unit No.: 8003139959-1-1
Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
Date of Joint Survey: June 30th, 2014
Page: 1

This is to certify that on June 30th, 2014 the undersigned did at your request investigate the circumstances regarding the above referenced boat located at Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409.

We report our findings as follows:

PARTIES IN ATTENDANCE:
Rolando Santos, Marine Surveyor - Alpha Marine Surveyors c/o Law Offices of Peter M. Commette, P.A.
Brian Donnalley, Marine Surveyor – Donnalley Marine Services c/o Foremost Insurance
Joe Rose, Service Manager, Bellhart Marine

BACKGROUND:
On 5/28/14 we were provided with numerous documents on the matter. Documents provided and/or gathered came from various sources and we have listed them below. Photographs and references in the body are also incorporated:

5/28/2014 – Emails from Peter Commette - Attachments Received:

Email # 1:

- Complaint
- Answer to Complaint

Email # 2:

- Notice of Removal to Federal Court as Filed

Email # 3:

- 2002 3372 Invoice for Purchase
- Brian Donnalley Phone Calls
- Foremost Family Boater's Policy
- Foremost Policy Declaration
- Foremost Survey Report 01-21-14
- Maint Schedule
- Water Pump – Maintenance Schedule Seawater Pump
- Water Pump Housing Receipt (Landscape, Ex D)
- Water Pump Housing Receipt

Email # 4:

- 01-07-14 from Pirok
- 01-13-14 from Pirok
- 01-17-14 from Pirok
- 01-23-14 from Pirok
- 01-24-14 from Pirok
- 01-24-14 to Pirok
- 01-29-14 from Pirok
- 02-24-14 from Donnalley
- 02-28-14 from Donnalley
- 03-02-14 to Donnalley
- 03-18-14 from Pirok
- Denial Letter from Foremost
- Denial Letter

6/11/2014 – Email from Joe Rose - Attachments Received:

Email # 1:

- IMG_8726
- IMG_8748
- IMG_8749
- IMG_8750
- IMG_8751
- IMG_8752

6/18/2014 – CD from Peter Commette – Attachments Received:

CD Labeled: Rule 26 Disclosures:

- IMG_1934 to IMG_2061 (Shows Date Modified 1/4/14)

- IMG_2242 to IMG_2257 (Shows Date Modified 1/10/14)
- IMG_2420 to IMG_2457 (Shows Date Modified 1/19/14)

6/20/2014 – Email from Mike Triggiano – Attachments Received:

Email #1:

- Diagram of How Boat is Tied to Dock – Triggiano
- Photographs taken and provided by Mr. Tripper McShane on 7/24/14
- Photographs & video provided by Mr. Dwayne Dehart of Bellhart Marine
- Photographs provided by Mr. Moore & Mr. Rose

From the documentation we surmised that the Marine Surveyor for Foremost had concluded that the proximate cause of loss was associated with an alleged failure of the raw water pump via an alleged corrosion mechanism. Communication between our principal and the Foremost Marine Surveyor indicated that there were potentially some areas that were not properly documented and/or investigated.

June 6th 2014:
After the preliminary review of the materials we contacted Marine Surveyor Brian Donnalley (BD) and after disclosing our involvement on behalf of the Mr. Triggiano he agreed to answer only based on the content of his report:

1. Raw water pump was found leaking – proximate cause of loss was in his opinion associated with corrosion causing the housing to crack and leak. He confirmed that the ingress rate was never verified and that he was of the opinion that it was dependant on the position of the impeller
2. BD further confirmed that the raw water pump was pressurized with city water hose
3. BD stated that he found no other source of ingress
4. BD would not elaborate much more stating that most was in the report and stood "as is"
5. We discussed dates of attendance for a joint inspection and coordination was turned over to Donna Meredew in our office

On 6/18/14 we were informed by Mr. Triggiano that his boat has been kept at berth Nr 7 for over 10 years. That the boat was last used December 14 & 15th 2013 and was reported to have partially sunk on 12/27/13. Mr. Triggiano explained that the area where his boat was being berthed was under construction and he was aware that his boat and others were being moved around to accommodate the construction.

Mr. Triggiano explained that he had replaced the raw water pump on the engines less than (3) years ago which was well within the prescribed maintenance period and that when last used he confirmed that his aft bilge pump was working properly.

Mr. Triggiano explained that his boat was always secured with spring lines and that shore power was always connected to maintain the integrity of his onboard batteries.

Mr. Triggiano states that the marina employee Troy Moore at about 1300hrs noticed that the boat was sitting low and

Bellhart Marine was dispatched and recovered the boat.

Photo provided by Mr. Triggiano taken by Mr. Joe Rose - Picture taken 12/27/13 @ 1322hrs

Mr. Triggiano stated that water reached the top of the valve covers. Mr. Triggiano through his own efforts became aware that during the construction/renovation of the docks in his area that boats were being moved around and that power was being shut off for indeterminate amounts of time.

We had spoken to Mr. Darren Anderson, Assistant Manager for Inlet Watch Marina and he stated that the primary Electrical contractor was Mead Electric c/o Brian Mead. We spoke to Mr. Mead who stated that the entire bulkhead in the area had collapsed and that all of the boats in the immediate area had been removed.

He further stated that there were (2) other contractors working in the area one for the walkways and ramps and the other was a Marine Contractor with a large barge and work boats installing the new sheet piles and bulkhead.

Mr. Mead stated that he was unaware where the displaced boats were being kept but that most of his work was completed by October 2013.

We later spoke with Mr. Troy Moore, Manager of Inlet Watch Marina (who was on vacation during our attendance) and he elaborated further.

Mr. Moore stated that the bulkhead collapsed last year around thanksgiving of 2012 and that it took some time to obtain the correct permits, bids etc. but that it was his goal to have all repairs completed before the anniversary of the problem.

Mr. Moore explained that there were (3) contractors involved but that all work was completed in October to very early November 2013 and that the repairs would not have physically impacted slip 7 where Mr. Triggiano kept his boat.

Mr. Moore did confirm that during the repairs boats were moved and he did state that there were localized power outages associated with the repairs but the disruption was kept to a minimum.

Mr. Moore understood that we were investigating this matter for Mr. Triggiano since his primary insurance had denied

coverage. Mr. Moore confirmed that he knew and considered Brian Donnalley (BD) to be a friend.

Mr. Moore confirmed that BD never approached him to ask or investigate potential circumstances regarding the care & custody at the dock, marina or slip 7. Mr. Moore confirmed that he never gave BD any photographs of Mr. Triggiano's boat as found since BD had not approached him about the matter.

We asked Mr. Moore regarding the circumstances when he was made aware of the problem and he stated that he was alerted by one of the home owners that the Triggiano boat appeared to be sinking. It was then that Mr. Moore went and personally investigated the matter and started to contact parties to have the boat tended to.

In our conversations with Mr. Moore we confirmed the following about the marina:

1. Cameras are present but not working for the area where slip 7 is located due to corroded wiring. Mr. Moore indicated that future plans are to install wifi powered units to restore video surveillance
2. The marina maintains a live watch from 0800hrs to 1700hrs (7) days a week. For (15) hrs in the evening to the next morning there is no watch and there is no record of who potentially comes & goes from the marina via water.
3. The marina does not accept transient boats from the ICW but they have found this activity to exist; mostly discovered on the next day when marina personnel arrive. Mr. Moore states that this week such an event occurred but was later found to be an owner who had leased a slip and not reported the activity
4. There have been thefts at the marina where access was gained by water presumably the ICW
5. There have been periods of power outages although not well documented
6. And that this event was not discovered by Inlet Watch personnel but brought to the attention by a neighbor/home owner who alerted Inlet Watch near the afternoon of the 27th.

Mr. Moore did confirm that the boat that would have normally been in slip nr 8 next to Mr. Triggiano's boat was not there during the month of December since it had been involved in an accident and was dry hauled.

Mr. Moore states that he was not aware of any other boat being kept at slip 8.

Mr. Moore in our conversation did state that he did not believe that the contractors had anything to do with the problems with Mr. Triggiano's boat and he did state that he was unaware of any other unauthorized boat activity in the area that could have resulted in the problem.

Mr. Moore did sight the damages to the port bow and the transom swim platform to Mr. Triggiano's boat.

Mr. Moore researched his file and found (2) additional pictures of the boat as found. The two pictures are below and a cropped portion showing that the thru hull fittings were submerged:

ALPHA MARINE SURVEYORS

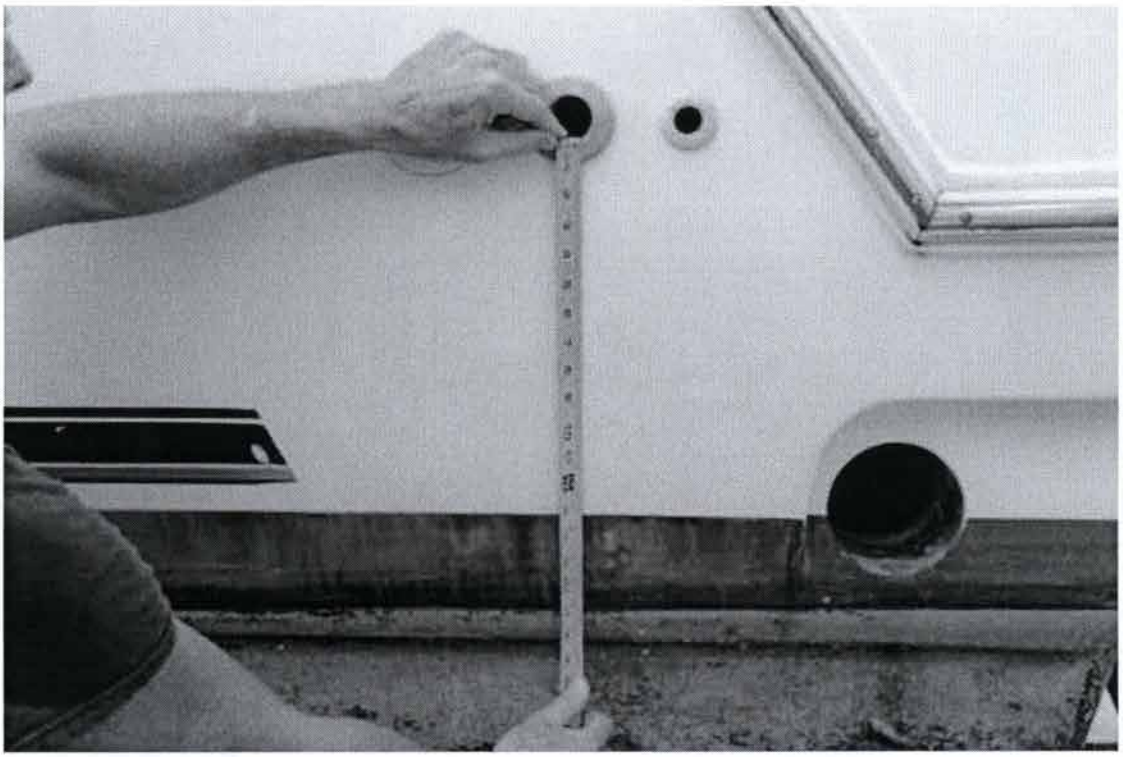
PRELIMINARY REPORT # 1
Our File No.: 0514/038RRS
US Court Case No.: 14-CV-61057-WPD
Insured/ Owner: Michael Triggiano
Claim Unit No.: 8003139959-1-1
Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct. Wilmington, NC 28409
Date of Joint Survey: June 30th, 2014

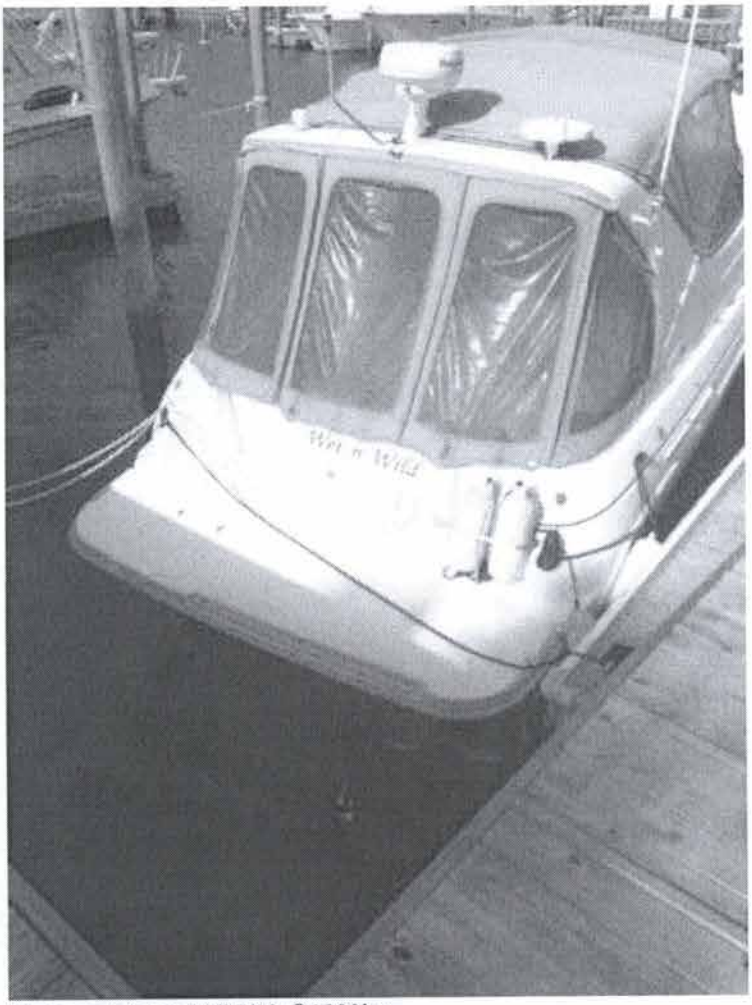
Photograph taken 12/27/13 @1230hrs

Cropped out area of the photograph provided

The photo shows that the port list was so extreme that it submerged the aft bilge pump discharge, generator exhaust and the weather deck scupper drain.

All of these through hull fittings were 13" above the painted top edge of the bottom paint and 17" above the normal static waterline sighted on the hull.





Photograph taken 12/27/13 @1230hrs
The pictures which were produced after our attendance clearly show that this boat sank much further than indicated by the static waterlines visible on the hull.

Interestingly enough the pictures show that this boat sank with a strong port list which is 100% contrary to BD's hypothesis of how this vessel foundered. This boat in the engine room contains several longitudinals that although modified with small diameter drain holes would have caused a favored list depending on the point of ingress.

If this sinking would have been the result of the stbd engine raw water pump we would have expected a stbd list when 1st discovered NOT a port side list as found. Below is a general diagram of the boat from the owner's manual and we have added the proximate location of the longitudinal as sighted and we also took the liberty to show the proximate location of the raw water pumps on each engine (red lines = longitudinal, red boxes = raw water pumps). As noted the raw water pump on the stbd engine would have been on the stbd longitudinal accumulating water in that area. Located centerline between the P&S engines & longitudinal was the aft bilge pump. The "house" battery was found completely drained indicating that the aft bilge pump was working and functioned until the battery was drained and/or rapidly submerged:

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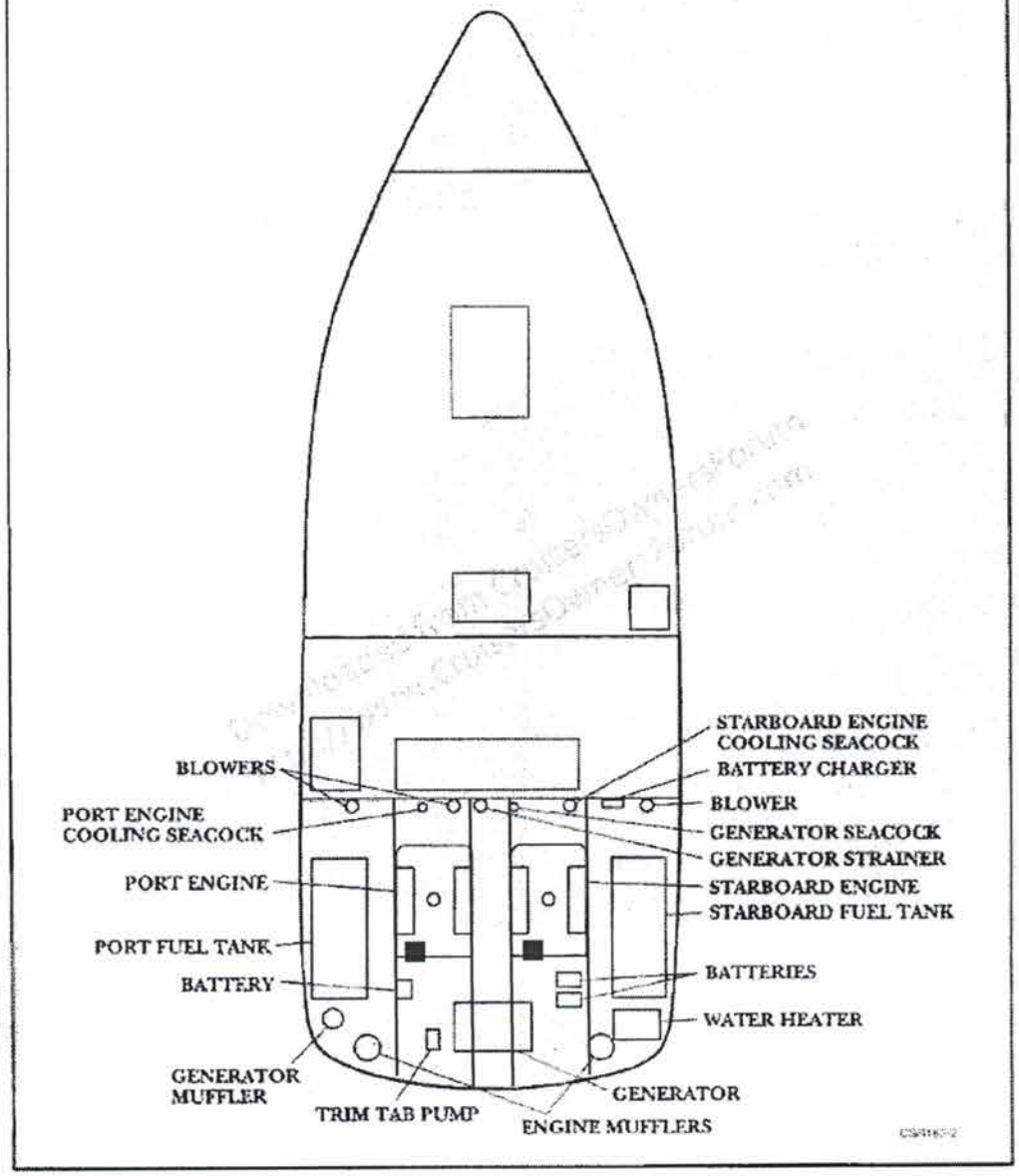
GENERAL LAYOUT
Inboard V-Drive Installation



Cruisers yachts

2-4

Stbd side provided by Mr. Joe Rose showing that it is high – we presume that the boat at this point may have been pumped out. Photograph submitted by Mr. Triggiano

(3) thru hull fittings – genset, bilge pump & weather deck scupper drain

On 7/23/14 we spoke to Mr. Dwayne Dehart, owner of Bellhart Marine. We had met Mr. Dehart the morning of our attendance but he was unable to remain or be interviewed by the undersigned due to a prior commitment. Mr. Dehart explained that he was present when the boat was refloated on 1/9/14 and that BD was as well. He states that when the boat was launched early in the morning BD went into the boat to search for leaks. No leaks were found and that he left BD on the boat for a significant period of time. Returning to the boat Mr. Dehart states that BD approached him and stated that he could find no leaks.

It was then after some discussion that the raw water pump inlets were pressurized and the alleged leak in the stbd engine raw water pump was allegedly discovered. Mr. Dehart explained that he told BD that the inlet lines were likely "Air locked".

Mr. Dehart sent us the only picture he had of the boat the day it was discovered and it shows that there is activity such as hoses, batteries and the canvas is pulled back. There is a person standing next to the transom area on the dock with what appears to be tools:

Below we have added a series of pictures of Inlet Watch Marina taken from Google Maps which show the inlet area, marina and the berth with Nr. 8 unoccupied. Coincidentally Triggiano's boat is in slip 7:

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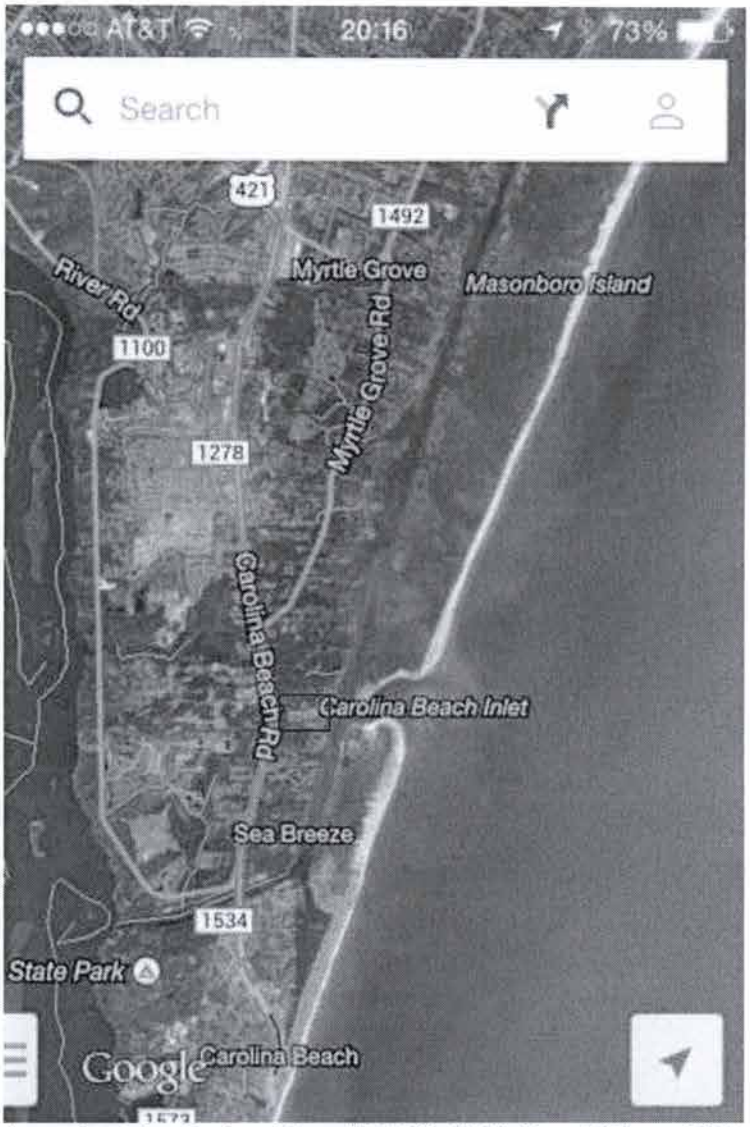

Approximate location in red box of Inlet Watch Marina – ICW runs N&S

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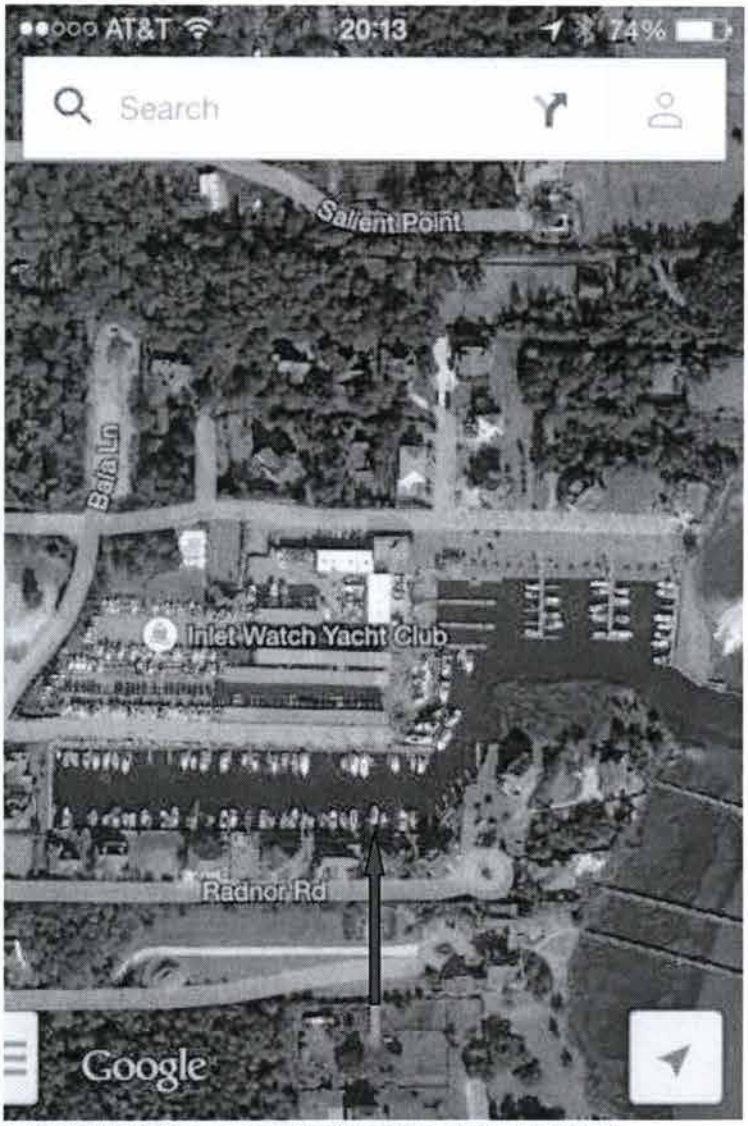
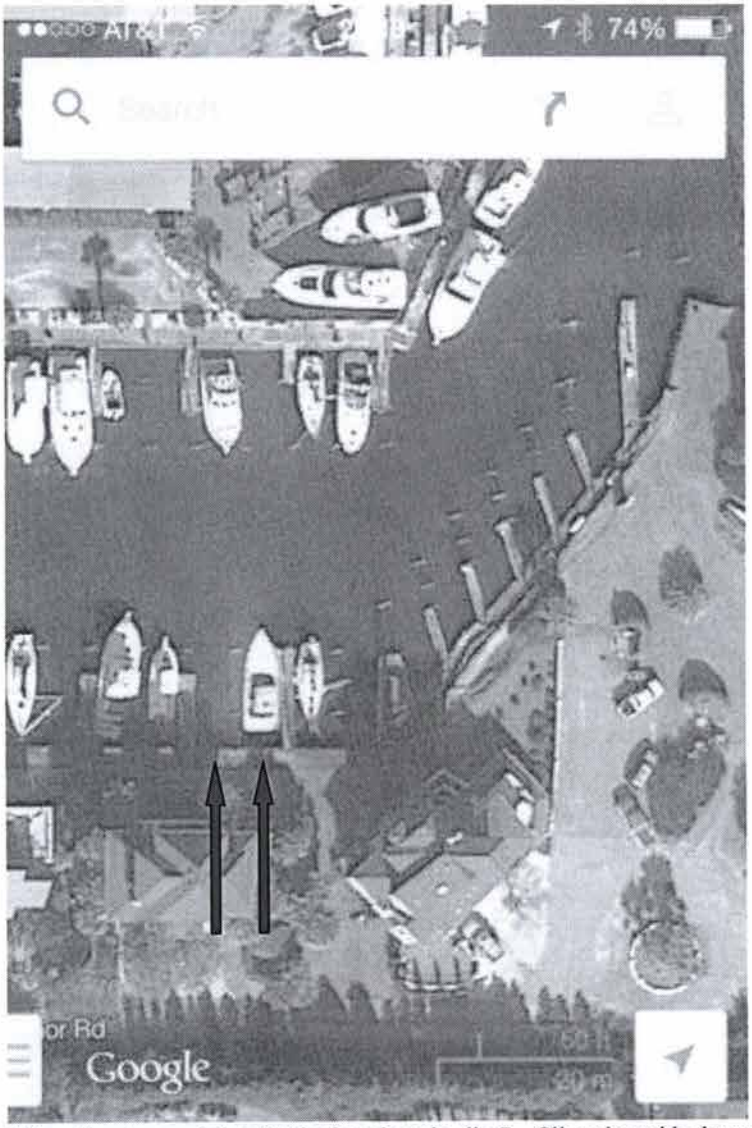


Inlet Watch Marina – approximate location of slip 7 indicated



Slip nr 8 not occupied and Triggiano boat in slip 7 – Slips alongside the construction area are empty indicating that this area was still under repairs or near completion

Alternate picture of the above

SURVEYORS FINDINGS:
The undersigned completed the joint inspection on June 30th, 2014 with Mr. Brian Donnalley. Findings & conclusions are as follows:

1. Repairs to the bulkhead area that included slips 301 thru 7 (Triggiano's slip) took place and was completed prior to the loss. We know that during this period of construction there were a total of (3) contractors working in the area and that the boats up to slip 7 had been moved to alternate slips. The exact details are not known at this time but the port side of Mr. Triggiano's boat clearly shows fendering marks something that would not have been readily visible to our client since his boat was secured stbd side to slip 7. The fendering action resulted in the failure of (2) out of (4) thru hull fittings which would have easily allowed rapid flooding of the boat if forced under. The exact time/date and how these thru hull fittings came to be damaged cannot be established at this time but what can be said is that this damage did exist the day of the loss and is a clear path for allowing rapid water ingress into the hull.

    a. BD admitted to the undersigned that he had not seen the failed thru hull fittings and that he had not investigated this area.

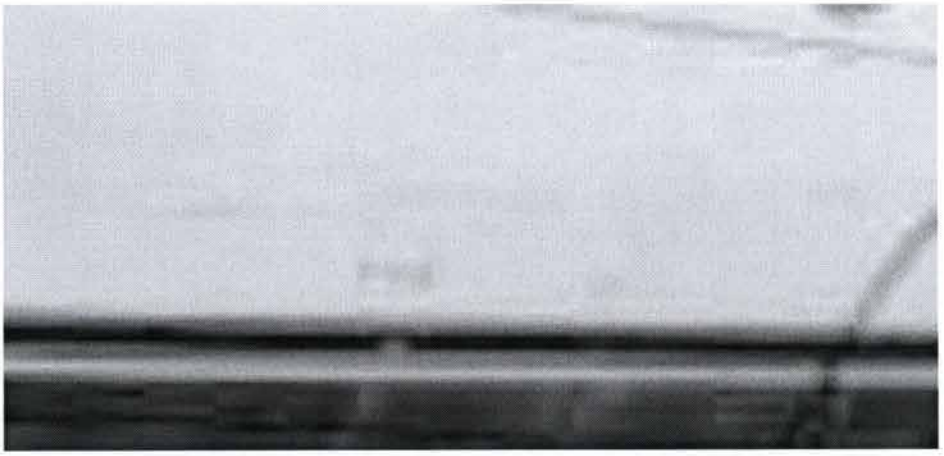
    b. A perusal of the photographs taken by BD show that only (1) photograph was taken of the port side bow area. The picture provided to us is low resolution and it is a profile view of the port side. The picture shows the horizontal fendering marks in and around the (4) thru hull fittings. Due to the low

resolution we were unable to clearly view the (4) thru hull fittings. But BD also admitted to the undersigned that he did not inspect these fittings and there are no additional photographs of this area.

c. BD also admits that he never inspected the berth/slips and was completely unaware that there had been construction in the area of Mr. Triggianno's slip/berth

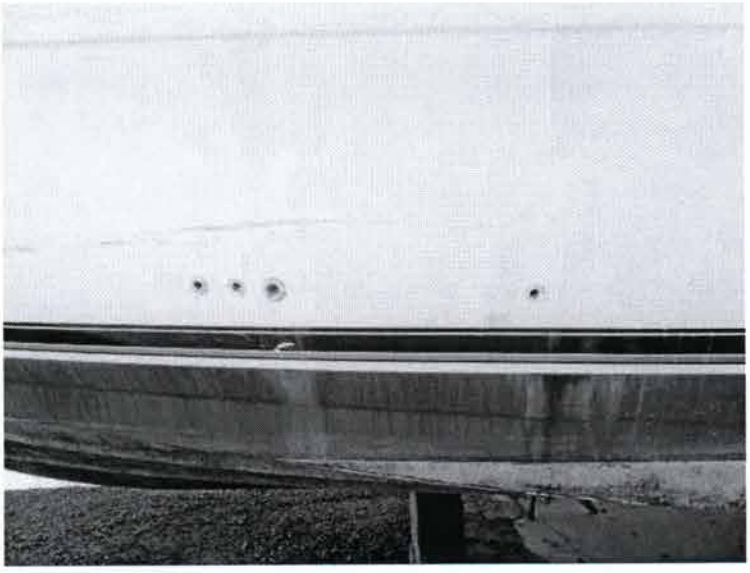
d. BD also admits that he did not realize that during this construction period power to the slips had been renewed resulting in blackout periods and the possibility that boats were being moved in/out of the area to accommodate the construction.

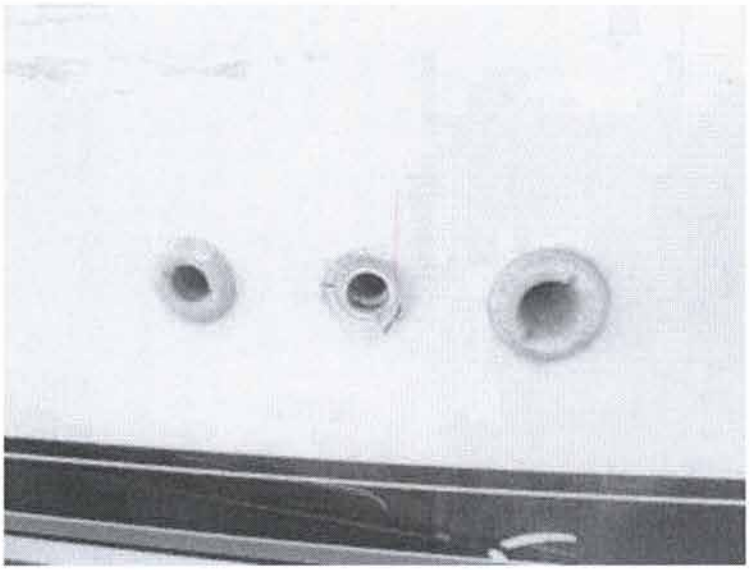
Picture provided by BD

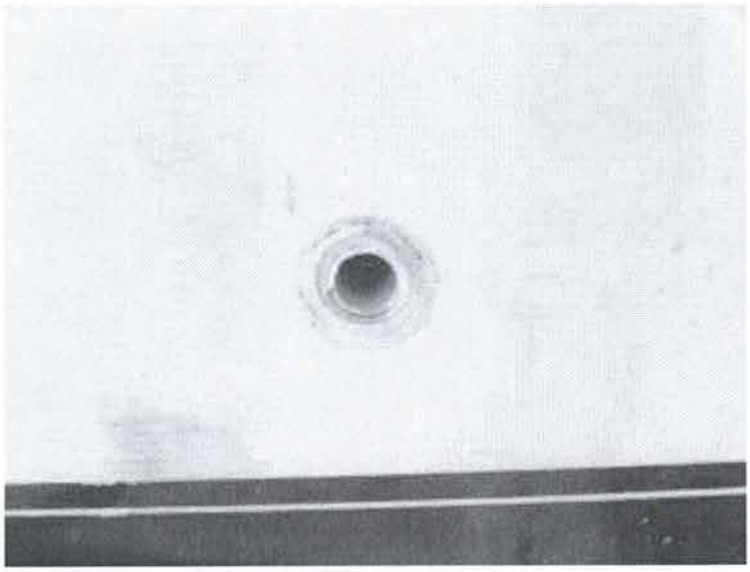


Portion cropped from the above picture to show the fendering marks that were captured by BD. Resolution is too low to determine condition of thru hull pictures from this picture

Below (3) pictures were taken by the undersigned and show the same area except with greater detail







2. We jointly inspected the (4) thru hull fittings which BD admits he never looked at during his inspection and confirmed that they belonged to:

    a. Galley sink

    b. Head sink

    c. Shower sump

    d. Bilge pump

3. The damaged thru hull fittings are an open hole in the hull in this area and if forced under will sink the boat very quickly. BD admits that he never inspected this area during his inspection so therefore it was never considered as part of his investigation

4. Next we made observations of the visible waterlines on the hull. As previously noted from the photographs supplied by Mr. Moore the boat was submerged significantly more than indicated by the water lines. What remained on the hull showed changing multiple water lines in the area of the boot stripe which is normal.

   Where it changed from the normal static waterline to an abnormal line was noted to be quick and approximately (max) 2.5" above the normal static line.

   From there it rapidly increased another 8 to 9". We now know from Mr. Moore's pictures that this 8 to 9" increase was actually twice as deep and significant. This may have been the result of shifting accumulated water at some point during the event (bow to stern area) or the boat being rapidly forced under.

   We examined the boat for any indications that could have caused (1) the sinking and (2) rapid change in trim. The following was found:

   a. Rub rail was examined and internal water marks clearly confirmed that there was ingress

   b. Port side trim tab fitting was observed with "old" leakage pattern

   c. Swim platform fittings all had new leak patterns consistent with the transom sitting low in the water

   d. Aft bilge pump discharge which was normally 17" above the normal static waterline was submerged and this would have been a source

   e. Genset discharge was which was normally 17" above the normal static waterline was submerged and this would have been a source

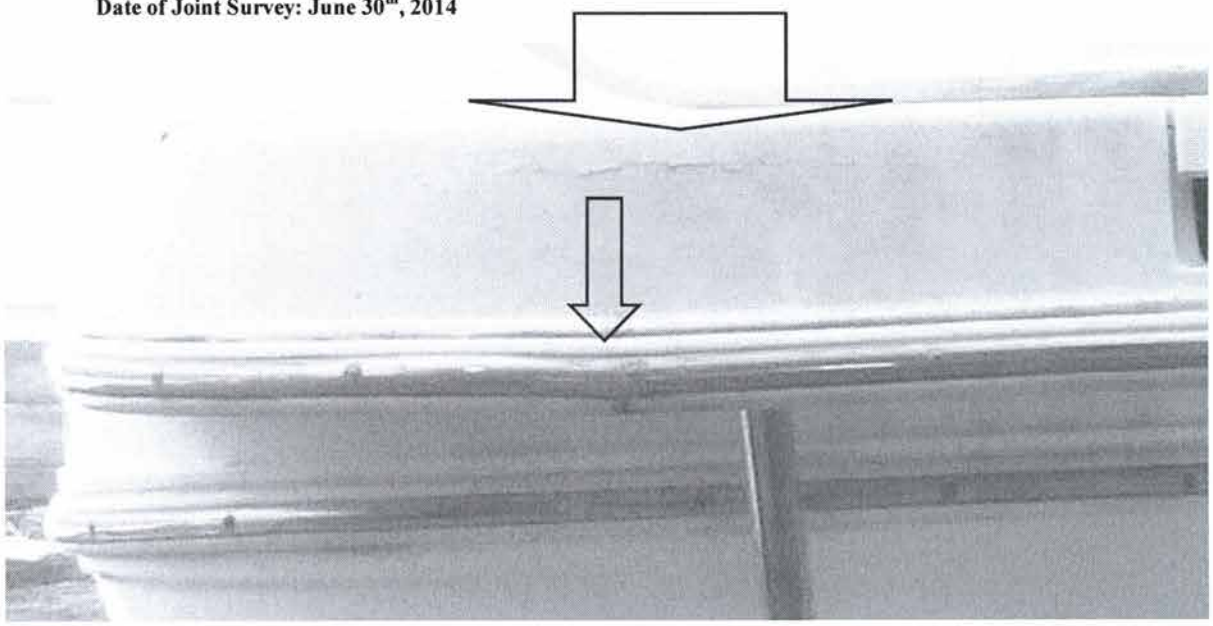
   f. The weather deck scupper drain was also submerged and this could have been another source

   BD had not made any observations of these water lines and the change from about 2.5" to an additional 8 to 9" is clearly a rapid change in vessel trim that should have alerted him. We know that BD never discussed the loss with Inlet Watch Marina or Troy Moore. The pictures that were provided to us were never given to BD during his initial inspections since BD never made contact with the Marina, its personnel or Troy Moore.

5. As previously mentioned the as found pictures provided by Troy Moore show a strong port list which contrary to BD's hypothesis that the boat sank by ingress on the stbd side. This was not discussed the day of the joint inspection since these photos were not produced at the time.

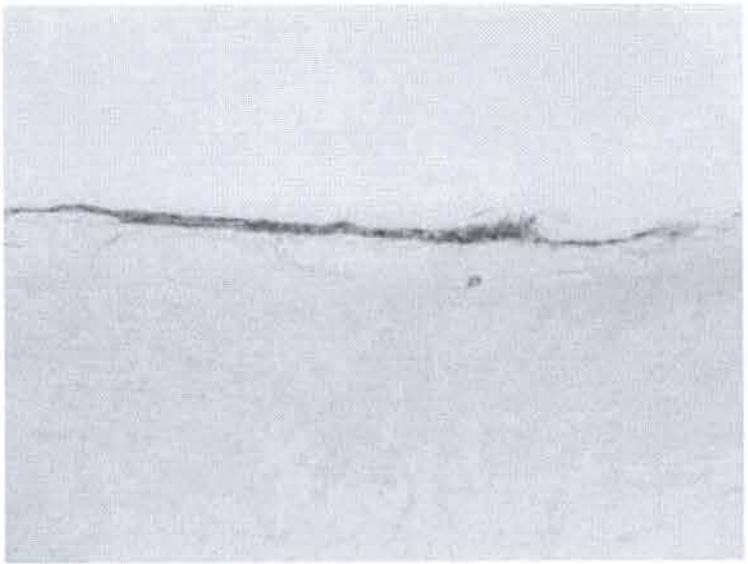
6. Next we inspected the exterior of the hull to determine if there were any signs that the boat was forced under. Outwardly along the gunwale & rubrail areas of the hull no strong indications were noted other than the previously sighted rubrail marks and damage to the (2) out of (4) thru hull fittings on the port bow.

   On the aft port side edge of the swim platform we observed a visible "deflection" on the rubrail which appeared to be an area where it was potentially hung up as being caught under a dock, structure or possibly being underneath another boat that was improperly secured in Mr. Triggiano's berth resulting in this damage



On the exterior surface there were repeated dock impacts which were older and not related but when we went underneath the swim platform to inspect we found a "fresh" large fiberglass failure consistent with this swim platform being caught underneath some type of structure/vessel.

This was shown to BD who after inspecting agreed that it was "fresh" and consistent with this swim platform being caught underneath a structure/vessel.



7. The raw water pump was produced. A box was brought forth by Mr. Joe Rose of Bellhart and we note that it was not sealed and when opened and inventoried we found numerous unrelated items in the box which we left "as is". An inventory of the related parts indicated that what was missing was as follows:

1. O-ring
2. Plastic fractured piece from the pump housing/volute
3. Shaft seal
4. Washers

Items that were in the box unrelated consisted of a dime; part of a rubber impeller, plastic pieces of unknown origin, etc. all of this was left as is. Of note the O-ring that is used to seal the pump housing to the SS wear plate was missing. Using a digital micrometer readings of the pump and its components were taken with BD independently taking measurements using his own micrometer. Any readings taken that were challenged were retaken. The SS wear plate was visibly distorted in the center penetration and measured to sit "proud" by approximately 0.187" at the (3) position (measurements below). The pump housing itself was measured at exactly 2.0" (less the O-ring which was missing) which renders an interference fit of about 0.146" since the impeller is 1.959".

We noted that the shaft housing (cast aluminum) where the bolts that secure the pump were cracked at the threads in two locations. Noted that the shaft seal was also failed (and missing). All of this was never noted by BD as relevant information & admitted to the undersigned.

As we examined the SS wear plate we explained to BD that this was likely the product of heat and thrust and quite possibly the result of an uneven bolting pattern since the threaded holes in two locations were cracked and could have resulted in a gap resulting in the SS wear plate distortion versus the conclusion that it was corrosion. BD did not agree although he admittedly did not notice the failed bolt holes in the cast aluminum housing.

We commented to BD that our client had replaced the raw water pump impeller and was within the prescribed maintenance period. BD acknowledged this fact but asserted that it was his opinion that the owner should have seen this problem. Note: we revert to the fact that this boat did not leak when float tested and required high pressure to produce a leak.

We examined the water pump housing specifically the interior wear/contact pattern in the plastic housing. We noted that the rubber impeller, which was hard against the housing, created a sealed edge all around and that this would not have allowed water to leak out since the impeller was in clear contact (hard contact). BD was shown this and he realized this but countered that the whole housing was cracked. We drew BD's attention to the failed area and one could clearly see the "old" cracks versus the new cracks in the plastic housing. We surmised based on that pattern that our 1st conclusion was correct and concluded secondly that the new cracks developed after the raw water pump was pressurized with the city water hose by BD.

Based on our examination we decisively concluded that the raw water pump was not the cause of the sinking. We shared this conclusion with BD who did not comment. Note: we revert to the fact that this boat did not leak when float tested and required high pressure to produce a leak.

Lastly BD confirmed that he never checked the ingress rate before doing his high pressure test which in our opinion damaged the pump when it was pressurized.

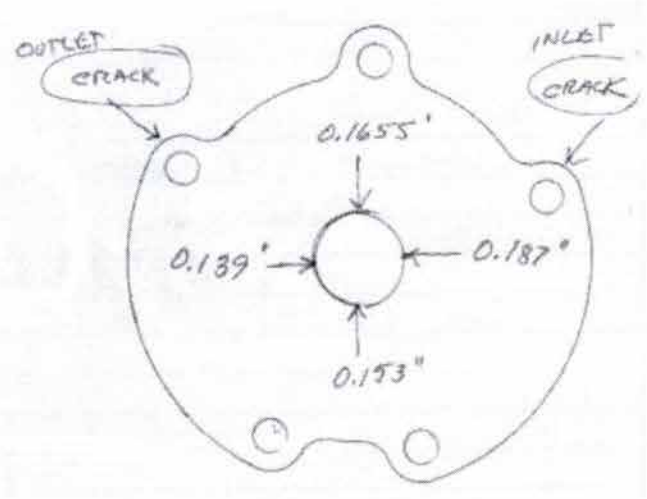
We asked BD how long did the boat remain in the water for the float test and he was unsure. We later learned in speaking with Joe Rose that the boat was floated before 10am and remained in the water all day. Mr. Rose stated that the boat only made water after the raw water pump was pressurized otherwise the boat had not been making water. This was also confirmed by Mr. Dwayne Dehart.

Photographs of the raw water pump supplied by BD don't clearly indicate if these are pre or post – pressurization.

We know that BD did not perform a simple ingress rate test and at this point it was not possible to perform an ingress rate test since the raw water pump had been destroyed.

We know that BD was unaware as to how long the boat remained in the water.

We know that BD stated on more than one occasion that it was his opinion that the ingress rate (leak) was dependant of the position of the internal rubber impeller. This remark caused curiosity since this would have indicated that ingress rate was in fact observed by BD.



8. Next we inspected the engine room. Looked for drip patterns in the area of the stbd engine raw water pump. None were found iwo which is inconsistent with a constant leaking appurtenance. This was shown to BD who acknowledged that there was no drip pattern in the area of the alleged leaking raw water pump.

9. Inspected the batteries and the wiring to/from the batteries. BD did not interpret the damage patterns correctly. There are (3) grp 27 batteries. (2) are starter batteries and the third is a house battery. All (3) are wired to a "Parallel" switch which is used to boost the power when the starter batteries are low by paralleling them thru a toggle switch on the helm station. Inspection of the (3) batteries and wiring rendered the following:

    - Stbd starter was 100% hot when it went down – DOM 3/10
    - Port starter was dead or very near dead when it went down. Since our inspection where the boat was found with a hard port list we would have investigated the starter solenoid on the port engine which could have contributed to the partially drained condition that was found. Visible water lines at the joint inspection suggested an even list sinking which we now know was not the case – DOM 6/13
    - House battery was 100% dead when it went down – DOM 4/13

    The parallel wires burned off hot on the port & stbd starter batteries indicting that this wire was energized (likely between the starter batteries) but remained intact on the house battery further confirming that this battery was completely dead when the boat went under.

Based on the patterns we would suspect that the bilge pumps were hot wired to the house battery only. A perusal of the owner's manual confirms that the starter batteries are isolated and that only the house battery supplies power to the DC components. BD was shown the patterns and agreed with our findings

10. Aft bilge pump and float switch was inspected. We confirmed that it was wired up and that the connections were "good". Wires coming from the pump and the float switch were properly connected and still intact – other wires that BD had made comment too were unrelated and probably from some other appurtenance that was no longer in use. BD agreed that the wiring was intact

SUMMARY:
Based on our inspection we can conclusively state the following:

1. The boat sank from a rapid ingress of water likely the result of a forced change in trim. This was not a gradual accumulation over an extended period of time. From last use on the 15th of December to the 27th of December there were only 11 to 12 days

2. Boat sank with a hard port list indicating that the stbd side raw water pump was not the source as indicated by BD

3. Float test conducted on 1/9/14 had negative results until the city water hose is used to apply significant pressure to the raw water inlet system

4. BD conducts a float test and states that the ingress rate was never observed and then states that the position of the raw water pump impeller likely influenced the ingress rate. We asked BD if it was leaking before the pressure test and he stated "yes" but could not state that observed rate.

5. BD's conclusion that this was the result of the raw water pump is in our opinion flawed. Our observations of the wear patterns don't support his theory plus by nature the pump would not have functioned if the suction volute had in fact been cracked as alleged. BD's comments that the ingress rate was dependant on the position of the impeller are telling that his observations and conclusions are flawed. We surmise that the complete failure of this item was done when the pump was over pressurized with city water causing spoliation of the pump. BD should have preserved the evidence, developed a protocol and requested a joint inspection for further consideration especially when he failed to properly investigate this matter.

6. BD failed to properly inspect the boat and failed to properly investigate the circumstances and environment that the boat was maintained

7. The marina maintains personnel (7) days from 0800hrs to 1700hrs but admitted to the undersigned that transient boats do come in from the ICW and are generally dealt with on the next day especially when they arrive after hours. The fact that the Triggiano boat was discovered by a neighbor versus the Inlet watch marina personnel points to the lack of vigilance that is claimed to exist by Mr. Moore. We opine that the possibility does exist that the damage to Mr. Triggiano's boat may have been the result of an improperly secured boat that came into contact with the properly secured Triggiano boat that came & left unnoticed but resulted in the partial sinking. The physical evidence is present and was never noticed or investigated by BD.

We are of the opinion that the Triggiano boat sank from being forced under as evidenced by the "fresh" damage to the swim platform, rubrail marks on the port bow area damaging (2) out of the (4) thru hull fittings.

Additional observations that were made:

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Policy No.: 0028043014
Boat: 2002 33 Ft Express Cruiser w/ Twin Mercruiser Engines
Date of Loss: 12/27/2013
Survey Location: Bellhart Marine Services – 801 Paoli Ct.
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Date of Joint Survey: June 30th, 2014

1. Inspect the berth – clearly because of the significant tidal changes and the marina being located on the ICW which is subject to transient berthing

2. Bumpers affixed to slip 7 are white and the transfer in the area where the (2) thru hull fittings are damaged is black. Clearly this came from a boat/barge/etc that came in contact with the Triggiano boat likely a transient

CHAIN OF CUSTODY:
The raw water pump was produced by Mr. Joe Rose and as previously stated was in an unsecured cardboard box with unrelated items of unknown origin. We took possession of the failed raw water pump and the exemplar that was used for comparison from BelHart Marine.

Parts missing were noted and previously discussed in this report. BD did not want to sign the chain of custody letter but was present when the "box" was tendered, contents inventoried, examined and secured. This pump as documented in BD's report to the insurance company was tested, examined, removed, disassembled and apparently left unsecured by BD at Belhart Marine.

PHOTOGRAPHS:

Dock:

New exterior wood enclosure

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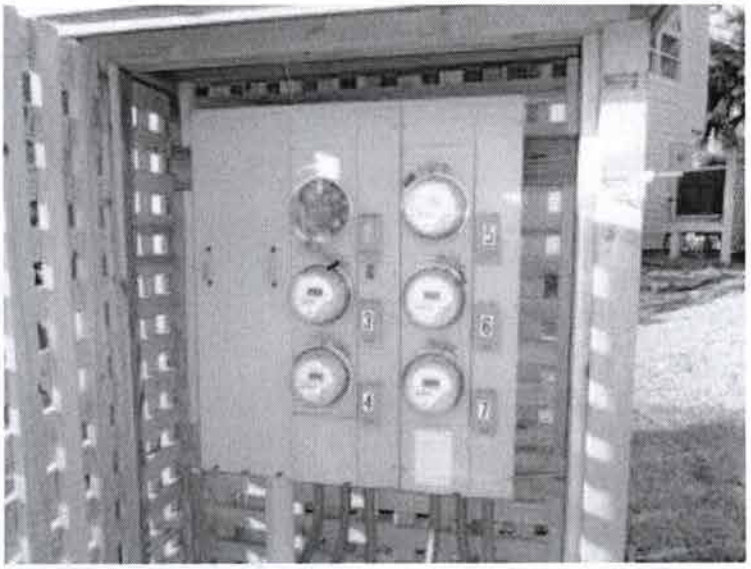

Electrical cabinet to nr 3 thru nr 7

New conduit and junction boxes to the electrical cabinet

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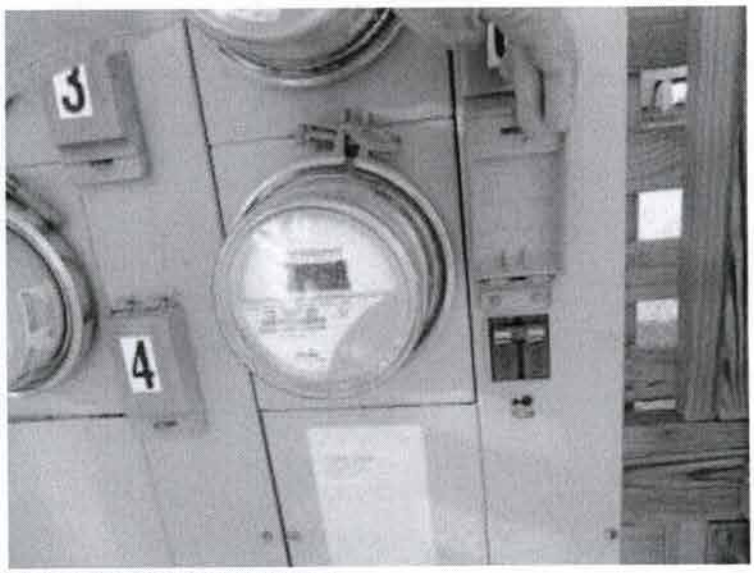
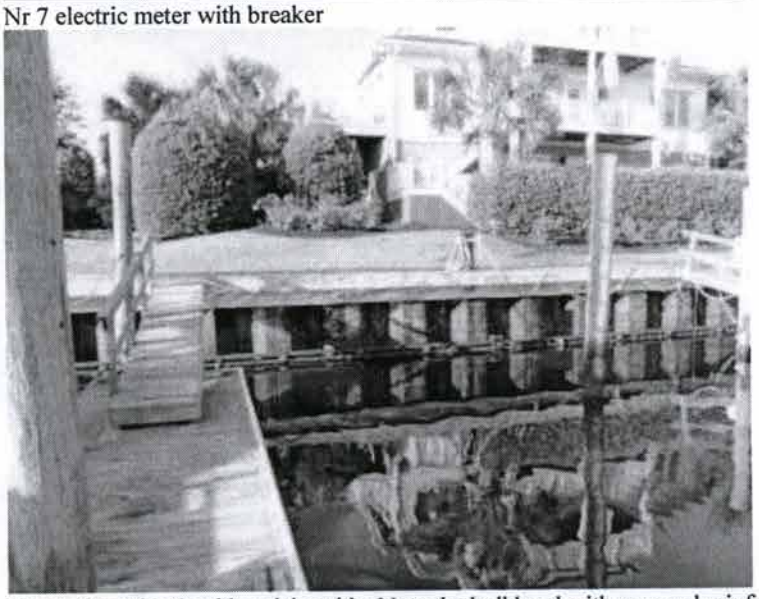
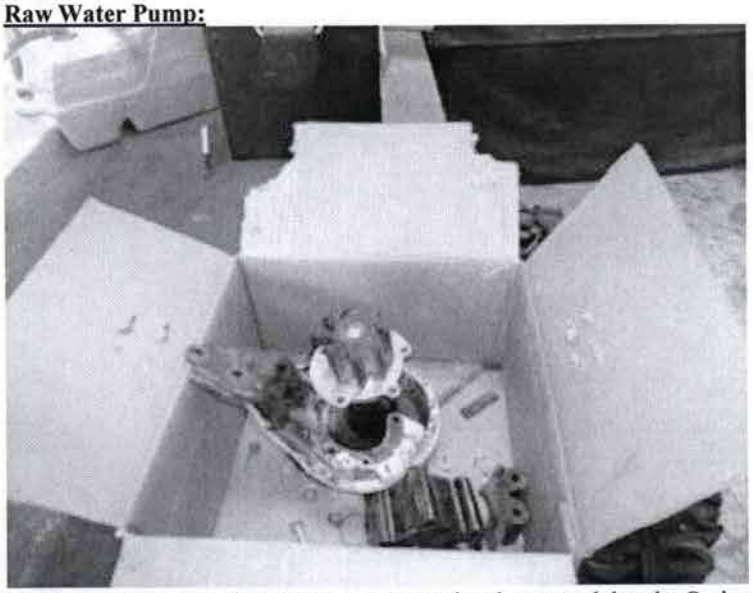


Nr 7 electric meter with breaker


View of nr 7 berth with a rising tide. Note the bulkhead with exposed reinforcement which extends outward approximately 12" from the face. Potential area where swim platform can be caught if boat is not properly secured

Exemplar of older conduit feeding berth nr 8 and up that was not renewed

Raw Water Pump:



Raw water as produced. Box was not secured and we noted that the O-ring was missing

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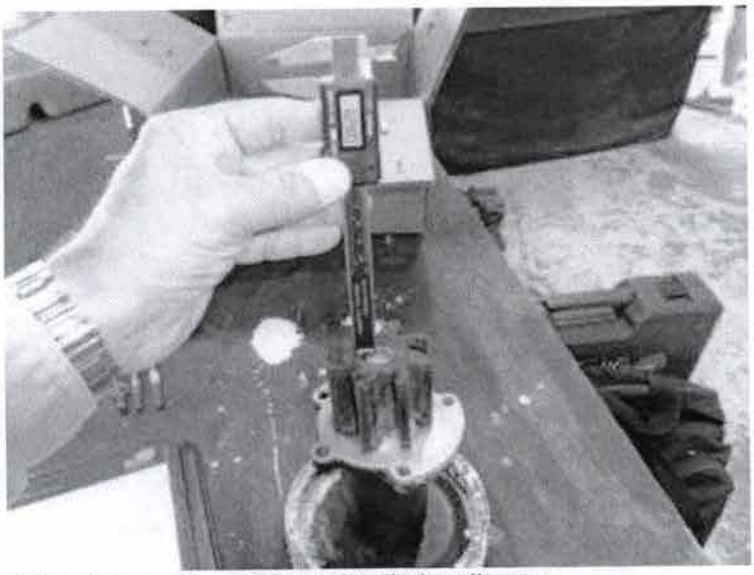
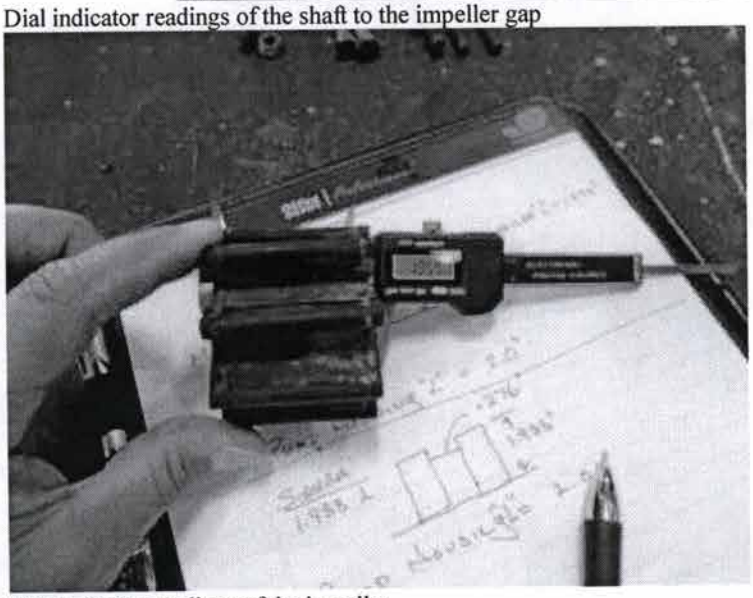


Dial indicator readings of the shaft to the impeller gap



Dial indicator readings of the impeller

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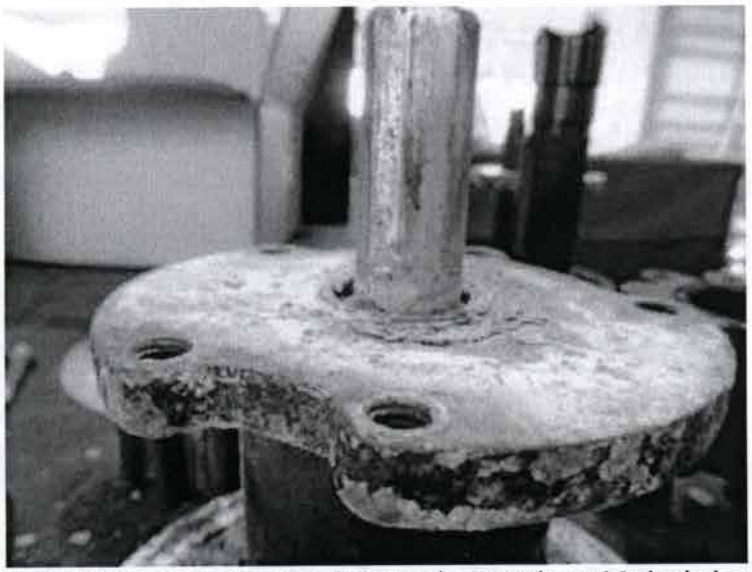

Pump drive contact surface showing extensive wasted area. Mechanical seal was not present and presumably lost when the pump was taken apart

Mock up of the SS wear plate against the rubber impeller

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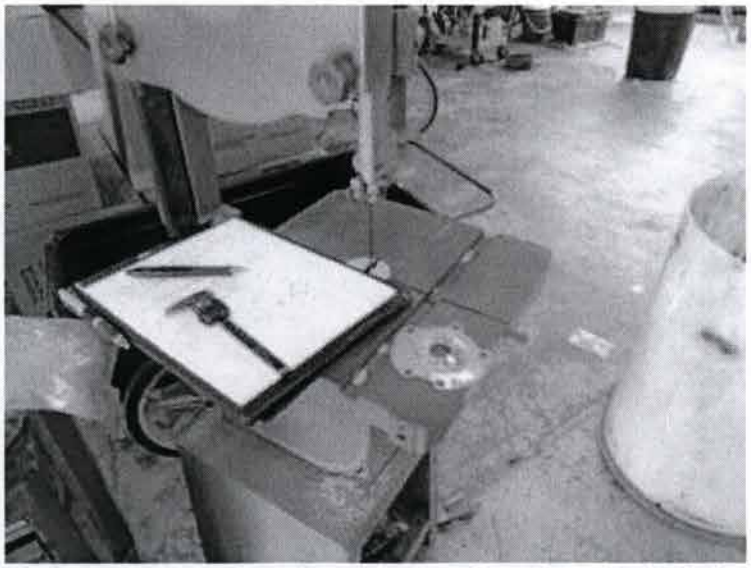
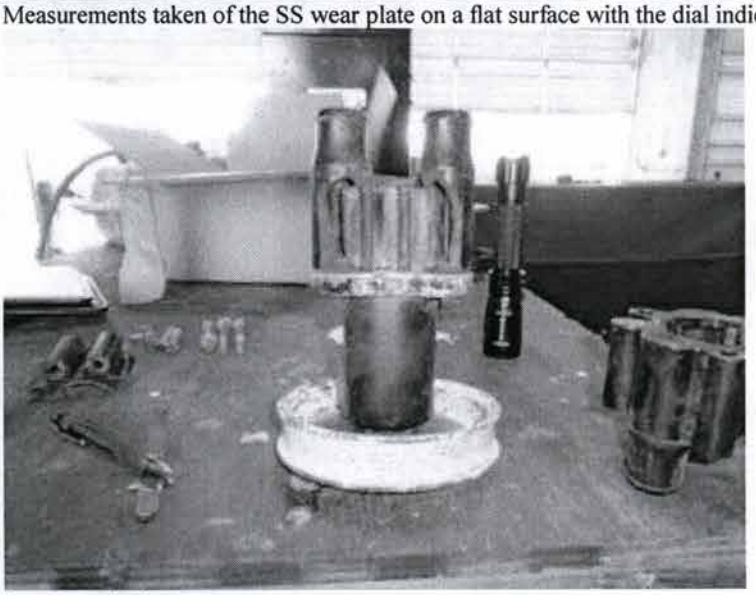


Measurements taken of the SS wear plate on a flat surface with the dial indicator



Pump mocked up

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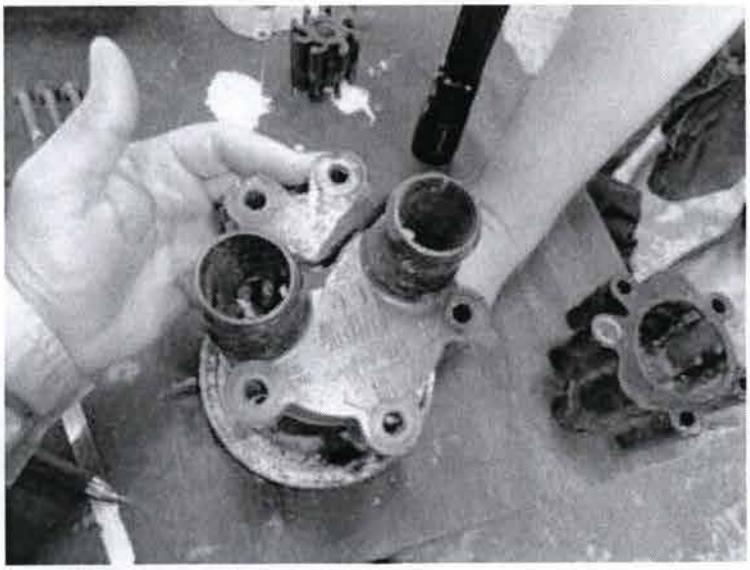

Pump mocked up

Heavy contact pattern clearly showing that the original failed area was well within the hub of the raw water pump impeller and not exposed to the inlet/discharge port of the pump volute. The missing plastic was also not present and presumably blown out when the pump was over pressurized

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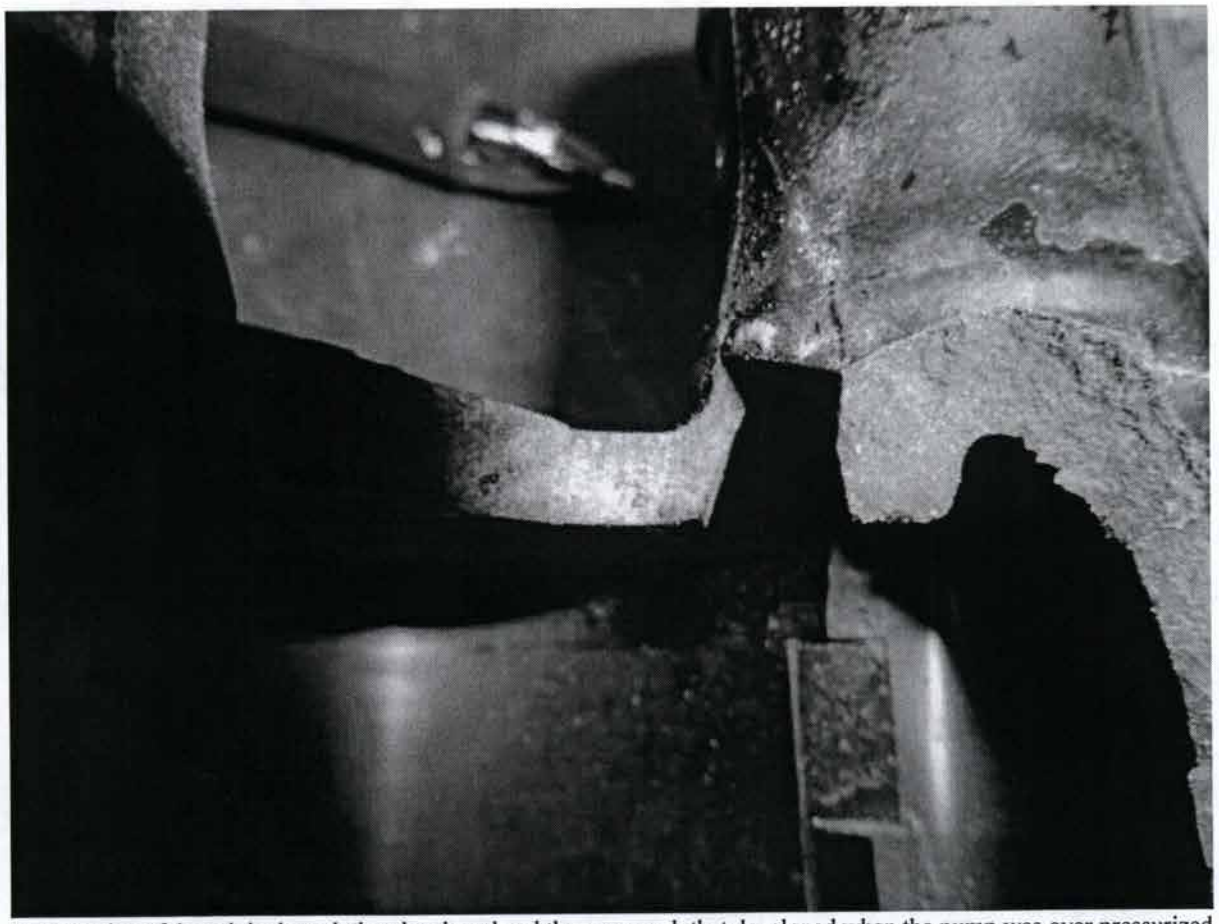

Demarcation of the original crack that developed and the new crack that developed when the pump was over pressurized with the water hose. By the position of the raw water pump impeller this original crack would have been sealed by virtue of contact and we are of the opinion that this pump would have minimal to no leak under normal operating conditions

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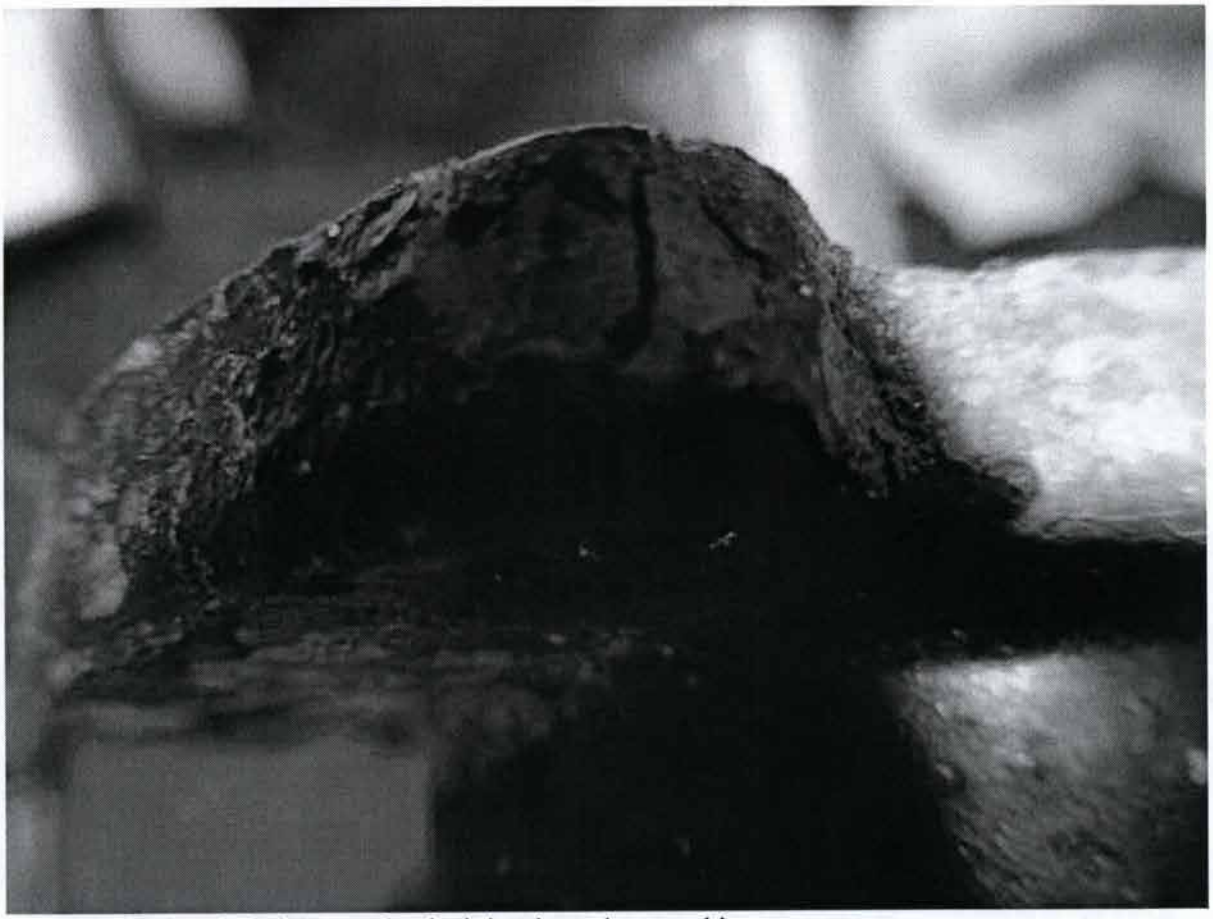

One of cracks where the bolts secure the plastic housing to the pump drive

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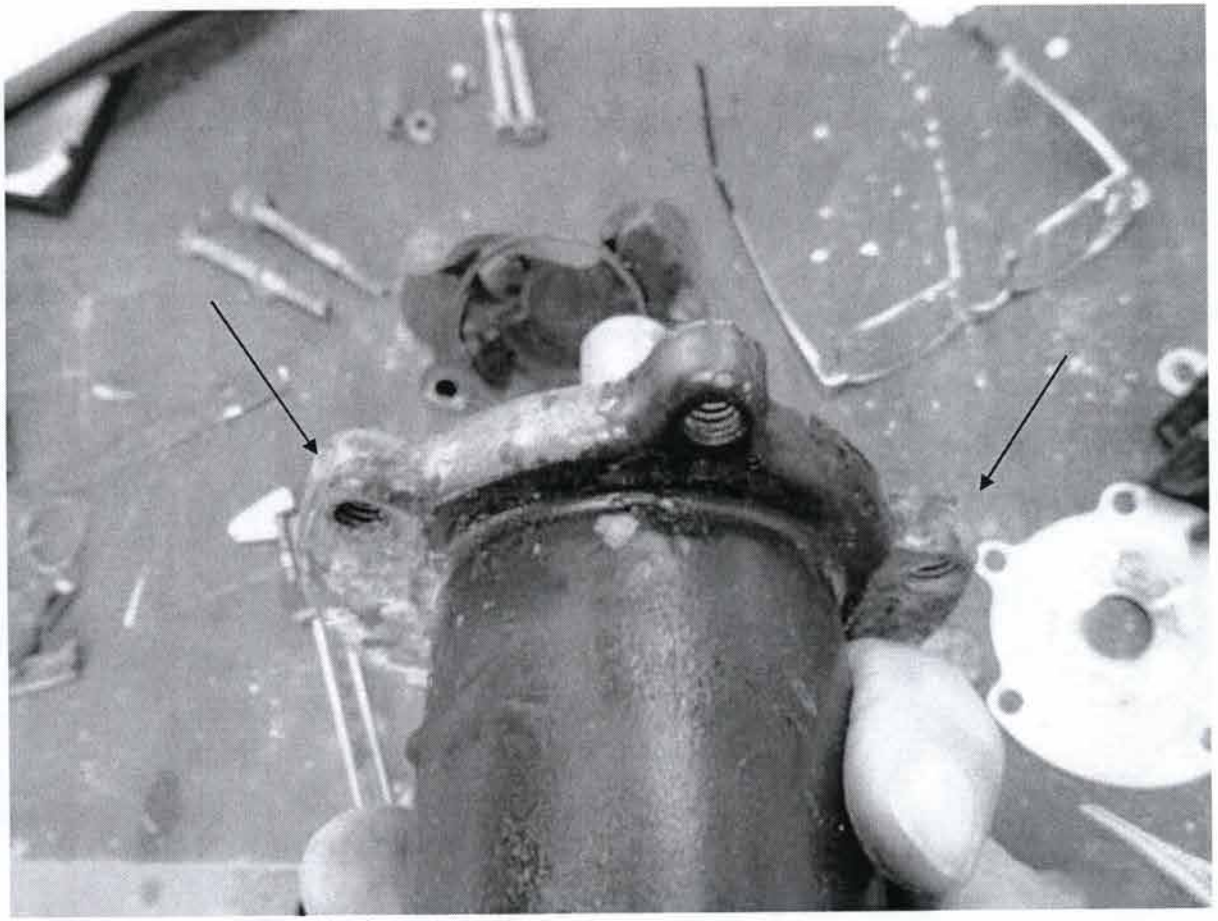

Cracks were found as indicated by the arrows

Inspection of Boat:

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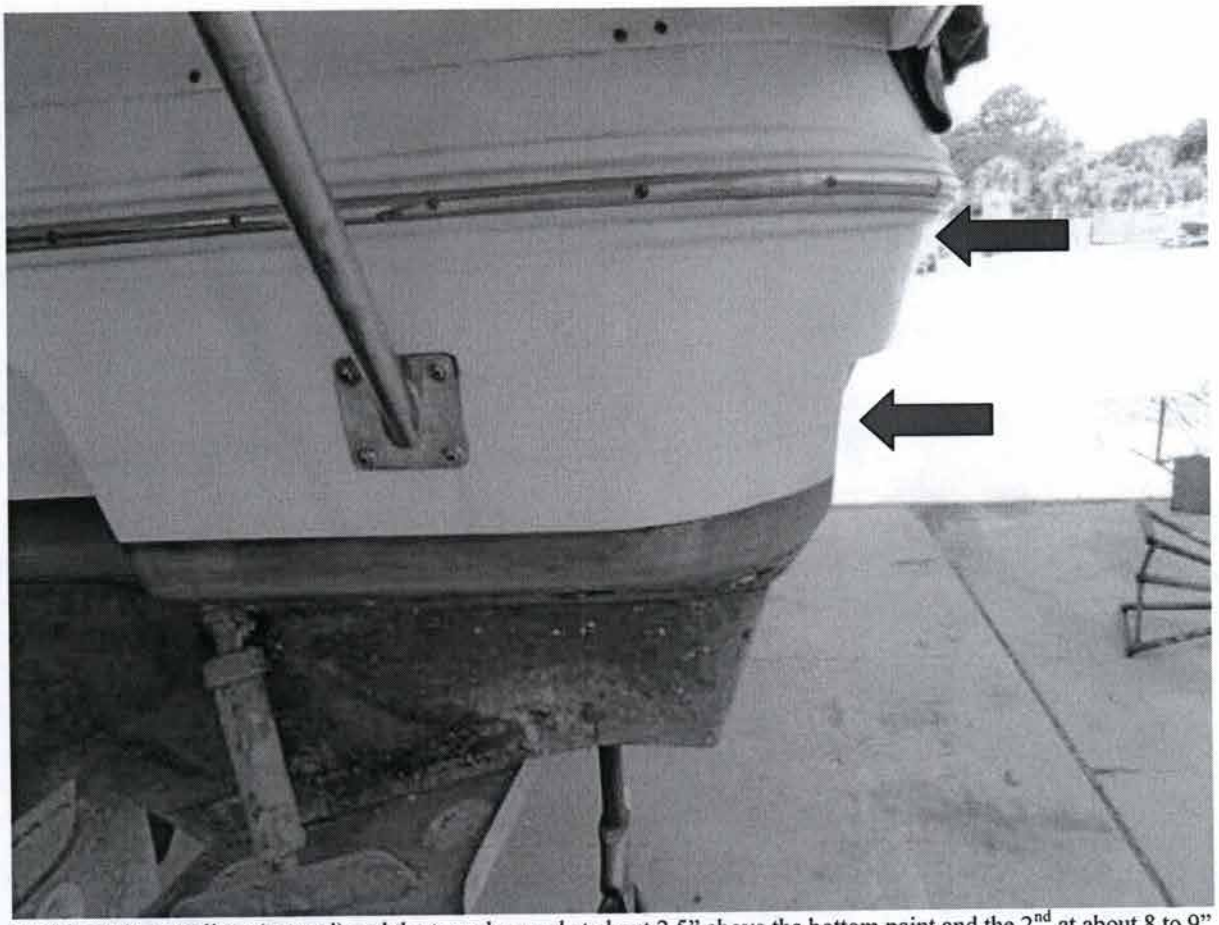

Visible static waterlines (normal) and the two observed at about 2.5" above the bottom paint and the 2nd at about 8 to 9" increase at the bottom edge of the rub rail

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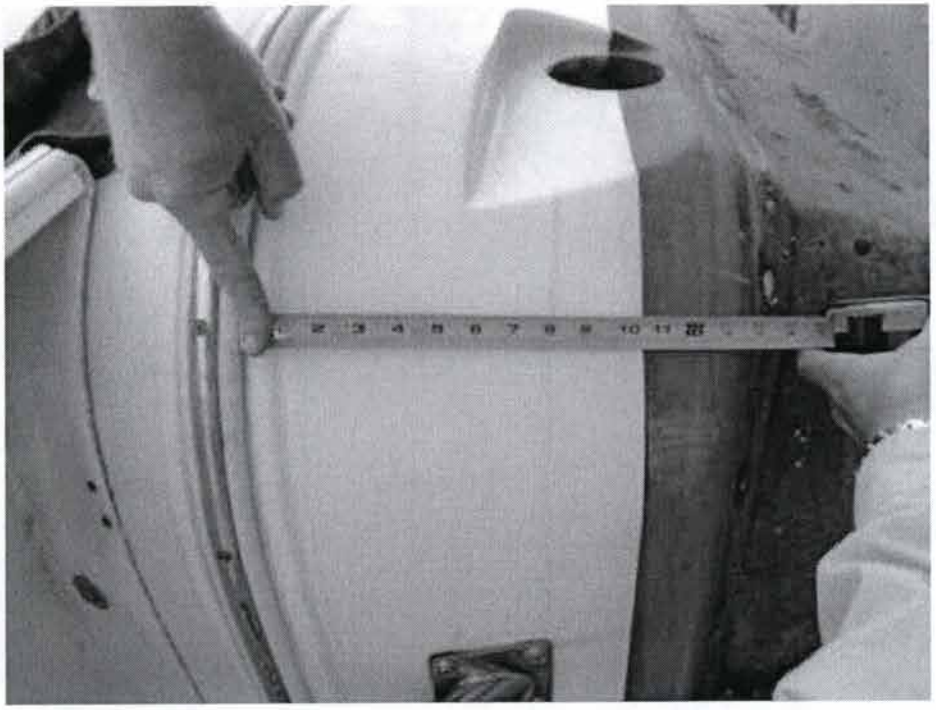

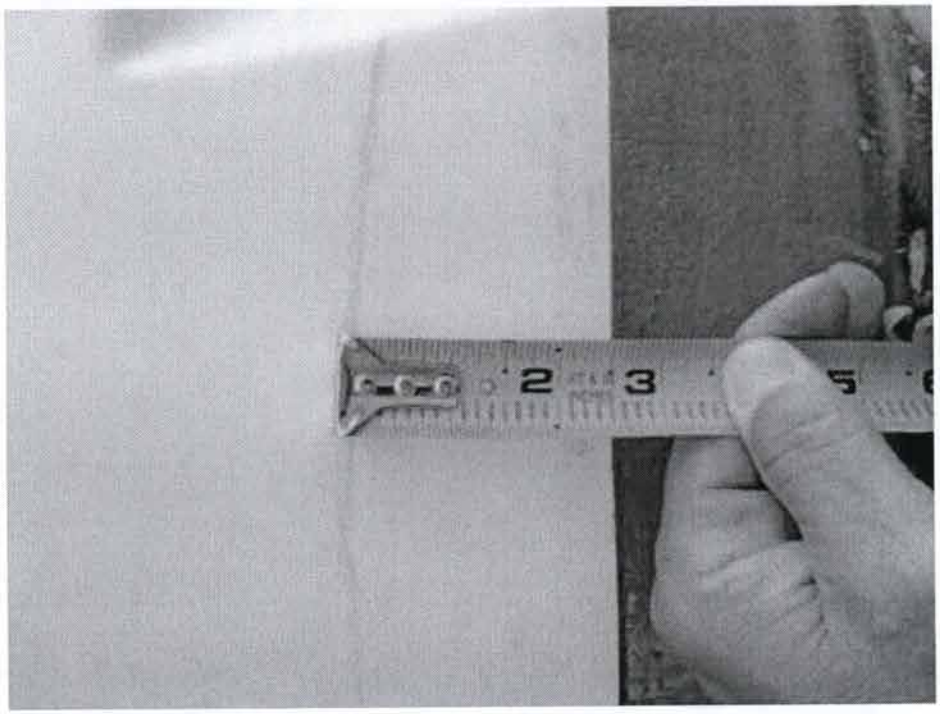

ALPHA MARINE SURVEYORS

PRELIMINARY REPORT # 1
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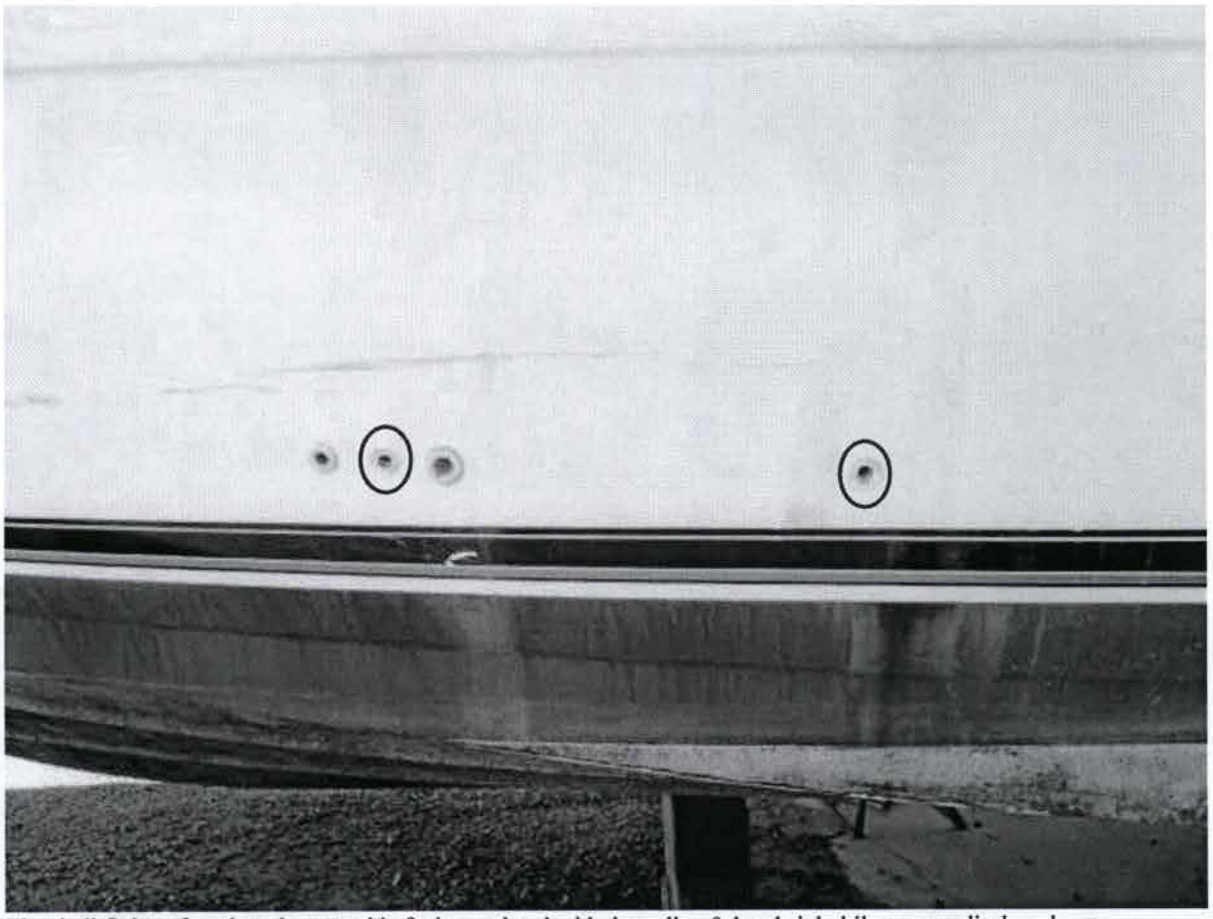

Thru hull fittings found on the port side fwd associated with the galley & head sink, bilge pump disch and sump pump disch. (2) of the thru hulls are freshly damaged creating a hole in the hull. Note the fresh black transfer on the hull

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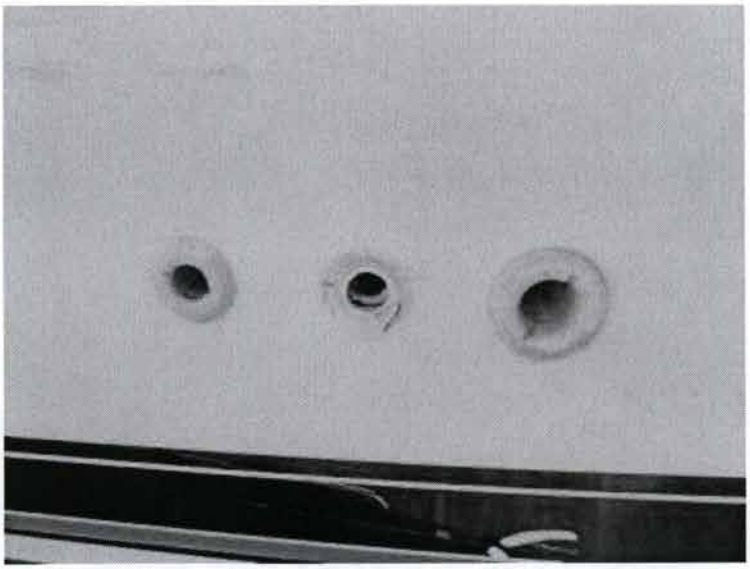

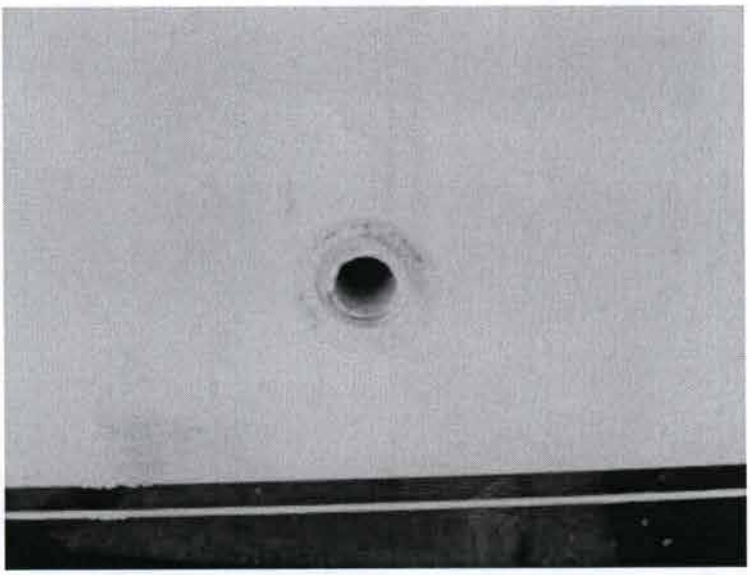

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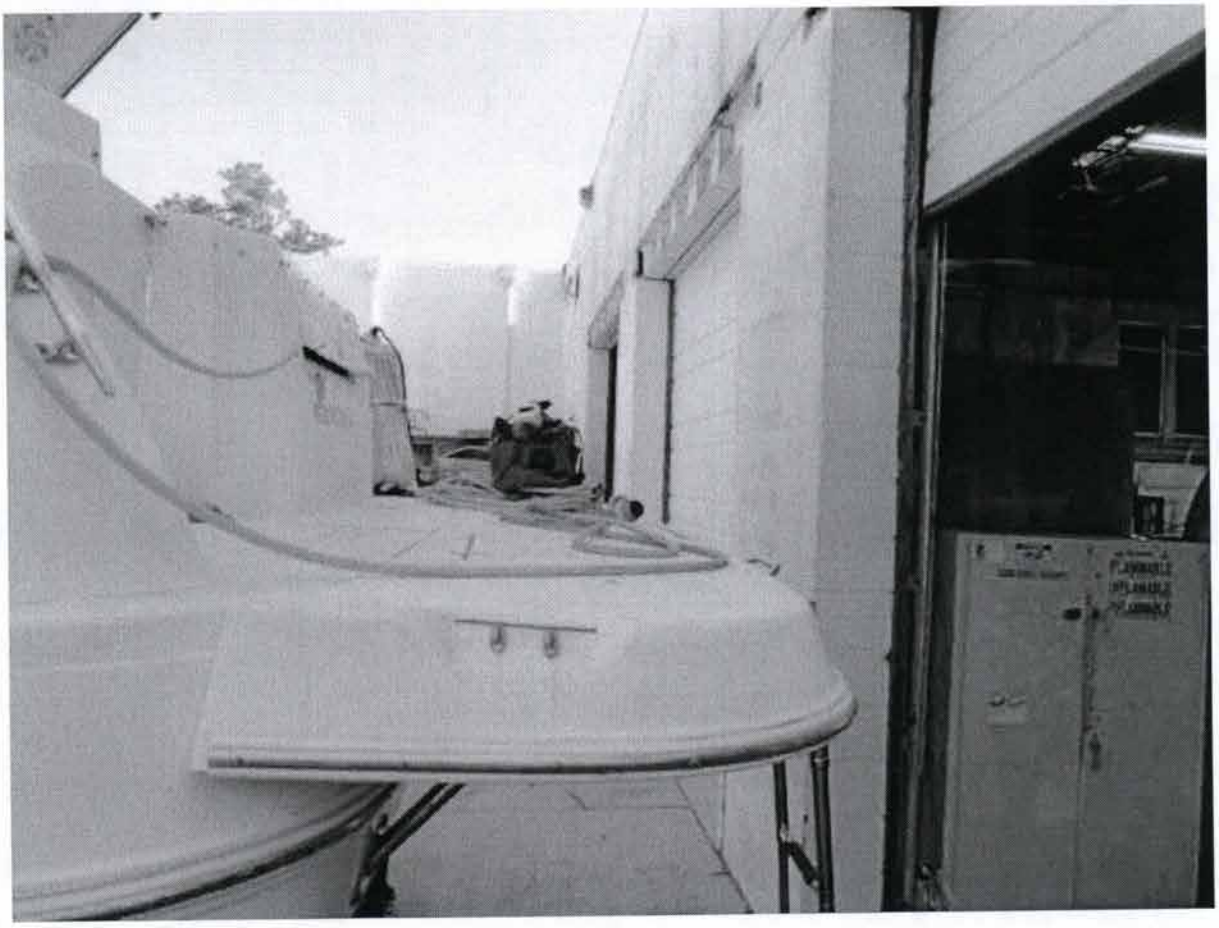

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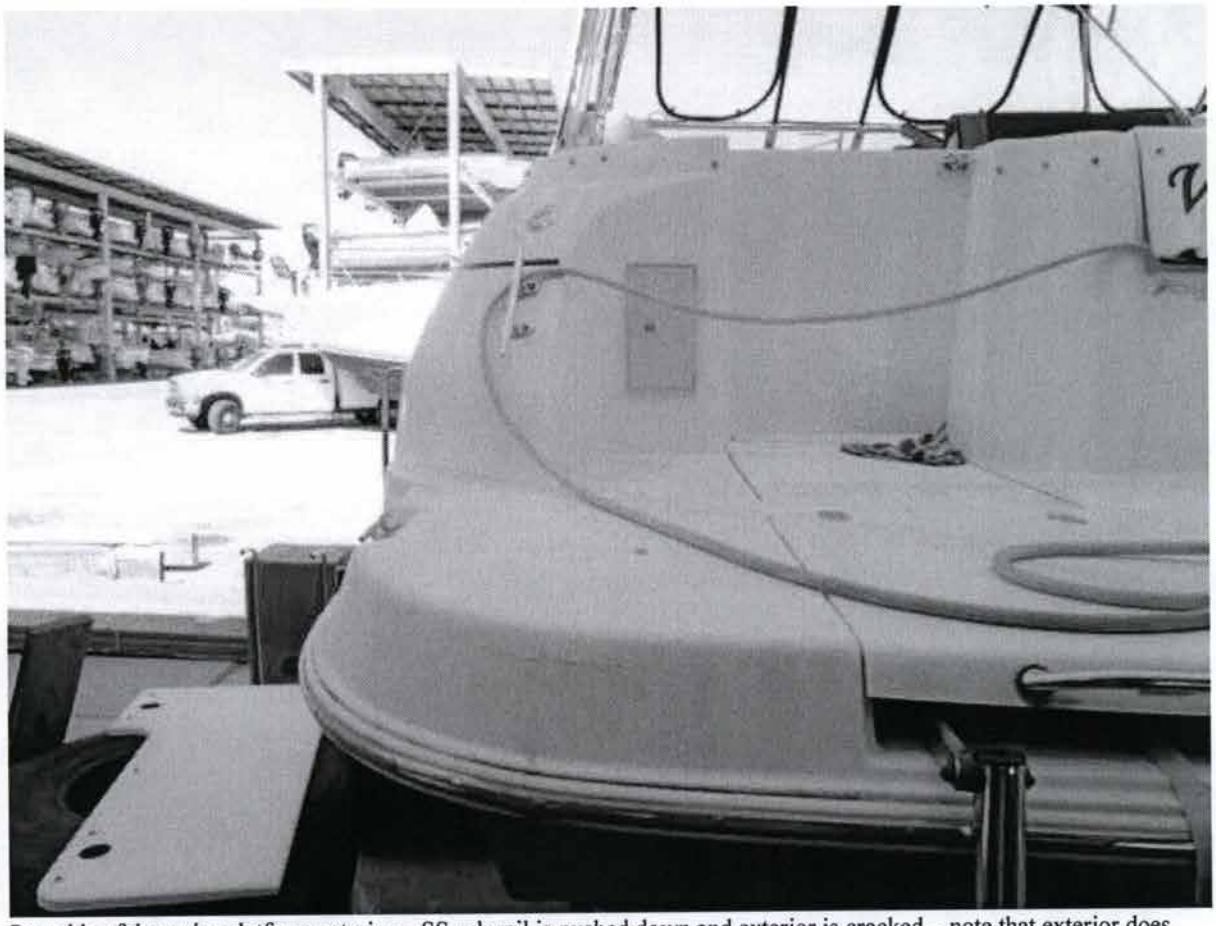

Port side of the swim platform exterior – SS rub rail is pushed down and exterior is cracked – note that exterior does display new & old cracks that can be easily overlooked

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Fresh crack found underneath the swim platform associated with the exterior crack on the port side

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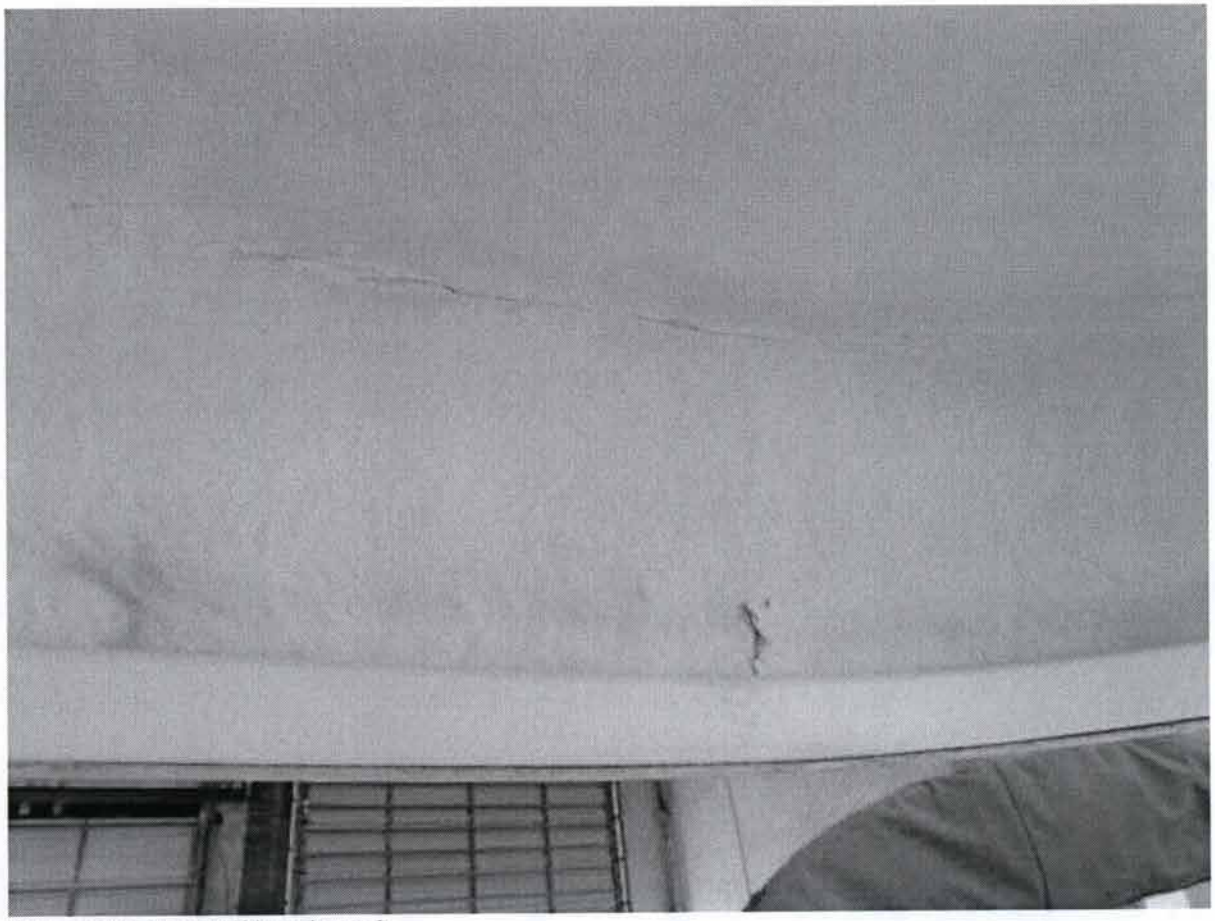

fresh crack in the port side underneath

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Port side underneath fresh crack

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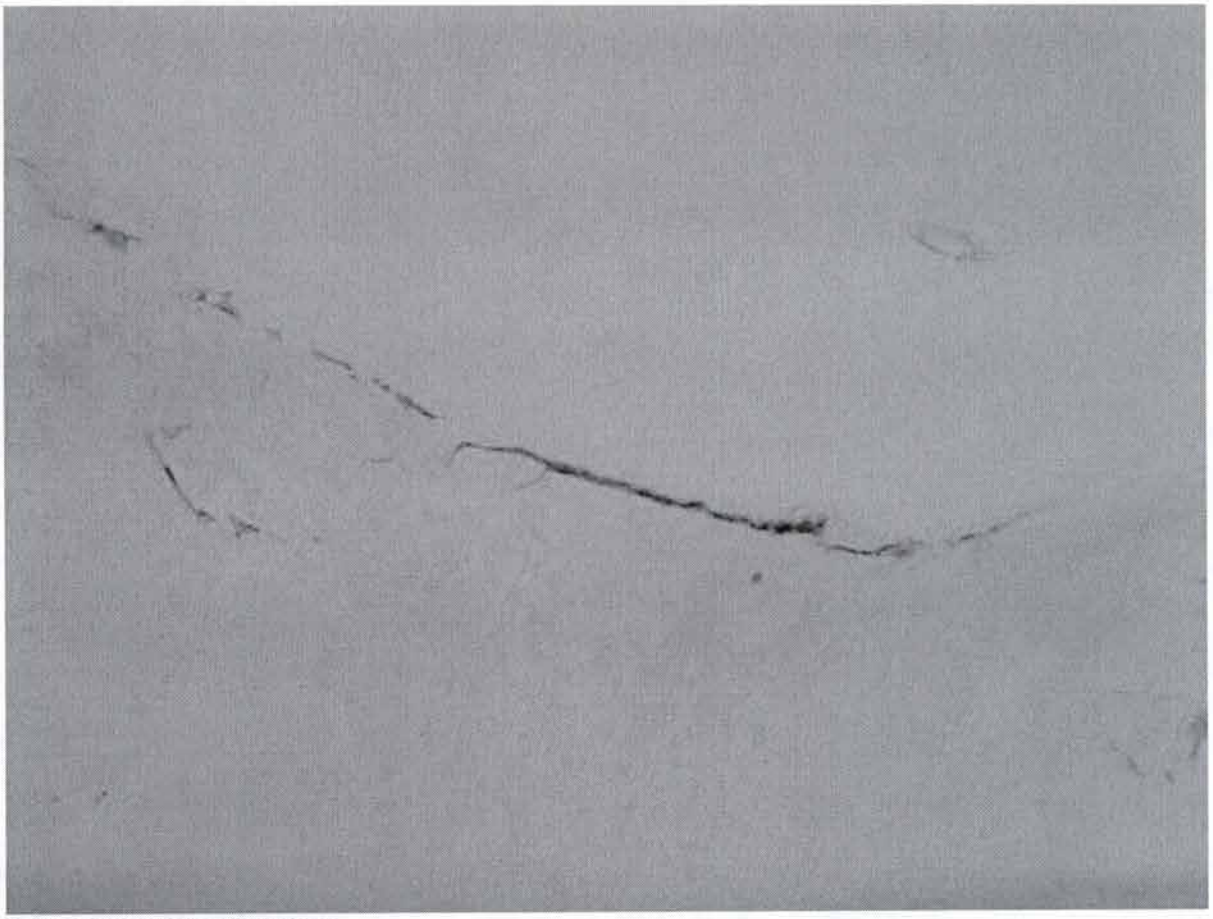

Fresh crack in the swim platform

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No damage to the stbd side

Engine Room Inspection:

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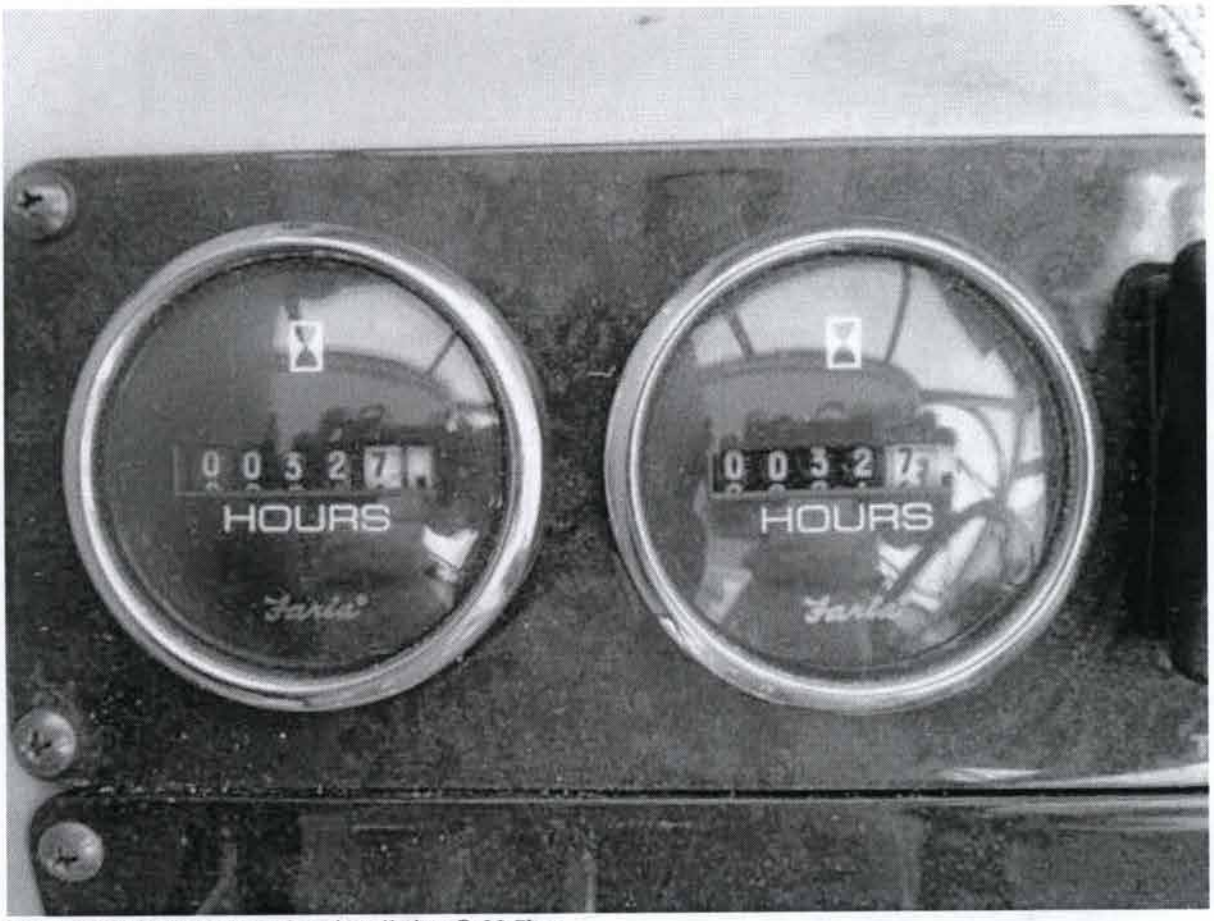

Hours on the P&S engines since installation @ 32.7hrs

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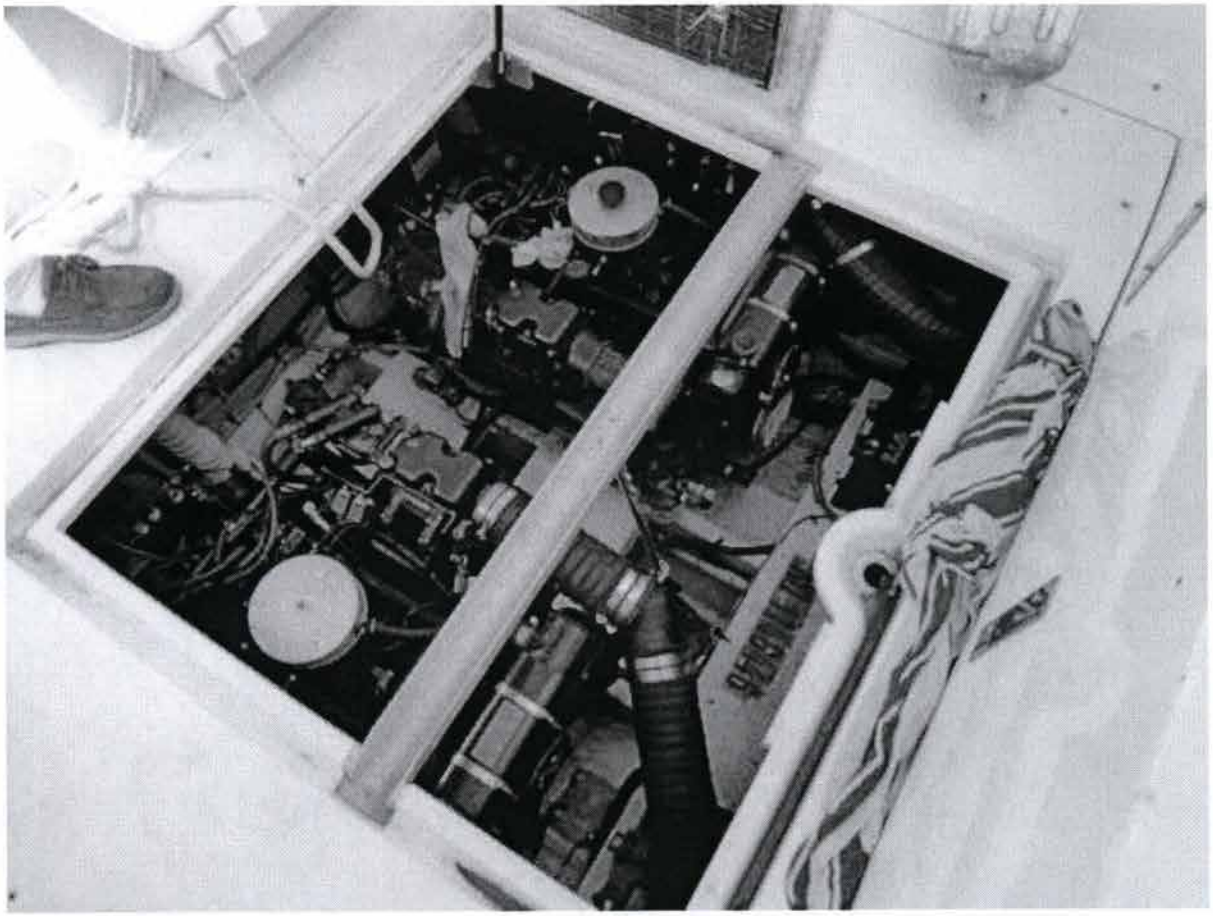

Port & stbd engines

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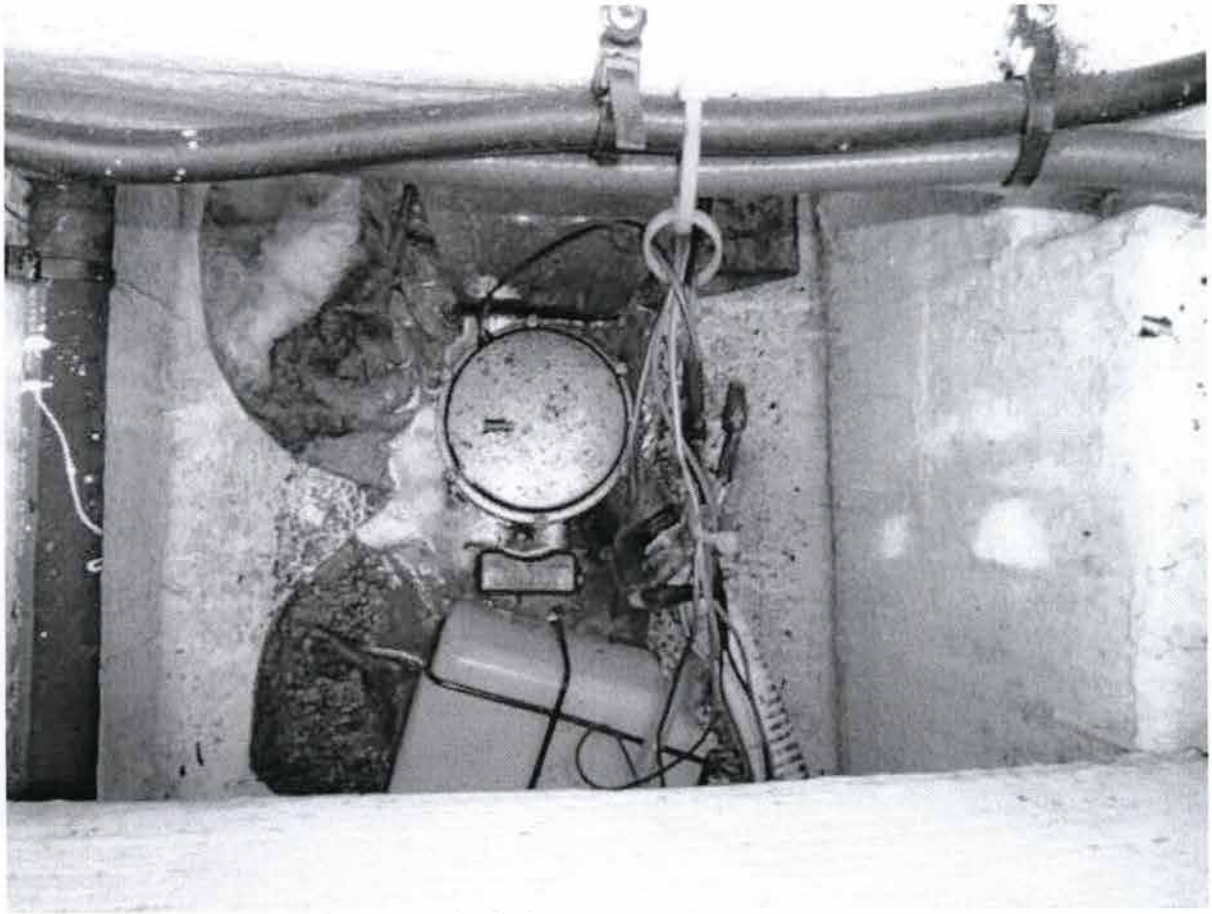

Johnson pump and float switch found properly wired

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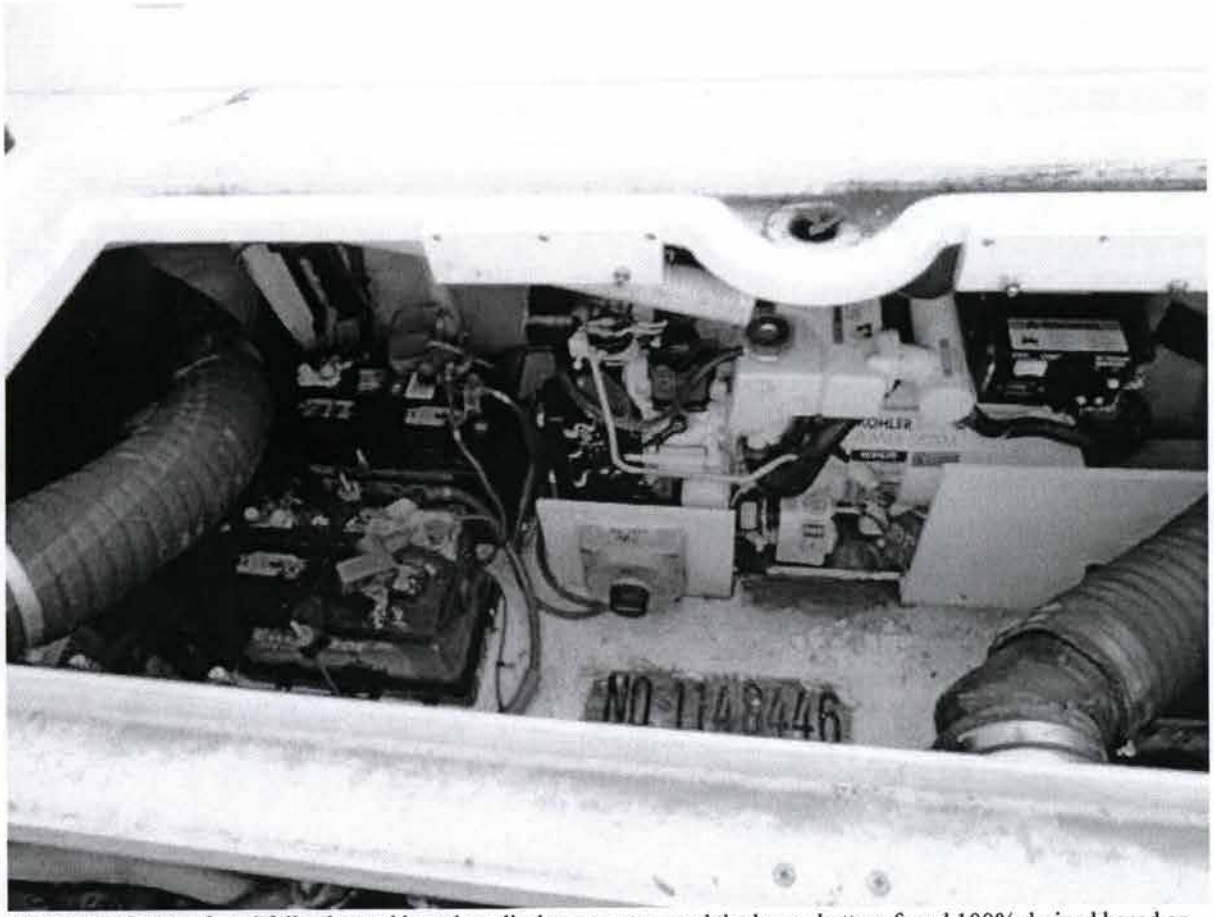

Stbd starter battery found fully charged based on discharge pattern and the house battery found 100% drained based on the discharge pattern

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Port engine starter battery found drained

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No water pattern associated with the alleged leak of the raw water pump observed in the bilge

Interior Inspection:

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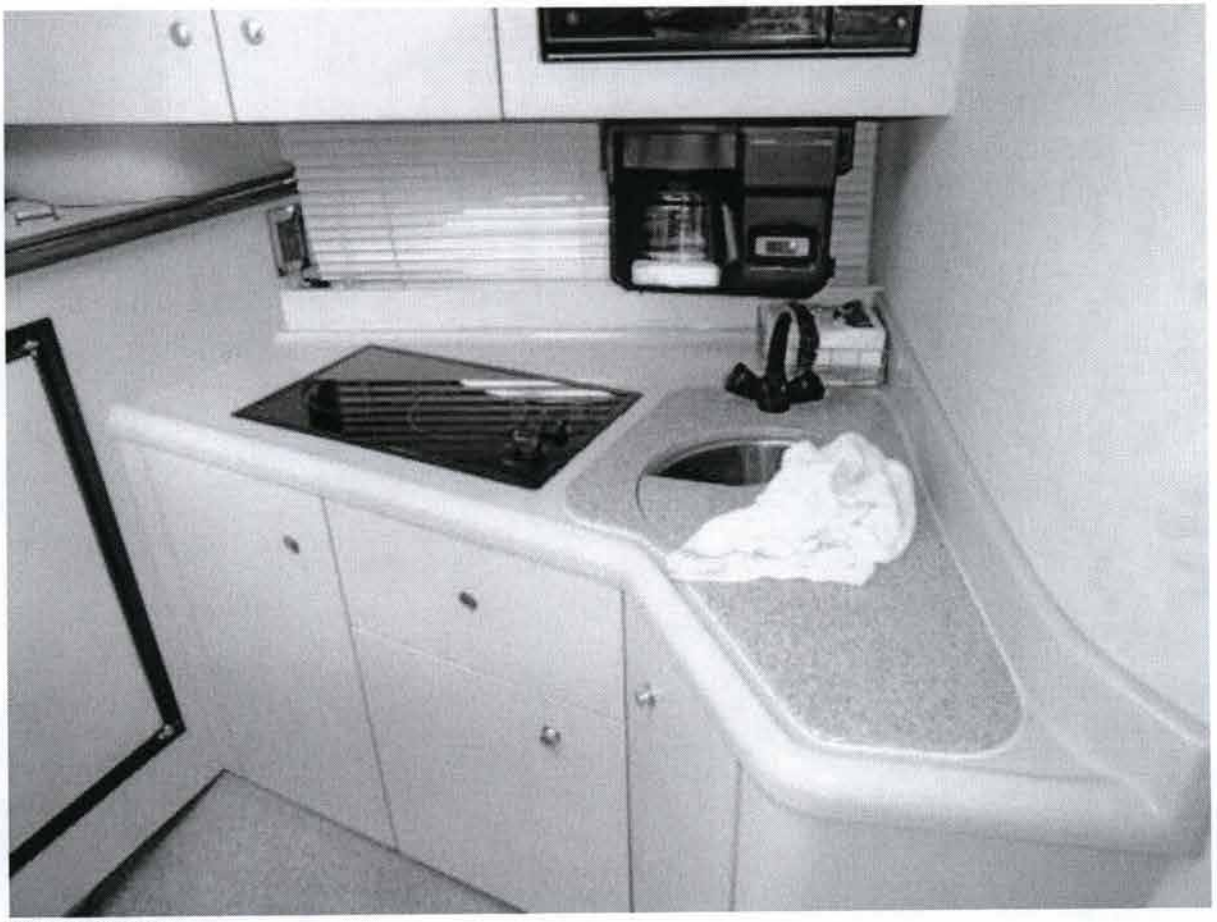

Galley with sink

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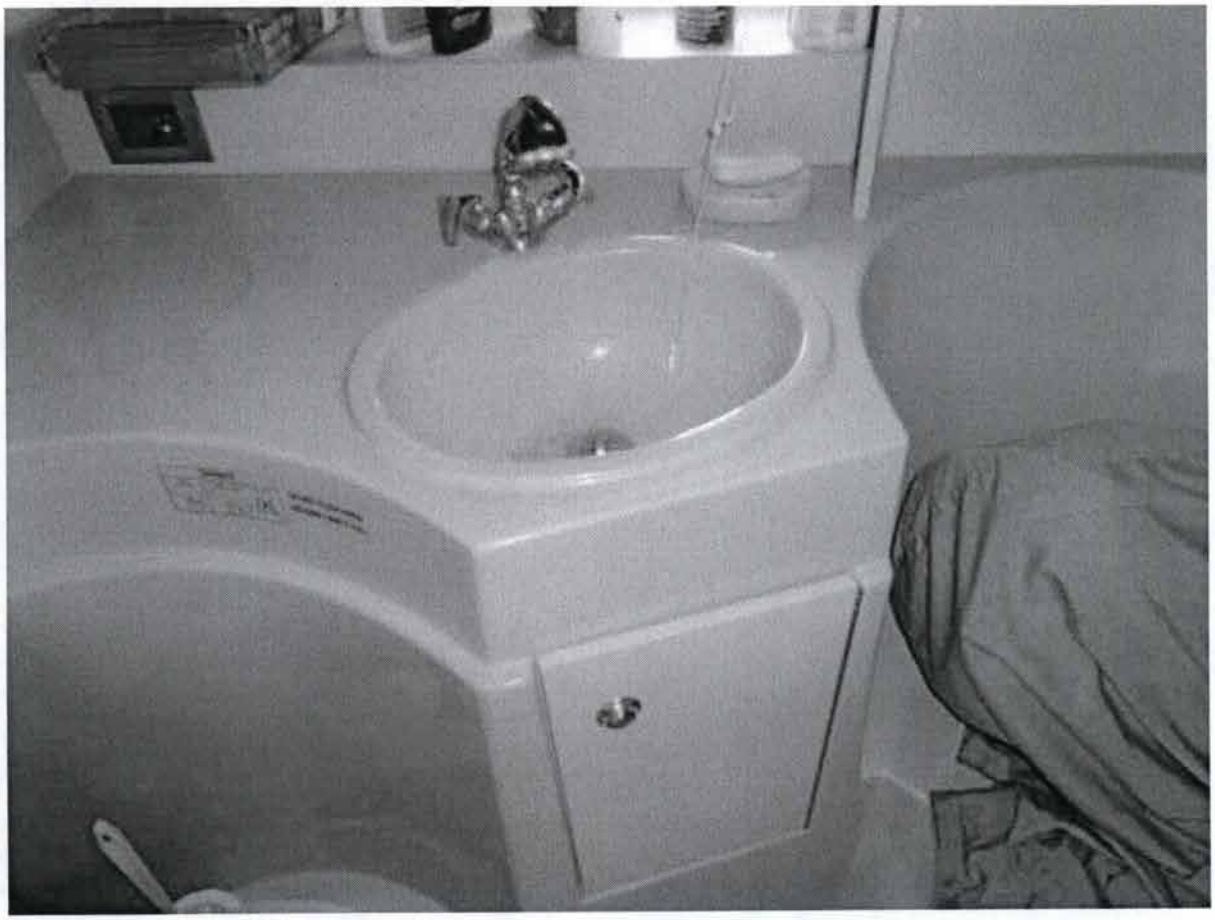
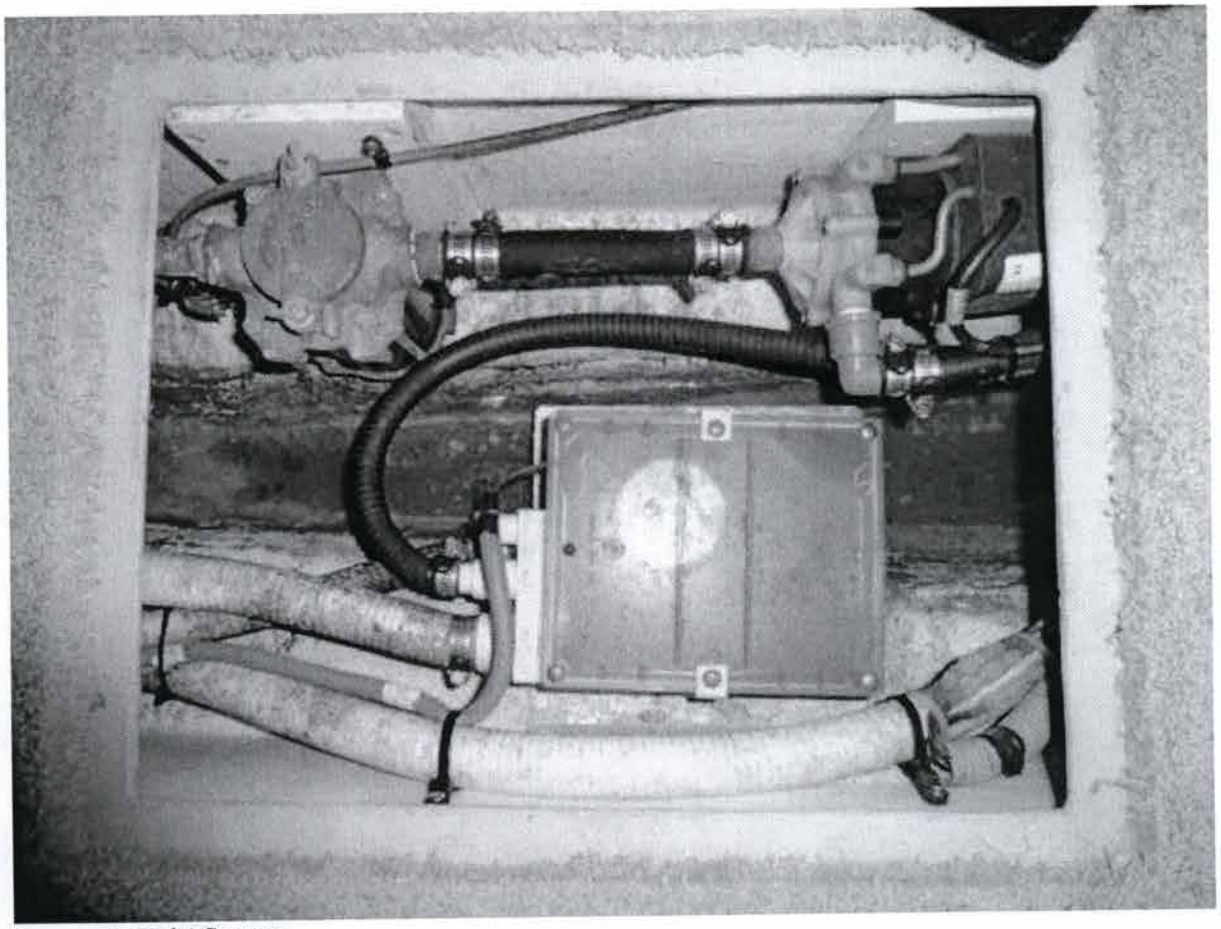


sink



Sump pump and AC pump

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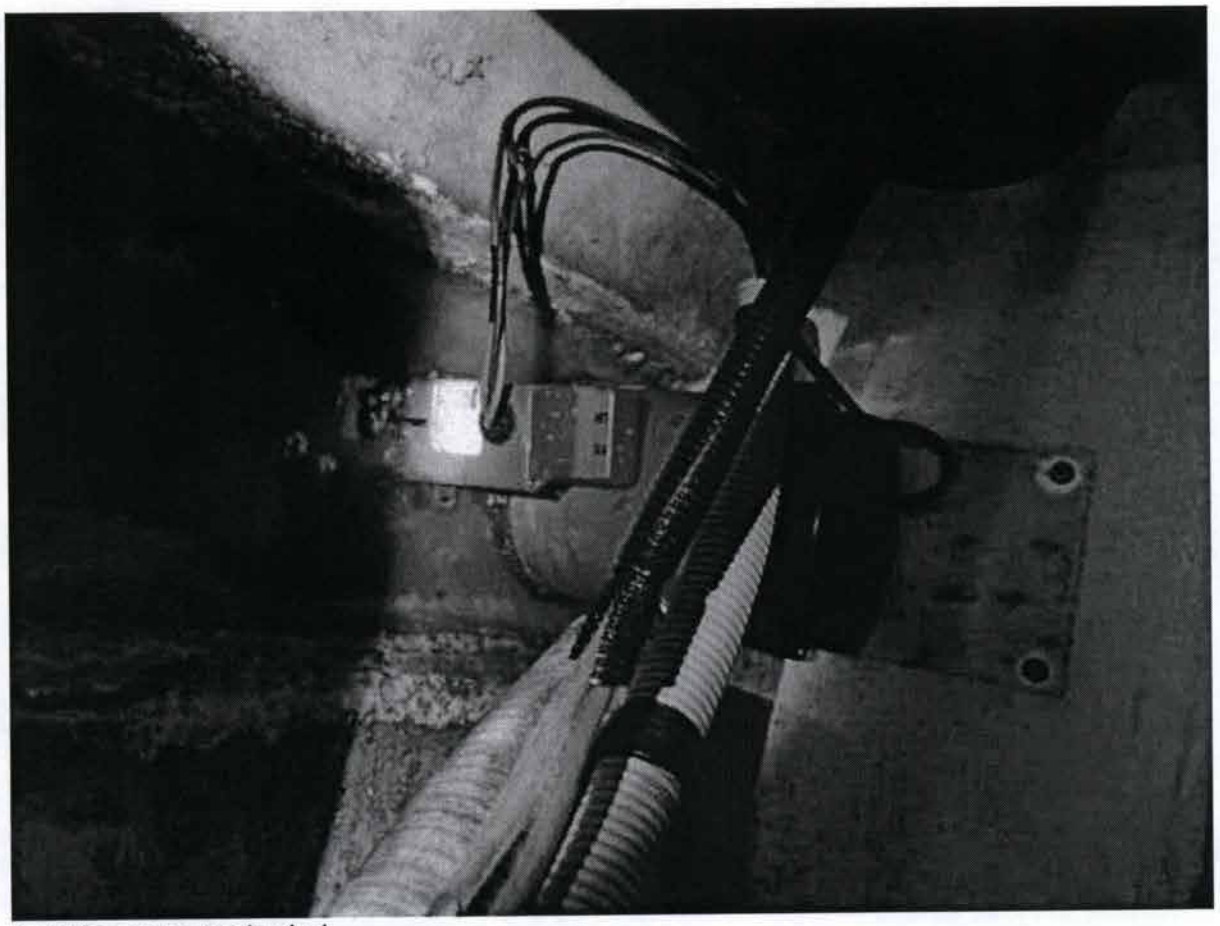

Fwd bilge pump properly wired

This report is offered solely as a marine survey and associated work product and for no other purpose. Any opinions, estimates, projections, calculations, or other materials are provided exclusively in the context of a marine survey and any further adjustment, accounting, tax, or other professional services related hereto must be secured from an appropriate professional.

The report is based only on the facts presently available to the surveyor in attendance and is submitted without prejudice to the right of whom it may concern. The right to amend and/or supplement this report should additional information be made available is reserved.

Digital photos contained in the body of this report were taken by the attending surveyor(s). We certify that the content of these pictures has not been changed and/or altered.

Respectfully Submitted

ALPHA MARINE SURVEYORS

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ALPHA MARINE SURVEYORS

FOR THE CORPORATION
Rolando R. Santos, Marine Surveyor
Senior Marine Surveyor - Miami Office
SCMSHQ – MCMS
SAMS – AMS – E, Y&SC, H&M, C

Wendy Anderson

From: Wendy Anderson
Sent: Thursday, August 08, 2013 8:08 AM
To: scott@lifesourceengineering.com
Subject: Complaint
Attachments: Baggerly 2013012445; PCP Book.pdf

Mr. Baggerly:

As requested, attached is a copy of the file as presented to the Probable Cause Panel. A letter closing the file has been forwarded via regular US Mail.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

August 8, 2013

Preston Scott Baggerly
Lifesource Engineering
6752 West Gulf-to-Lake Highway, Unit 222
Crystal River, Florida 34429

RE: Complaint #2013012445

Dear Mr. Baggerly:

In regard to the complaint filed with the Florida Board of Professional Engineers (Board) against you, please be advised that the case listed above has been closed by the issuance of a Cease and Desist.

Please note that Section 471.031(1)(a)(b)1., Florida Statutes states:

(1) A person may not:

(a) Practice engineering unless the person is licensed or exempt from licensure under this chapter.

(b)1. Except as provided in subparagraph 2. or subparagraph 3., use the name or title "professional engineer" or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer when the person is not licensed under this chapter, including, but not limited to, the following titles: "agricultural engineer," "air-conditioning engineer," "architectural engineer," "building engineer," "chemical engineer," "civil engineer," "control systems engineer," "electrical engineer," "environmental engineer," "fire protection engineer," "industrial engineer," "manufacturing engineer," "mechanical engineer," "metallurgical engineer," "mining engineer," "minerals engineer," "marine engineer," "nuclear engineer," "petroleum engineer," "plumbing engineer," "structural engineer," "transportation engineer," "software engineer," "computer hardware engineer," or "systems engineer."

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500

Failure to refrain from said unlicensed activity until such time that you receive proper licensure, or adherence to the order to Cease and Desist will force the Board to seek the remedies available to it under Section455.228, Florida Statutes, which may include an administrative penalty not to exceed $5,000 per incident, as well as attorney's fees and court costs.

The Board's Probable Cause Panel encourages you to be aware of the appropriate venue at which to pass out your business cards to avoid confusion in the future.

Thank you very much for your cooperation in this matter.

Sincerely,

Wendy Anderson
Investigator

/wsa

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

INVESTIGATIVE REPORT

Office:	Date of Complaint:	Case Number:
FLORIDA BOARD OF PROFESSIONAL ENGINEERS	February 18, 2013	2013012445

Subject:	Complainant/Source:
Preston Scott Baggerly **Lifesource Engineering** **6752 West Gulf-to-Lake Highway, Unit 222** **Crystal River, Florida 34429**	**FEMC**

Prefix:	License #:	Profession:	Board:	Report Date:
			Engineers	May 29, 2013

Period of Investigation:	Type of Report:
February 18, 2013 through May 29, 2013	Unlicensed Activity

Alleged Violation:

Synopsis: This complaint was predicated upon receipt of an inquiry from a Professional Engineer regarding the use of the words "licensed engineer" on a business card (Ex. 1). Specifically, the inquiry noted:

> ***I am a licensed P.E. in the State of Florida.***
>
> ***I was recently at an event and obtained the business card for a business specializing in water and wastewater treatment system design and construction.***
>
> ***The name of the company is LifeSource Engineering, Inc., located in Crystal River, Florida. www.lifesourceengineering.com The person's name on the card is Preston Scott Baggerly Under the name, it says "Licensed Engineer" (quotes mine).***
>
> ***As I am interested in the possibility of doing business with this company, I looked on the DBPR website for his license, and do not find a listing for this gentleman.***
>
> ***Would it be possible for you to verify this person's license for me, as it would affect my ability to possibly work with this company?***
>
> ***If he is not licensed, then should his card indicate that he is a licensed engineer?***

This Investigator responded to Mr. Ern and requested a copy of the business card (Ex. 2). A copy of the business card was received on February 19, 2013 (Ex. 3).

Subject was notified of the complaint on March 27, 2013 and was also issued a Notice to Cease & Desist (Ex. 4). When this Investigator had not received a response from Mr. Baggerly, telephone contact was made. During that telephone conversation, Mr. Baggerly advised that he had just returned from a trip and had not yet opened all of his mail. A copy of the letter and Notice to Cease & Desist were emailed to Mr. Baggerly on May 15, 2013 (Ex. 5) along with a request for a copy of his Marine Engineer License. On May 16, 2013, Mr. Baggerly provided a copy of the front of his "United States Coast Guard License" with the following response (Ex. 6):

> ***Please be advised that I never intended to portray that I am a Florida Licensed Professional Engineer. I am "in fact" a Licensed Engineer, USCG # 749202 (see attached) as stated on my "old" business cards. The license has been officially recorded and preserved so it can be utilized whenever deemed necessary. I have changed the business card (see attached) to appease your Board and the complainant. I am requesting the identification of the complainant so I can give them a new business card.***
> ***I trust that this will conclude this issue.***

Upon receipt of this information from Mr. Baggerly, this Investigator met with Prosecuting Attorney John Rimes. Mr. Rimes advised that Mr. Baggerly not utilize the word "licensed" to prevent confusion. Because of ongoing discussions between Mr. Rimes, this Investigator and Mr. Baggerly, Mr. Rimes suggested that the question of whether an individual who holds this type of license with an notation on the back which reflects: "License renewed for continuity purposes only, service under the authority of this license is prohibited until all of the requirements for renewal are met" (Ex. 7), is a questions for the Board.

Please note that this Investigator requested information regarding the status of Mr. Baggerly' s USCG license (Ex. 8). To date, no response has been received. Additionally, a complaint was also opened against LifeSource Engineering for offering engineering services without a Certificate of Authorization. A Notice to Cease & Desist has been issued and this Investigator is working with Mr. Baggerly on updating the website.

For these reasons this matter is being forwarded to legal for processing.

Related Case:	
Investigator/Date: Wendy Anderson Investigator	Date: April 2, 2013
Distribution: Legal	

INVESTIGATIVE REPORT CASE NUMBER #2013012445

TABLE OF CONTENTS

Wendy Anderson

From: Rob Ern <rern@besandh.com>
Sent: Monday, February 11, 2013 4:54 PM
To: Wendy Anderson
Subject: Question on Licensure of Engineer

Hello:
I am a licensed P.E. in the State of Florida.
I was recently at an event and obtained the business card for a business specializing in water and wastewater treatment system design and construction.
The name of the company is LifeSource Engineering, Inc., located in Crystal River, Florida.
www.lifesourceengineering.com The person's name on the card is Preston Scott Baggerly Under the name, it says "Licensed Engineer" (quotes mine).

As I am interested in the possibility of doing business with this company, I looked on the DBPR website for his license, and do not find a listing for this gentleman.
Would it be possible for you to verify this person's license for me, as it would affect my ability to possibly work with this company?

If he is not licensed, then should his card indicate that he is a licensed engineer?
Many thanks, and I look forward to hearing back from you.

I would hope that this inquiry would be kept in confidence, as I do not want to create trouble for anyone, but simply want to clarify licensure.
Thanks,

--
Robert A. Ern, Jr., P.E., Principal
Booth, Ern, Straughan& Hiott, Inc.
(352) 343-8481 Phone
(352) 343-8495 Fax
rern@besandh.com
...._o
..O>'O....

Wendy Anderson

From: Rob Ern [rern@besandh.com]
Sent: 2013-02-12 09:32
To: Wendy Anderson
Subject: Re: Question on Licensure of Engineer

No sweat, will do.

Robert A. Ern, Jr., P.E., Principal
Booth, Ern, Straughan& Hiott, Inc.
(352) 343-8481 Phone
(352) 343-8495 Fax
rern@besandh.com
...._o
..O>'O....

On 2/12/2013 9:23 AM, Wendy Anderson wrote:
> Mr. Ern:
>
> The fax number is 850-521-0521. I do not believe our fax machine is functioning this morning. We are expecting a repairman to arrive today to cure the issue. Please if possible, send the fax either late this afternoon or tomorrow morning. I apologize for the inconvenience and appreciate your assistance.
>
>
> Wendy Anderson
> Investigator&
> Public Records Requests
>
>
> 2639 North Monroe Street
> Suite B-112
> Tallahassee, FL 32303
> 850-523-1619
>
>
>
>
>
> -----Original Message-----
> From: Rob Ern [mailto:rern@besandh.com]
> Sent: 2013-02-12 09:19
> To: Wendy Anderson
> Subject: Re: Question on Licensure of Engineer

>
> What is your fax number, I will fax it. I'm having some issues with my scanning ability.
> Thx,
>
> Robert A. Ern, Jr., P.E., Principal
> Booth, Ern, Straughan& Hiott, Inc.
> (352) 343-8481 Phone
> (352) 343-8495 Fax
> rern@besandh.com
> ...._o
> ..O>'O....
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>
> Booth, Ern, Straughan& Hiott, Inc. (BESH).
> This data is for general information only and shall not be used to produce documents of any kind without same being submitted to, reviewed by and approved by BESH in writing. All data is subject to change. User assumes all liability relating to the use of this data and agrees to release, indemnify, and hold harmless BESH from any and all claims relating to said use. User is responsible for checking for any viruses before use.
>
>
>
> On 2/12/2013 7:57 AM, Wendy Anderson wrote:
>> Mr. Ern:
>>
>> I was unable to find any licensing information for either Mr. Baggerly or Lifesource Engineering. While Mr. Baggerly may be a licensed engineer in another State, he is not licensed in the State of Florida and is possibly violating Florida Law. I would appreciate your forwarding a copy of the business card you mentioned in your email.
>>
>> Additionally, please note that all correspondence (emails), etc., received by the Florida Engineers Management Corporation/Florida Board of Professional Engineers, is or becomes a public record.
>>
>> Thank you and if you have any additional questions, please contact me.
>>
>>
>> Wendy Anderson
>> Investigator&
>> Public Records Requests
>>
>>
>> 2639 North Monroe Street
>> Suite B-112
>> Tallahassee, FL 32303
>> 850-523-1619
>>
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>>
>> -----Original Message-----
>> From: Rob Ern [mailto:rern@besandh.com]
>> Sent: 2013-02-11 16:54
>> To: Wendy Anderson
>> Subject: Question on Licensure of Engineer

>>
>> Hello:
>> I am a licensed P.E. in the State of Florida.
>> I was recently at an event and obtained the business card for a business specializing in water and wastewater treatment system design and construction.
>> The name of the company is LifeSource Engineering, Inc., located in Crystal River, Florida. www.lifesourceengineering.com The person's name on the card is Preston Scott Baggerly Under the name, it says "Licensed Engineer" (quotes mine).
>>
>> As I am interested in the possibility of doing business with this company, I looked on the DBPR website for his license, and do not find a listing for this gentleman.
>> Would it be possible for you to verify this person's license for me, as it would affect my ability to possibly work with this company?
>>
>> If he is not licensed, then should his card indicate that he is a licensed engineer?
>> Many thanks, and I look forward to hearing back from you.
>>
>> I would hope that this inquiry would be kept in confidence, as I do not want to create trouble for anyone, but simply want to clarify licensure.
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>> change. User assumes all liability relating to the use of this data
>> and agrees to release, indemnify, and hold harmless BESH from any and
>> all claims relating to said use. User is responsible for checking
>> for any viruses before use.
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ATTN:
WENDY ANDERSON
850-521-0521

PER EMAIL 2-12-13

LifeSource Engineering, Inc.
Specializing in Water Purification and Wastewater Treatment Systems

Preston Scott Baggerly
Licensed Engineer

6752 W. Gulf-to-Lake Hwy., Unit 222
Crystal River, FL 34429
Scott@LifeSourceEngineering.com
www.LifeSourceEngineering.com

Tel: (352) 795-3832
Fax: (352) 795-7923
Cell: (727) 510-0375

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

March 27, 2013

Preston Scott Baggerly
Lifesource Engineering
6752 West Gulf-to-Lake Highway, Unit 222
Crystal River, Florida 34429

RE: Complaint #2013012445

Dear Mr. Baggerly:

The Florida Board of Professional Engineers is required to investigate legally sufficient complaints that allege violations of the Engineering Practice Act. Section 455.225(1), Florida Statutes, further states that when an investigation is undertaken, the Board shall promptly furnish to the person or his/her attorney a copy of the complaint or document which resulted in the initiation of the investigation.

Attached for your review is a copy of the complaint or document received by the Board. Also attached is a Notice to Cease and Desist. You have the option of submitting a written response to the complaint for consideration by the Board's legal staff and by the Probable Cause Panel for the Board. Please submit this response to the Board office within twenty (20) days. You may also submit a written request for a copy of the Board's investigative file. This file will be provided to you once the investigation is completed.

Thank you for your cooperation in this matter.

Sincerely,

Wendy Anderson
Investigator

/wsa
Enclosures

Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee, Florida 32303
850-521-0500 Tel.
850-521-0521 FAX
www.fbpe.org

NOTICE TO CEASE AND DESIST
Section 455.228(1), Florida Statutes

To: Preston Scott Baggerly
6752 W. Gulf-to-Lake Highway, Unit 222
Crystal River, Florida 34429

FBPE Case No. 2103012445

The Florida Board of Professional Engineers ("FBPE") notifies you that it has probable cause to believe that you may be utilizing a title which indicates that you hold an active license as an engineer in the State of Florida without the professional license or certification required by Florida law, specifically Chapter 471, Florida Statutes. Probable cause is based on the following facts:

> **Florida Statute 471.031 says in part a person may not use the name or title "professional engineer" or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer when the person is not licensed under this chapter.**
>
> **On your business card, under your name, it says: Licensed Engineer.**

Our records show that you do not currently have a license as required by section 471.015, FS. If the above facts are true, they establish probable cause for FBPE to believe you are violating Florida law by utilizing a title, designation, words… without the required license.

This Notice to Cease and Desist is not final agency action by the FBPE. If you have any questions, please call the Investigator at the number listed below. For information on the law, go to www.leg.state.fl.us/statutes. If you are engaged in the practice of unlicensed activity and do not stop your unlicensed practice, the Florida Board of Professional Engineers can enforce this Notice to Cease and Desist in circuit court by injunction or writ of mandamus.

The FBPE is giving you this Notice to cease utilizing the protected titles in any form without a license so you can follow the law by applying and qualifying for a license. Information about licensure may be found online at www.myflorida.com/dbpr. If the FBPE finds in the future that you have not ceased the unlicensed practice of PROFESSIONAL ENGINEERING, the FBPE has the authority to issue a citation against you or bring an administrative action and pursue penalties up to $5,000.00 for each incident of unlicensed activity. Please govern your future behavior accordingly.

ISSUED this 27th day of March, 2013.

Zana Raybon, Executive Director

Wendy S. Anderson
Investigator
850-523-1619

Wendy Anderson

From: Wendy Anderson
Sent: Wednesday, May 15, 2013 3:19 PM
To: 'scott@lifesourceengineering.com'
Subject: Complaint #2013012445

Mr. Baggerly:

Thank you for taking the time to speak with me this afternoon. During that telephone conversation you advised me that you held a Marine Engineering License from the US Coast Guard. You also indicated that you would revise your business cards. Your current business cards reflect "licensed engineer". You have advised that you will replace "licensed engineer" with "licensed marine engineer". Please confirm your understanding of this conversation and please provide me a copy of your Marine Engineer license. Thank you.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

Wendy Anderson

From: Scott Baggerly <Scott@LifeSourceEngineering.com>
Sent: Thursday, May 16, 2013 1:00 PM
To: Wendy Anderson
Cc: scott@lifesourceengineering.com
Subject: RE: Complaint #2013012445
Attachments: Lifesource Engineering, Inc for Preston Scott.pdf; USCG License.pdf

Wendy:
Please be advised that I never intended to portray that I am a Florida Licensed Professional Engineer. I am "in fact" a Licensed Engineer, USCG # 749202 (see attached) as stated on my "old" business cards. The license has been officially recorded and preserved so it can be utilized whenever deemed necessary. I have changed the business card (see attached) to appease your Board and the complainant. I am requesting the identification of the complainant so I can give them a new business card.
I trust that this will conclude this issue.
Regards,
Preston "Scott " Baggerly
www.LifeSourceEngineering.com

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Wednesday, May 15, 2013 3:19 PM
To: scott@lifesourceengineering.com
Subject: Complaint #2013012445

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Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
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Specializing in Water Purification and Wastewater Treatment Systems

Preston Scott Baggerly
Licensed Marine Engineer

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Scott@LifeSourceEngineering.com

Tel: (352) 795-3832
Fax: (352) 795-7923
Cell: (727) 510-0375

www.LifeSourceEngineering.com

DEPT. OF TRANSP., U. S. COAST GUARD, CG-2849 (REV. 8-67)

FILE NO. GCH

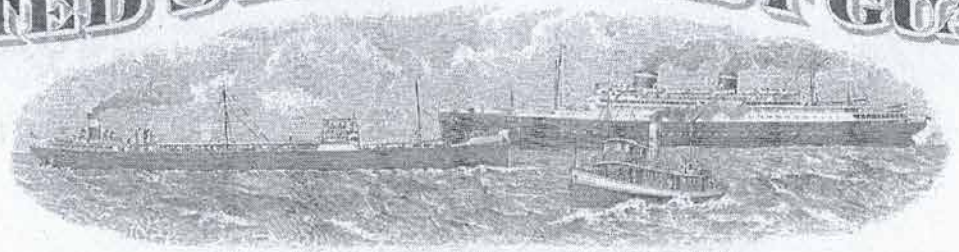
SERIAL NUMBER

749202

ISSUE NUMBER

2-2

UNITED STATES COAST GUARD



LICENSE

TO U. S. MERCHANT MARINE OFFICER

This is to certify that *** PRESTON S. BAGGERLY ***

having been duly examined and found competent by the undersigned, is licensed to serve as DESIGNATED DUTY ENGINEER OF MOTOR VESSELS OF NOT MORE THAN -1000- HORSEPOWER.**********

****

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****

****

****

for the term of five years from this date.

Given under my hand this 1ST *day of* FEBRUARY *, 19* 95.

"SEE ENDORSEMENT ON REVERSE SIDE"

MIAMI, FLORIDA

Port

BY DIRECTION OF THE

Zona R. Mingo

ZONA R. MINGO

Officer in Charge of Marine Inspection

Wendy Anderson

From: Scott Baggerly <Scott@LifeSourceEngineering.com>
Sent: Friday, May 24, 2013 2:59 PM
To: Wendy Anderson
Cc: scott@lifesourceengineering.com
Subject: FW: Complaint #2013012445
Attachments: USCG License # 749202 (back).pdf

Wendy:
Please see back of license and discussed.
Regards,

Preston "Scott " Baggerly
www.LifeSourceEngineering.com

From: Scott Baggerly [mailto:Scott@LifeSourceEngineering.com]
Sent: Friday, May 17, 2013 12:37 PM
To: 'Wendy Anderson'
Subject: RE: Complaint #2013012445

Wendy:
So with that statement you are saying I cannot list myself as a "licensed operator" with the attached documents? It does not say "Licensed Water Plant Operator" or "Licensed Wastewater Plant Operator" . Law states that I must display these "Licenses" whenever I am in charge of a system requiring this documentation. This is the same for the USCG License, I must display the License while I am in charge of a vessel. I spent many years to achieve these Licenses. USCG states "...undersigned is licensed to serve as Designated Duty Engineer ..." Please call to discuss: 727 510 0375

Preston "Scott " Baggerly
www.LifeSourceEngineering.com

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Friday, May 17, 2013 10:48 AM
To: Scott Baggerly
Subject: RE: Complaint #2013012445

Mr. Baggerly:

Thank you for your email. Upon receipt of your email and attachments, I discussed this complaint further with the Prosecuting Attorney. The License you provided does not list you as a "Licensed Marine Engineer", it licenses to as a Designated Duty Engineer of Motor Vessels. I must amend my previous email to you. You may call yourself Marine Engineer, but not Licensed Marine Engineer. If you will agree to this title and change your business cards to reflect only Marine Engineer, I will draft the affidavit and forward it to you for review. Thank you.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

From: Scott Baggerly [mailto:Scott@LifeSourceEngineering.com]
Sent: Thursday, May 16, 2013 1:00 PM
To: Wendy Anderson
Cc: scott@lifesourceengineering.com
Subject: RE: Complaint #2013012445

Wendy:
Please be advised that I never intended to portray that I am a Florida Licensed Professional Engineer. I am "in fact" a Licensed Engineer, USCG # 749202 (see attached) as stated on my "old" business cards. The license has been officially recorded and preserved so it can be utilized whenever deemed necessary. I have changed the business card (see attached) to appease your Board and the complainant. I am requesting the identification of the complainant so I can give them a new business card.
I trust that this will conclude this issue.
Regards,
Preston "Scott " Baggerly
www.LifeSourceEngineering.com

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Wednesday, May 15, 2013 3:19 PM
To: scott@lifesourceengineering.com
Subject: Complaint #2013012445

Mr. Baggerly:

Thank you for taking the time to speak with me this afternoon. During that telephone conversation you advised me that you held a Marine Engineering License from the US Coast Guard. You also indicated that you would revise your business cards. Your current business cards reflect "licensed engineer". You have advised that you will replace "licensed engineer" with "licensed marine engineer". Please confirm your understanding of this conversation and please provide me a copy of your Marine Engineer license. Thank you.

Wendy Anderson
Investigator &
Public Records Requests

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

Additional Endorsements: MIAMI, FLORIDA 1 FEBRUARY 1995

"LICENSE RENEWED FOR CONTINUITY PURPOSES ONLY, SERVICE UNDER THE AUTHORITY OF THIS LICENSE IS PROHIBITED UNTIL ALL OF THE REQUIREMENTS FOR RENEWAL ARE MET."**********

ZONA R. MINGO
BY DIRECTION

Signature of Licensee _____

LEFT THUMB PRINT ↓

Z or Book Number SSN# 257-21-8415

Date of Birth 2/10/59

Place of Birth SAN MATEO, CA

Present Address 12723 82ND TERRACE NORTH

SEMINOLE, FLORIDA 34646

PRESENTED U.S. MMD FROM PREVIOUS LICENSE AS PROOF OF U.S. CITIZENSHIP

Wendy Anderson

From: Wendy Anderson
Sent: Friday, May 17, 2013 10:48 AM
To: 'Scott Baggerly'
Subject: RE: Complaint #2013012445

Mr. Baggerly:

Thank you for your email. Upon receipt of your email and attachments, I discussed this complaint further with the Prosecuting Attorney. The License you provided does not list you as a "Licensed Marine Engineer", it licenses to as a Designated Duty Engineer of Motor Vessels. I must amend my previous email to you. You may call yourself Marine Engineer, but not Licensed Marine Engineer. If you will agree to this title and change your business cards to reflect only Marine Engineer, I will draft the affidavit and forward it to you for review. Thank you.

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Investigator &
Public Records Requests

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From: Scott Baggerly [mailto:Scott@LifeSourceEngineering.com]
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Cc: scott@lifesourceengineering.com
Subject: RE: Complaint #2013012445

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Regards,
Preston "Scott " Baggerly
www.LifeSourceEngineering.com

From: Wendy Anderson [mailto:WAnderson@fbpe.org]
Sent: Wednesday, May 15, 2013 3:19 PM
To: scott@lifesourceengineering.com
Subject: Complaint #2013012445

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U.S. Department of Homeland Security

United States Coast Guard

Contact Us

Send us a message

This site is for public information only and is not a distress communication channel. People in an emergency and need of Coast Guard assistance should use VHF-FM Channel 16 (156.8 MHz), dial 911, or call their nearest Coast Guard unit.

Mailing Addresses

Please use this Mailing Information link to find the appropriate office with corresponding address and phone number.

Additional Contact Info

E-mail Comments

For further information use the e-mail form below and submit your question to us. We will forward your request to an appropriate Coast Guard staff member for response.

Visit the *US Coast Guard Recruiting* web site for information about enlisting in the Coast Guard

Do not enter:

Enter your E-mail Address

wanderson@fbpe.org

Select the category of your comments or questions

Licensing Information

Subject of your message

Preston Scott Baggerly USCG License #749202

Enter your comments or questions below.

I have been advised that Preston Scott Baggerly holds the above referenced USCG license. Upon receipt of a copy of the front and back of that license, I am curious whether Mr. Baggerly is currently authorized through that license to provide and/or offer Marine Engineering services.

Wendy Anderson
Investigator
Florida Board of Professional Engineers
850-523-1619

Reminder:

- If requesting information by regular mail, please include your name and mailing address.
- If referring to a particular web page, please provide the address of web page so that we can respond to your request quicker.

Send Reset

No Solicitations Accepted.

Wendy Anderson

From: scott <scott@lifesourceengineering.com>
Sent: Monday, July 15, 2013 8:37 AM
To: Wendy Anderson
Subject: re: Lifesource Engineering

Wendy:
Good morning.
Please send me the requested documents in my letter that included the affidavit. Also, please explain also the reason to not rescind the C&D as it is not applicable.
Regards,

Preston "Scott " Baggerly

www.LifeSourceEngineering.com

From: "Wendy Anderson" <WAnderson@fbpe.org>
Sent: Friday, July 12, 2013 8:20 AM
To: "scott@lifesourceengineering.com" <scott@lifesourceengineering.com>
Subject: Lifesource Engineering

Mr. Baggerly:

Thank you for forwarding the executed Affidavit. I will be closing the file this morning against LifeSource; however, please be advised that the Cease & Desist is not and will not be rescinded. The file is being closed because you are now in compliance. Thank you.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

2639 North Monroe Street
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850-523-1619

Wendy Anderson

From: Scott Baggerly <Scott@LifeSourceEngineering.com>
Sent: Friday, May 17, 2013 12:37 PM
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Subject: RE: Complaint #2013012445
Attachments: FI Licenses DW 8241 WW 14194.pdf

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Preston "Scott " Baggerly
www.LifeSourceEngineering.com

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Investigator &
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Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

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Tallahassee, FL 32303
850-523-1619

FSMC Opened Complaint

he did not want to open complaint

Wendy Anderson

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Sent: 2013-02-11 16:54
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Subject: Question on Licensure of Engineer

Hello:
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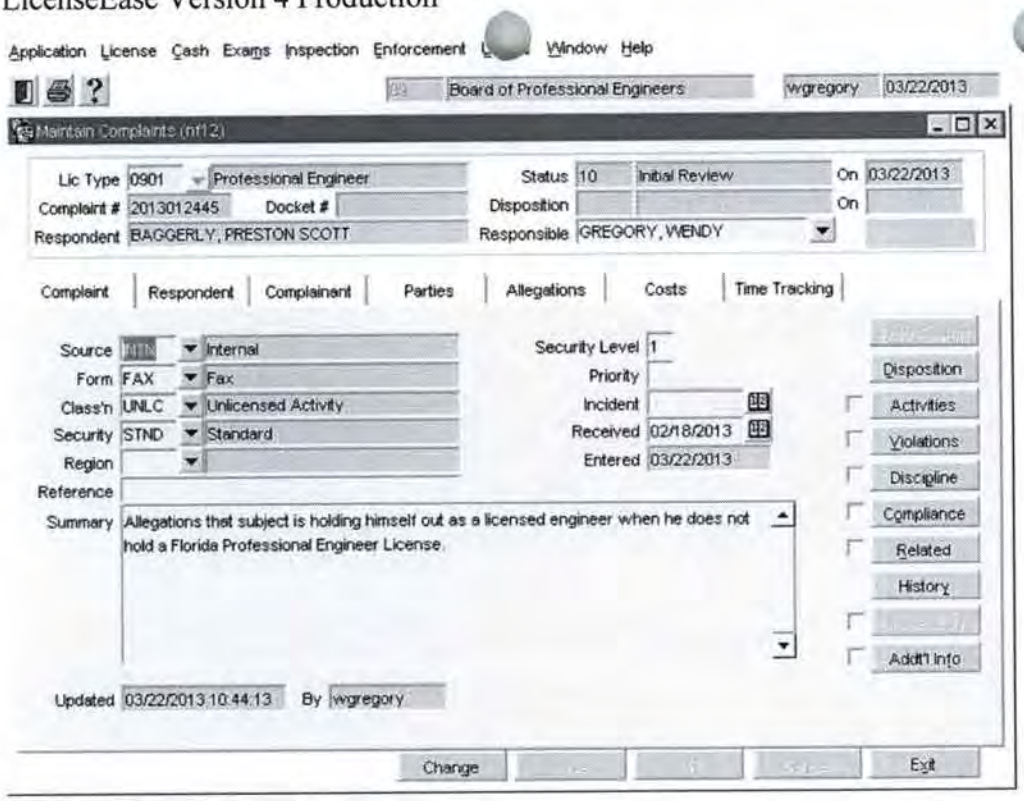

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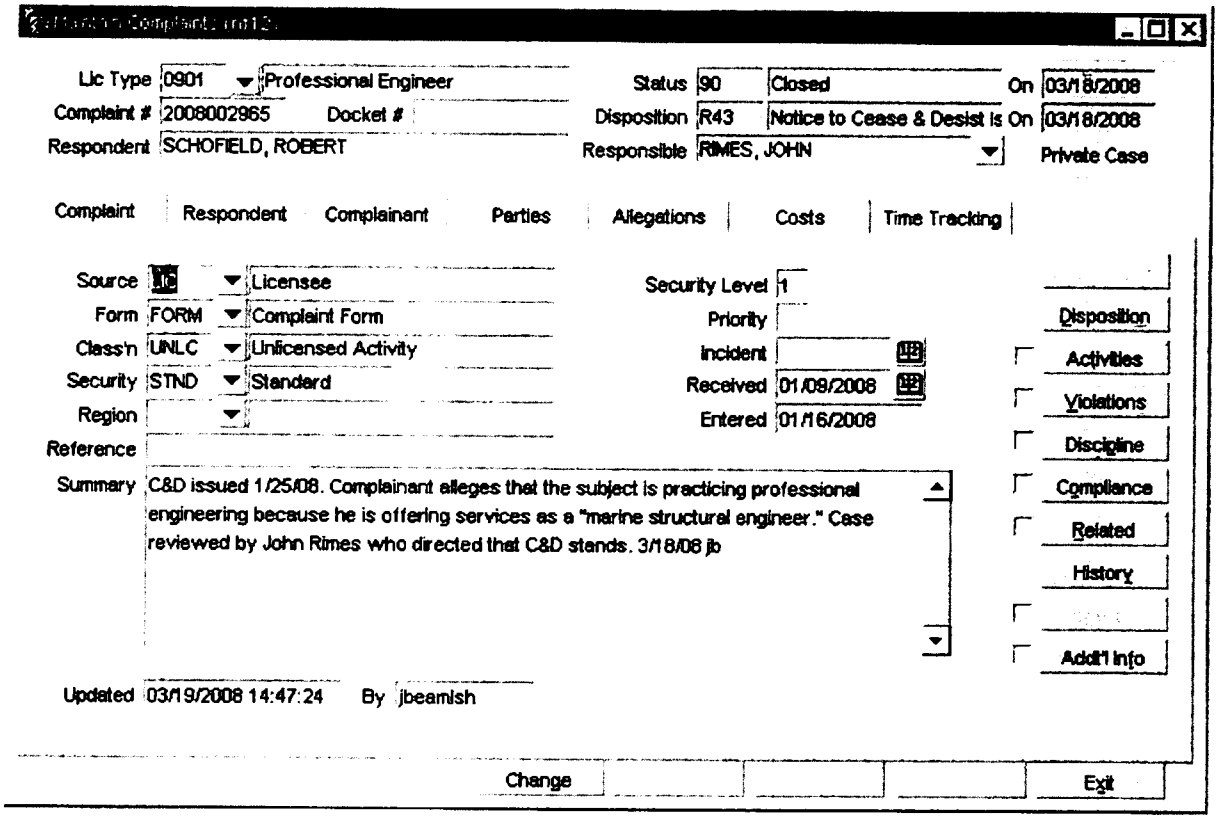
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Complaint # 2008002965 Docket #
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Responsible RIMES, JOHN
Private Case
Complaint
Respondent
Complainant
Parties
Allegations
Costs
Time Tracking
Source LIC Licensee
Form FORM Complaint Form
Class'n UNLC Unlicensed Activity
Security STND Standard
Region
Reference
Security Level 1
Priority
Incident
Received 01/09/2008
Entered 01/16/2008
Summary C&D issued 1/25/08. Complainant alleges that the subject is practicing professional engineering because he is offering services as a "marine structural engineer." Case reviewed by John Rimes who directed that C&D stands. 3/18/08 jb
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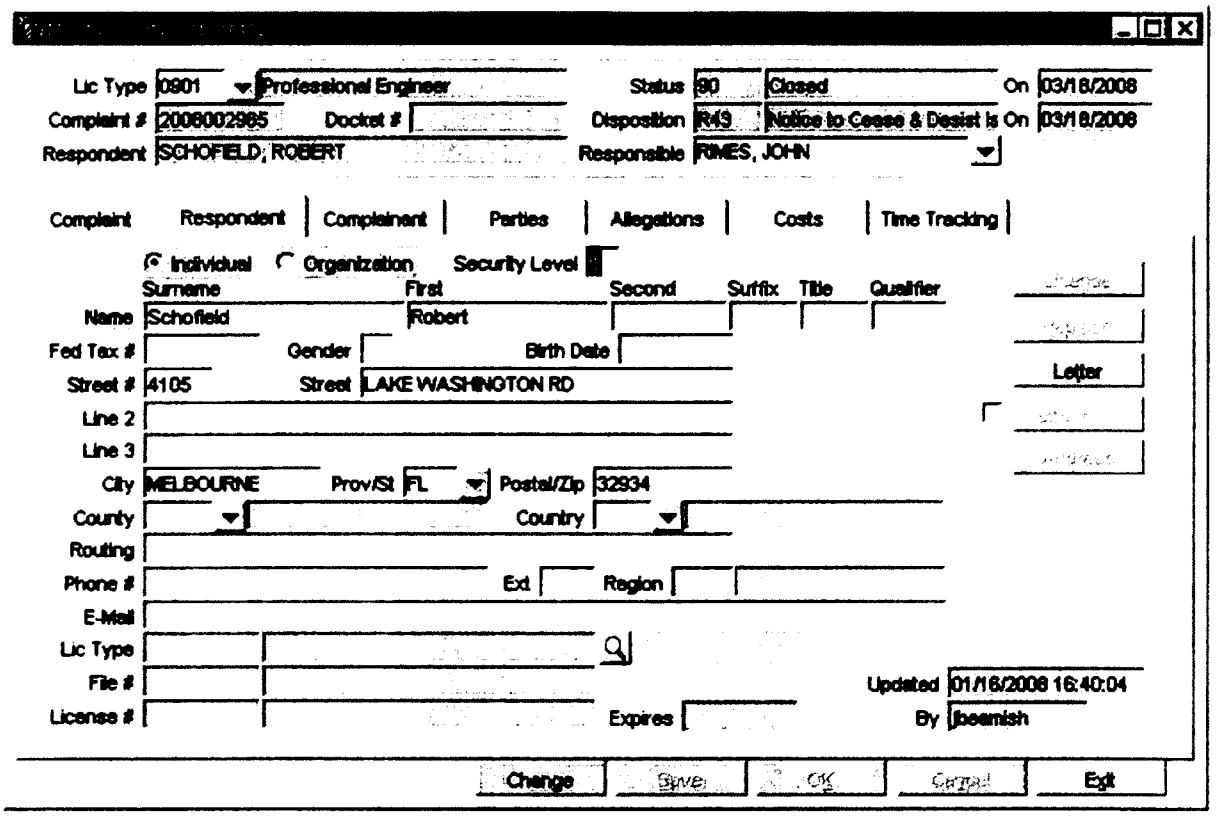
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Title
Qualifier
Name Schofield Robert
Fed Tax #
Gender
Birth Date
Street # 4105
Street LAKE WASHINGTON RD
Letter
Line 2
Line 3
City MELBOURNE
Prov/St FL
Postal/Zip 32934
County
Country
Routing
Phone #
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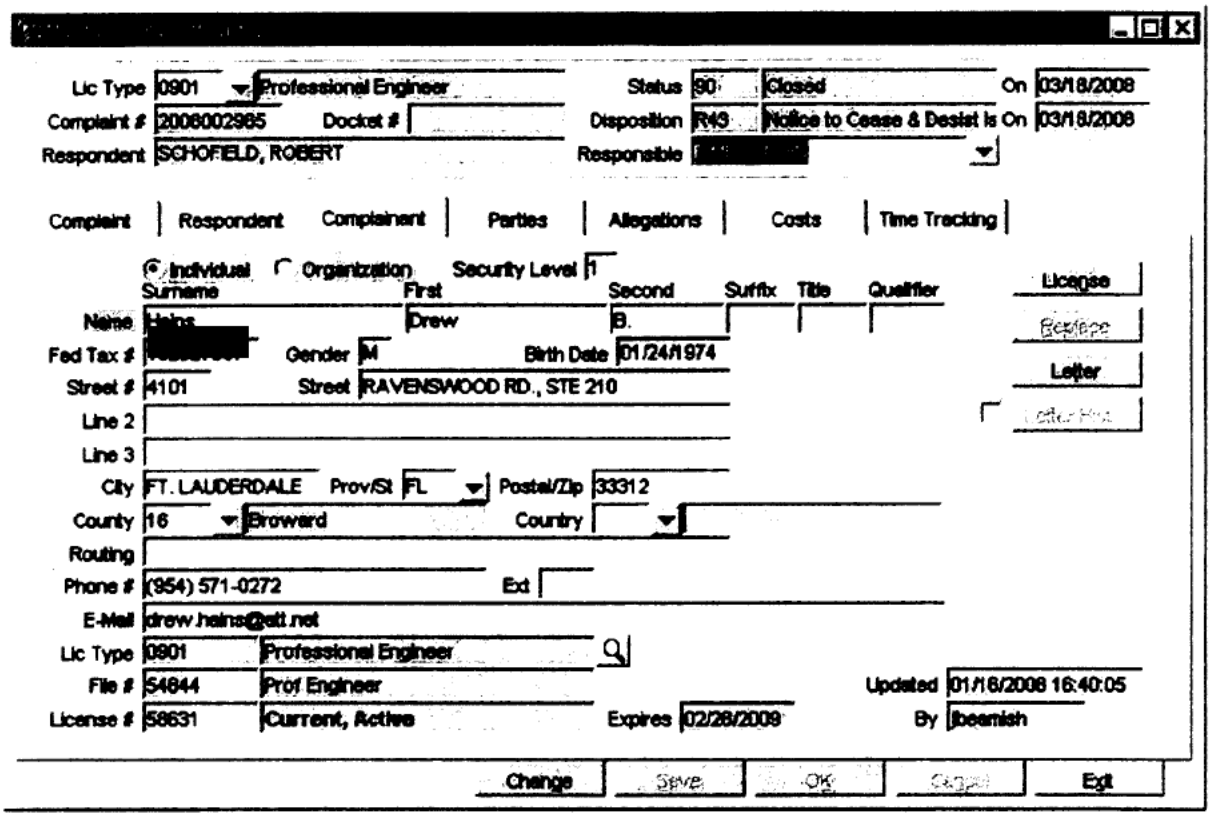
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Name
Drew
B.
Fed Tax #
Gender M
Birth Date 01/24/1974
Letter
Street # 4101
Street RAVENSWOOD RD., STE 210
Line 2
Line 3
City FT. LAUDERDALE
Prov/St FL
Postal/Zip 33312
County 16 Broward
Country
Routing
Phone # (954) 571-0272
Ext
E-Mail drew.hains@att.net
Lic Type 0901 Professional Engineer
File # 54644 Prof Engineer
Updated 01/16/2008 16:40:05
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Expires 02/28/2009
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FLORIDA BOARD OF PROFESSIONAL ENGINEERS

CHARLIE CRIST, GOVERNOR

HOLLY BENSON, SECRETARY
DEPARTMENT OF BUSINESS
AND PROFESSIONAL REGULATION

January 26, 2008

Robert A. Schofield
4105 Lake Washington Road
Melbourne, FL 32934

Re: Notice to Cease & Desist Case no. 2008002965

Dear Mr. Schofield:

Pursuant to Sections 455.228 and 471.038, Florida Statutes, the Board of Professional Engineers is required to investigate legally sufficient complaints that allege unlicensed practice of engineering.

Attached for your information is the complaint or document received by the Board in this case. You will further find enclosed a Notice to Cease and Desist ordering you to refrain from unlicensed practice of engineering.

This Notice to Cease and Desist does not constitute agency action for which you can demand an administrative hearing, but it may be enforced by court action in your county. You may still be subject to criminal proceedings or formal administrative proceedings.

If you claim an exemption from the applicable statutes or wish to present additional information for consideration by the Board, please transmit it to the undersigned. In order to avoid administrative action by the Board, please execute the enclosed affidavit and return it to me. Upon receipt of the executed affidavit, this matter will be considered closed. The duty of the Board thereafter will be limited to confirm compliance with the affidavit and the laws of the State of Florida.

Sincerely,

Jack Beamish
Investigator
Florida Board of Professional Engineers

Encl.

7006 0100 0004 2481 9136

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2/25/08

Sent To: Robert A. Schofield
Street, Apt. No.; or PO Box No.: 4105 Lake Washington Rd.
City, State, ZIP+4: Melbourne, FL 32934

PS Form 3800, June 2002 — See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Robert A. Schofield
4105 Lake Washington Rd.
Melbourne, FL 32934

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery 2-27-08

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7006 0100 0004 2481 9136

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

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Certified Fee	
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Total Postage & Fees	$

2008002965

Postmark Here

1/28/08

Sent To: Robert A. Schofield

Street, Apt. No.; or PO Box No.: 4105 Lake Washington Rd.

City, State, ZIP+4: Melbourne, FL 32934

PS Form 3800, June 2002 — See Reverse for Instructions

STATE OF FLORIDA
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

FBPE Case No. 2008002965

NOTICE TO CEASE AND DESIST

TO: Robert A. Schofield
4105 Lake Washington Road
Melbourne, FL 32934

You are hereby ordered by the FLORIDA BOARD OF PROFESSIONAL ENGINEERS to Cease and Desist from the unlicensed and illegal practice of Engineering.

You are notified that the following specifically described conduct constitutes the unlicensed practice of engineering:

Identifying yourself as a "marine structural engineer" in your curriculum vitae distributed to clients in the State of Florida.

Pursuant to Chapter 471, Florida Statutes, only persons or firms licensed by the Florida Board of Professional Engineers may practice engineering in the State of Florida. No person other than a duly licensed engineer shall practice engineering or use the name or title of "licensed engineer," "professional engineer," or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer in this state.

The unlicensed practice of engineering is made a crime by Section 471.031, Florida Statutes. Additionally, the Board of Professional Engineers is authorized by Sections 455.228 and 471.031 to impose a fine of up to $5,000 for each incident of the unlicensed practice of engineering.

Issued this 25 day of January, 2008.

Board of Professional Engineers

Carrie Flynn

Carrie Flynn, Executive Director

RECEIVED
JAN 9
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

Florida Board of Professional Engineers

UNIFORM COMPLAINT FORM

Please return to: Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, Florida 32303

Type or Print

Your Name: Drew B. Hains PE

Address: Murray and Associates, LLC

4101 Ravenswood Road Suite 210

Fort Lauderdale, FL (ZIP) 33312

Telephone: (954)527-5505 (954) 571-0272
Business Residence

Contact (other than yourself)

Name: ____NA_____

Address:_____

_____

_____(ZIP)_____

Telephone( )_____

Your Occupation: Naval Architect/Marine Engineer

SUBJECT OF COMPLAINT

Name: Robert A. Schofield (Individual) Robert A. Schofield, Naval Architect
Engineer and/or Engineering Firm

Address: 4105 Lake Washington Road Telephone: 321-255-8331

City: Melbourne State: Florida Zip: 32934

License # (if known): NONE

Have you contacted subject concerning complaint? Yes ☐ No X Date: NA

Private Attorney
(if applicable)_____
Name Address

_____ _____( )_____
City State Zip Telephone

Because of the Statute of Limitations, please do not delay in consulting with an attorney or initiating any actions to preserve your civil remedies in this matter. *The Board cannot be your legal representative. Matters, which involve monetary recovery or questions of restitution for damages, are civil in nature and should be addressed to the court with appropriate jurisdiction.*

Witnesses (Please give full name and address)

Mark A. Smedal
600 West Main Street, Suite 100
Louisville KY 40202

David Shaw
700 East Market St
Jeffersonville, Indiana 47130

Capt Moe Skula & Mate Tom Ripp
Contact via Donald J Kelly
Wyatt Tarrant & Combs, LLC
500 W Jefferson Street, Suite 2500
Louisville, KY 40202

Please see other side

Note: A copy of this form will be sent to the Engineer named in your complaint pursuant to **455.225(1) Florida Statutes.**

Please give full details of your complaint. Include facts, details, and dates. Please attach copies of documents, records, correspondence, plans and contracts.

Robert A. Schofield was engaged by Mr. Smedal to provide an evaluation of the stability of a yacht, and in the performance of the requested evaluation, he conducted a stability experiment on the yacht, did extensive calculations and wrote a report summarizing his findings. The test was conducted in Florida at Ocean Reef Club, Key Largo FL on January 18, 2007. Mr. Schofield's initial report (Exhibit A) is dated January 31, 2008. Subsequent to that report, Mr. Schofield issued an expert report dated October 29, 2007 (Exhibit B).

Additionally, Mr. Schofield provided a Curriculum Vitae (Exhibit C) indicating he has since 10/86 provided "consulting engineering" to 40 plus US boat manufacturers including a number of Florida based firms including Searay and Broward Yachts. Further, Mr. Schofield's CV indicates these services have included structural engineering.

Mr. Schofield is not licensed to provide engineering services in Florida under Chapter 471 of the Florida State Statutes. Additionally "Robert A. Schofield, Naval Architect" does not have a certificate of authorization.

Moreover, the services provided by Mr. Schofield to Mr. Smedal meet the definition of engineering as defined in FS 471.005 (7). In review of Exhibit B it is clear that specialized knowledge and training are required. Further the services Mr. Schofield has reported in his CV are termed by him as engineering as well and thus appear to meet the definition of engineering as defined in FS 471.005 (7). Thus the attached exhibits clearly demonstrate that Mr. Schofield has violated FS 471.031 (1) (a).

In Exhibit C, Mr. Schofield states, he "is a practicing naval architect and marine structural engineer." FS 471.031 (1) (b) clearly limits the use the title "Marine Engineer" and "Structural Engineer." Thus, Mr. Schofield's use of the term marine structural engineer clearly violates this statute.

Furthermore, Mr. Schofield indicates his status as a European Engineer (EU) and a Chartered Engineer (UK) and thus indicated he is in some way licensed or approved to practice; this violates the spirit of FS 471.031 (1) (b) and confuses the public with respect to his licensure status. Mr. Schofield provides his services from a location in Florida.

Further, having briefly reviewed the reports of Exhibit A and Exhibit B, the conclusion drawn by Mr. Schofield, that the stability is adequate and safe for a seagoing yacht, is not supported by my firm's independent analysis. Additionally there are a number of incorrect statements in Mr. Schofield's report as well as a number of misleading statements. Should the board desire, Murray and Associates will provide examples of Mr. Schofield's incorrect and misleading statements. Therefore, it can be concluded that Mr. Schofield's reports are violative of 471.033 (g).

Florida Statutes 837.06, False Official Statements: Whoever knowingly makes a false statement in writing with the intent to mislead a public servant in the performance of his official duty shall be guilty of a misdemeanor of the second degree.

01-05-2008

Signature (required to file complaint) Date

EXHIBIT A

ROBERT A. SCHOFIELD, NAVAL ARCHITECT

TEL# 321 255-8331
FAX# 321 255-3554
E-MAIL: rasna@attglobal.net

4105 Lake Washington Road
Melbourne, Florida 32934

Smith & Helman
600 West Main Street
Suite 100
Louisville, Kentucky 40202

31 January 2007

Attn: Mark A. Smedal

Project: Jefferson Yachts Starship 82', Hull No. 10
"JUST RELAXING"
Stability Test

Date of Test: 18 January 2007

Test Location: Ocean Reef Club (protected inland yacht slip provided)
Key Largo, Florida, USA

Parties in Attendance:
Capt. "Mo" Skula
Chief Mate Tom Ripp
David Shaw, Representative for Jefferson Yachts
Robert A. Schofield, Naval Architect

Weather Conditions at Time of Test:
Winds – from southwest, 10 knots
Air Temperature – 74 degrees F
Water Temperature – 72 degrees, F
Waves – calm

The attached documentation summarizes our findings during the subject stability experiment. As can been seen from the plots of heeling inclinations, the results of the inclining test were very consistent and indicative of a good test.

I took water and air temperature prior to initiation of weight movements and at end of tests, and sampled several areas of water around the yacht, for hydrometer testing with my NIST-calibrated hydrometer. I adjusted the specific gravity for the water temperature observed at the test site.

The yacht slip in which the yacht was moored during the test is about 7 to 8 feet deep, providing plenty of depth to avoid any bottoming out during the inclinations. Two loose bow crossed mooring lines across the slip were employed, as well as one port loose breast line at the stern, and one spring line along the starboard side. During the test, it was obvious on the few occasions when the lines fetched up due to wind or occasional nudging of the yacht on the pilings alongside the wharf. At those times, we waited until the perturbation passed before reading inclination measurements.

Test weights were provided by use of water pumping between polyethylene rectangular tanks for the weight movements. Six 30 gallon tanks and two 55 gallon tanks sitting hard against the deckhouse on the weather deck walkways port & starboard were used for the test.

With all weights in the "zero" symmetrical position and personnel at their data-taking stations, I measured the chine draughts at after end of transom and measured the freeboard of the chine intersection with the stem. Hydrostatics were calculated from a waterplane placed on those points on the mathematical hull model.

I determined the specific gravity of the water surrounding the ship to be 1.027 at the time of the experiment, which is slightly beyond seawater in density. This is adjusted for temperature.

All fuel, water, and sewage tanks were sounded and weights calculated for the "as-inclined" test condition.

I calculated the "as-inclined" test condition, deducted the test weights, weights of personnel, and fluids on board, to find the light ship weight. The attached calculations sheets show the yacht in 100% full load condition, 50% fuel, and 10% fuel loading conditions. Draft, trim, and stability were then calculated by computer for each of those loading conditions. I also calculated righting arm and moment curves to determine the state of stability for each of those loading conditions.

I also calculated the side profile windage area and heeling arm for wind loadings, for each of the 100%, 50%, and 10% loading conditions.

Summary of Findings
The yacht demonstrates an adequate range of positive stability for all probable loading conditions for seagoing service. Capsize angle is close to 90 degrees, with the peak righting moment demonstrated at about 55 degrees of heel. This is very good.

Initial metacentric height as a function of heel angle is positive and safe, but is somewhat proportionally lower than a typical broad-beamed, wide chine motoryacht hull. This initial "tenderness" is due to the rather narrow chines of the subject hull, and operators would feel a bit more heeling tendency than the norm for the beginning angles of roll motion. However, the metacentric height increases rapidly with angle of heel, due to the pronounced flare of this hullform. This increasing stability tendency is much better than the norm for yachts of this type.

A significant advantage of the initial tenderness would be that roll period in a beam sea would be increased. This improves passenger comfort appreciably. Fin stabilizers of proper size would nevertheless eliminate this initial heel tendency at minimal cruise speed.

I calculated that it would take a wind speed of 110, 100, and 90 knots respectively to capsize in the 100%, 50%, and 10% loading configurations. In storms of those magnitudes, ship masters steer a course to prevent broadside wind and sea actions, obviously, but this calculation shows a safe ship for seagoing service.

Recommendations
Since the stability is adequate and safe for a seagoing yacht, I recommend no changes to the weight distribution of the yacht, as-is, nor do I recommend addition of any ballast.

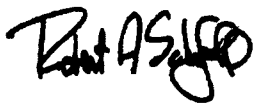
From the advice received, I understand that Wesmar is proposing increasing the area of the fin stabilizers from 11 to 16 square feet, and I wholeheartedly agree that this one change will take care of any feeling of initial tenderness in roll. Hard turns with a heeling wind can give passengers an uncomfortable feeling at times, even on the most stable of yachts. However, the proper sized fin stabilizers will eliminate any of that heeling tendency.

I noted that it is possible that the fuel tanks can be left cross-connected, with the existing arrangement of fuel transfer valves. Should a long-duration beam wind heel the yacht over a few degrees, with the valves left open the yacht could conceivably take on an even larger heel or list to the leeward side. This phenomenon may have been the item that precipitated the captain's initial concerns about stability for this yacht.

Therefore, I recommend that the cross connection transfer valves be closed, except when actively transferring fuel from one side to the other.

Please call if I can be of further assistance on these interesting technical matters.

Sincerely,



Robert A. Schofield
Eur. Ing.
CEng MRINA, BSc.

EXPERT REPORT OF

ROBERT A. SCHOFIELD, NAVAL ARCHITECT
4105 Lake Washington Road
Melbourne, Florida 32934

Date: 29 October 2007

Prepared for the Account of
Mark A. Smedal, Esq.
Smith & Helman
600 West Main Street
Suite 100
Louisville, Kentucky 40202

Project: Jefferson Yachts Starship 82', Hull No. 10
"JUST RELAXING"
Stability Test & Analysis

Reference: Johnston Family Louisville, LLC.
v.
Kentuckiana Yacht Sales, Inc. and Jefferson Yachts, Inc.

U.S. District Court, Western District of Kentucky at Louisville
CIV 3:07CV-122-S

Date of Stability Test: 18 January 2007

Background
I have been requested by counsel for the Defendant to evaluate the stability of the subject yacht in the referenced case. In performance of the requested evaluation, I conducted a stability experiment of the yacht, did extensive calculations and wrote a report summarizing my analysis and evaluation.

EXHIBIT B

In order to provide documentation of my findings, I am attaching **APPENDIX A** herewith, which is a copy of my original Report and substantiating calculation summaries.

Subsequent to publication of my original stability report on the subject yacht, a report was submitted through counsel by an expert for the Plaintiff, Murray and Associates, LLC, (unsigned) dated April 18, 2007. Counsel for the Defendant requested that I also review the Murray and Associates report and comment on differences between my findings and those of that firm.

This Report is a summary of my opinions on the subject matter, an overview and summary of my analysis and evaluation of the vessel's stability, and it is also an outline of points of difference or agreement with the results presented by the Murray and Associates report.

Opinions and Conclusions In this Case
Based on the results of my analysis, I conclude that the subject yacht is safe for operation at sea in the service for it was intended (pleasure yacht service) under normal loading conditions and the vessel possesses the following traits:

Under all loading normal conditions the yacht has a positive metacentric height, and is therefore stable under the universal definition of that term.

The yacht conforms to all requirements of the regulatory bodies applicable to pleasure yachts registered in the United States at the time of construction.

Under all conditions of loading, the yacht has a positive range of stability up to just beyond 80 degrees of heel. The Murray & Associates report alleges that downflooding due to angle of heel occurs at the location of the engine room ventilation openings above the main deck. However, these ventilation openings are of such a size and location that momentary heel sufficient to immerse them would not jeopardize the yacht. They are sufficiently high above normal operating waterlines that such immersion would be quite brief, and the heel angle required to reach that point is extreme. Furthermore, the openings are protected from spray and impacting seas by the substantial bulwarks on the main deck. It is extremely unlikely that the subject yacht would ever see such a violent sea condition during its service life.

There are no U.S. standards for pleasure yacht stability. Despite this, the Murray & Associates report represents that the IMO "Rahola Criteria" is a measure to compare the yacht's stability for seagoing conditions. For the U.S., these criteria are only applicable for passenger-carrying commercial inspected vessels "of unusual proportion and form", and they are very stringent. Only a few U.S. yachts will meet this standard, and generally, they are yachts purpose-built to British charter yacht requirements under the

MCA charter yacht regulations, which are somewhat similar to the U.S. Coast Guard commercial passenger vessel rules (SubChapter "T", 46CFR 170.170 to 173).

It is noteworthy that, even for passenger vessels, the U.S. Coast Guard imposes the IMO criteria only on "vessels of unusual proportion and form". These are the requirements of 46CFR173, referenced by the Murray & Associates report.

I have designed several superyachts (larger than 110 feet) to the MCA requirements, and the additional costs for conformance to MCA requirements added a sizeable increase to the finished price of the yachts certified to those standards. Additional watertight bulkheads and demonstration of damaged stability had to be made, regardless of where on the boat length potential collision damage would be sustained. The subject yacht was not built to those requirements, as it is not British flag, and it is not intended for chartering in British waters.

The American Bureau of Shipping has issued unlimited seagoing class certificates in recent years to several of my large yacht designs where the yacht would not meet the more stringent MCA requirements.

The U.S. Coast Guard similarly does not impose damaged stability requirements on small passenger vessels, which would be a requirement of the MCA for British-flagged charter yachts. The Murray & Associates report takes no issue with the lack of watertight subdivision per MCA, but does allege that the yacht is somehow deficient for lack of conformance to the MCA intact stability criteria.

For comparison purposes, I did evaluate the stability of the subject yacht against those U.S. Coast Guard commercial passenger vessel rules (SubChapter "T", 46CFR 170.170 to 173) when I first reported the results of the inclining experiment, and copies of the print-out are attached to my original inclining report, as part of Appendix "A". I found that the subject yacht met all the "Unlimited Ocean Service" criteria except for the overly-stringent U.S. Coast Guard "weather criterion" (46CFR 170.170 (A)), and just barely did not meet the criteria numbered (5) and (6) of 46CFR170.173 (B), but only for the 10 percent load condition ("Arrival Condition"). However, in that 10% load condition, the subject yacht came within 98% and 90% of the righting energy required by just those two last subparagraphs. This is pretty good for a pleasure yacht. At full load and half load conditions, the subject yacht meets all those criteria.

The U.S. Coast Guard "weather criterion" (46 CFR 170.170 (A)) referenced by the Murray & Associates report is the most stringent of the commercial passenger vessel criteria imposed on U.S. flag commercial vessels, and it is quite difficult to meet, even for commercial vessels. It is noteworthy that the Murray & Associates report correctly refers to this "weather criterion" as not very reflective of reality – as the vessel heels, the profile area and heeling lever arm reduce, but these ameliorating effects are not considered in the formula for the "weather criterion".

I did a cursory calculation under the U.S. Coast Guard "weather criterion" mentioned above and calculated the wind velocities necessary to "capsize" the subject yacht under various loading conditions in comparison to this "weather criterion". The critical wind velocities found were 65, 60, and 64 knots, respectively, for the full load, 50% load, and 10% load conditions. I used the form of the U.S. Coast Guard "weather criterion" formula of 46CFR170.170(A), but adjusted the coefficient to suit dynamic wind pressure to suit various wind velocities in knots. The calculated wind velocity result produces a momentary heeling moment equal to the maximum righting moment for each respective loading condition.

It is noteworthy that since U.S. Coast Guard imposed this "weather criterion", some commercial tourist cruise schooners in the U.S. have had to add ballast and the comfort of passengers at sea has been consequently worsened. The resulting quick roll period is quite disconcerting for the affected tourist boats, because of the required large metacentric height. Imposition of this requirement on a yacht would certainly degrade its comfort. Such a large margin of stability is obviously a desireable thing in ultimate "survival" sea conditions, but the inherent large range of positive stability that this yacht already posses provides a form of margin against ultimate sea conditions.

Differences Between Murray & Associates Report and My Report

The Murray & Associates stability report produces stability and displacement values that are considerably different from my own findings. Just prior to the time I performed my stability experiment, I invited the Plaintiff (through counsel) to provide experts for witnessing and review of the inclining test and results. Plaintiff declined to provide such experts. The yacht captain and chief mate were in attendance, but did not check results or verify data. I, or other qualified expert, was not invited to participate or witness the Murray & Associates inclining test, and therefore have no means to check data or verify calculations. A simple comparison of seawater specific gravity might account for the considerable variance with the reported results of that Murray & Associates inclining test. No calibration of hydrometer was provided in the published results, or indication of types of inclining weights used, or whether they were certified test weights. Pendulums or inclinometers were not specified in that report, and there was no means provided in the report by which the results could be checked.

Other major factors, which may account for the variances between the Murray & Associates reported results from my own, may be fuel and water tank free surfaces, or leaving open the fuel cross connection valves, or possibly ignoring the effect of free surfaces of any water tanks used as inclining weights, if such was the case.

My calculations are based on the original hull lines for this yacht model as provided by Her Shine, Ltd., shipbuilder. I replotted the original lines overlaid on top of the mathematical hull model used for my hydrostatics calculations and found excellent agreement. I used the RHINO MARINE hydrostatics computer program for calculation of the results, and I have extensive experience with this program qualifying vessels for classification society certification, EU Certification, government inspection or certification of

commercial passenger-carrying ferries, tour boats, other yacht models and naval craft. RHINO MARINE breaks up the hull and floodable surfaces into myriads of small triangles and rectangles, and the volumes, centers, and moments are very accurate as compared to other commercially-available computer programs. In the recent past, I did several RHINO MARINE comparisons of complicated vessel hull geometries with my own spreadsheet programs and with results calculated with GHS. RHINO MARINE produced the most accurate results as compared with certified scale weights, draft marks read, and moments to incline.

Murray & Associates used GHS for the calculations reported. GHS is a hydrostatics computer program which is also commercially available as is RHINO MARINE, and GHS was at one time considered the "industry standard" for conventional smooth-formed ship hulls. However, GHS is based on Simpson's Rule mathematical integration techniques that approximate the hull surface and floodable volumes by averaging curves of areas over each of three successive hull lines stations and combining all the 3-station results into an overall calculated volume. The three-decade-old U.S. Navy's SHCP hydrostatics program is reputedly the predecessor of the GHS program. I have personally used the SHCP program since 1975, up until the FORTRAN compiler-based version would not run on my WINDOWS-based office computers circa 1990 or thereabouts. From recent personal experience, I prefer to use the RHINO MARINE hydrostatics program over SHCP or other Simpson's Rule methods to obtain accurate results.

I recently designed a 40-passenger amphibious hard-chined craft for U.S. Coast Guard inspection which simply could not be analyzed by the Simpson's Rule hydrostatic calculation methods. The immersed geometry was simply too complicated, due to hull pockets for wheel wells, appendages, and propulsor. A subcontracted GHS model of that craft did not produce anywhere near credible results, and we inclined several of the craft under U.S. Coast Guard inspection. I wrote an EXCEL spreadsheet for that project, intending to compensate for the GHS deficiencies in handling hull pockets, suspension components tires and wheels. However, since it used the same mathematical approach as GHS (Simpson's Rule), that spreadsheet did also not produce credible results, but substantially agreed with the GHS output. Finally, I purchased the RHINO MARINE system during that project, and obtained almost immediate correlation of calculated versus actual tested results.

GHS seems to work well for smooth compound curvature hull forms that do not have abrupt changes in shape, such as commercial and most naval round-bottom ship forms. For that type of hull form, the computed results do not vary very much from actual in-water experimental results. However, for chined hulls, such as in the case of the subject yacht, the Simpson's Rule approach "smears" the volumes and waterplane areas too much for accurate calculation. This may be one of the factors influencing the variance between the Murray & Associates report findings and my own.

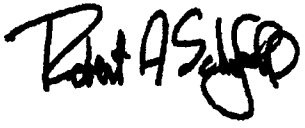
Recommendations

Since the stability is adequate and safe for a seagoing yacht, I recommend no changes to the weight distribution of the yacht, as-is, nor do I recommend addition of any ballast.

I have been advised that Wesmar, the fin stabilizer supplier for this yacht, is proposing increasing the area of the fin stabilizers from 11 to 16 square feet. I agree and recommend that this one change will take care of any feeling of initial tenderness in roll. Hard turns with a heeling wind can give passengers an uncomfortable feeling at times, even on the most stable of yachts. However, the proper sized fin stabilizers will eliminate any of that heeling tendency.

I recommend that the yacht's fuel transfer piping cross connection valves be kept always closed, except when actively transferring fuel from one side to the other. I noted that it is possible that the fuel tanks can be left cross-connected, with the existing arrangement of fuel transfer valves. Should a long-duration beam wind heel the yacht over a few degrees with the valves left open, fuel would drain from windward side to leeward side, and the yacht would conceivably take on an even larger heel or list to the leeward side. This phenomenon may have been the item that precipitated the captain's initial concerns about stability for this yacht.

Signed without prejudice to the interests of the parties concerned,



Robert A. Schofield
European Engineer (FEANI Registry, European Union #08120GB)
Chartered Engineer (#352565, United Kingdom)
MRINA, BSc.

APPENDIX A

Project: Jefferson Yachts Starship 82', Hull No. 10
"JUST RELAXING"
Stability Test

Date of Test: 18 January 2007

ROBERT A. SCHOFIELD, NAVAL ARCHITECT

tel# 321 255-8331
e-mail: rasna@attglobal.net

4105 Lake Washington Road
Melbourne, Florida 32934

ORIGINAL INCLINING EXPERIMENT REPORT 31 January 2007
U.S. Coast Guard Weather Criterion Corrected 29 October 2007

For the Account of:
Smith & Helman
600 West Main Street
Suite 100
Louisville, Kentucky 40202

Attn: Mark A. Smedal

Project: Jefferson Yachts Starship 82', Hull No. 10
"JUST RELAXING"
Stability Test

Date of Test: 18 January 2007

Test Location: Ocean Reef Club (protected inland yacht slip provided)
Key Largo, Florida, USA

Parties in Attendance:
Capt. "Mo" Skula
Chief Mate Tom Ripp
David Shaw, Representative for Jefferson Yachts
Robert A. Schofield, Naval Architect

Weather Conditions at Time of Test:
Winds – from southwest, 10 knots
Air Temperature – 74 degrees F
Water Temperature – 72 degrees, F

Waves – calm

The attached documentation summarizes our findings during the subject stability experiment. As can been seen from the plots of heeling inclinations, the results of the inclining test were very consistent and indicative of a good test.

I took water and air temperature prior to initiation of weight movements and at end of tests, and sampled several areas of water around the yacht, for hydrometer testing with my NIST-calibrated hydrometer. I adjusted the specific gravity for the water temperature observed at the test site.

The yacht slip in which the yacht was moored during the test is about 7 to 8 feet deep, providing plenty of depth to avoid any bottoming out during the inclinations. Two loose bow crossed mooring lines across the slip were employed, as well as one port loose breast line at the stern, and one spring line along the starboard side. During the test, it was obvious on the few occasions when the lines fetched up due to wind or occasional nudging of the yacht on the pilings alongside the wharf. At those times, we waited until the perturbation passed before reading inclination measurements.

Test weights were provided by use of water pumping between polyethylene rectangular tanks for the weight movements. Six 30 gallon tanks and two 55 gallon tanks sitting hard against the deckhouse on the weather deck walkways port & starboard were used for the test.

With all weights in the "zero" symmetrical position and personnel at their data-taking stations, I measured the chine draughts at after end of transom and measured the freeboard of the chine intersection with the stem. Hydrostatics were calculated from a waterplane placed on those points on the mathematical hull model.

I determined the specific gravity of the water surrounding the ship to be 1.027 at the time of the experiment, which is slightly beyond seawater in density. This is adjusted for temperature.

All fuel, water, and sewage tanks were sounded and weights calculated for the "as-inclined" test condition.

I calculated the "as-inclined" test condition, deducted the test weights, weights of personnel, and fluids on board, to find the light ship weight. The attached calculations sheets show the yacht in 100% full load condition, 50% fuel, and 10% fuel loading conditions. Draft, trim, and stability were then calculated by computer for each of those loading conditions. I also calculated righting arm and moment curves to determine the state of stability for each of those loading conditions.

I also calculated the side profile windage area and heeling arm for wind loadings, for each of the 100%, 50%, and 10% loading

conditions(Full Load, Half Load, and End of Voyage conditions).

Summary of Findings
The yacht demonstrates an adequate range of positive stability for all probable loading conditions for seagoing service. Capsize angle is close to 90 degrees, with the peak righting moment demonstrated at about 55 degrees of heel. This is very good.

Initial metacentric height as a function of heel angle is positive and safe, but is somewhat proportionally lower than a typical broad-beamed, wide chine motoryacht hull. This initial "tenderness" is due to the rather narrow chines of the subject hull, and operators would feel a bit more heeling tendency than the norm for the beginning angles of roll motion. However, the metacentric height increases rapidly with angle of heel, due to the pronounced flare of this hullform. This increasing stability tendency is much better than the norm for yachts of this type.

A significant advantage of the initial tenderness would be that roll period in a beam sea would be increased. This improves passenger comfort appreciably. Fin stabilizers of proper size would nevertheless eliminate this initial heel tendency, with any way on.

I calculated that it would take a wind speed of 65, 60, and 54 knots, respectively, to
capsize in the 100%, 50%, and 10% loading configurations. In storms of those magnitudes, ship masters steer a course to prevent broadside wind and sea actions, obviously, but this calculation shows a safe ship for seagoing service.

I calculated the yacht's range of stability as compared to the U.S. Coast Guard's
SubChapter "T" regulations for passenger vessels up to 49 passengers. Output sheets for the computer comparison are attached. The SubChapter "T" regulations are VERY stringent, particularly for heel due to wind directly abeam, and this comparison is perhaps a bit unfair to compare a yacht against. The subject yacht passed most of those stability criteria, and came very close to the required results for those criteria not passed. The "weather criterion", that is heel due to wind, is so stringent that the subject yacht showed only about half of the metacentric height necessary to pass that criterion. This is not a problem for a yacht, and in fact, the small passenger vessel industry has been complaining for years about that criterion being too tough to meet. As a consequence of this requirement, most small passenger vessels are very uncomfortably quick in roll due to their being too stiff. Passenger seasickness is the frequent result.

Tourist day cruise schooners are particularly hurt by this requirement.

Recommendations
Since the stability is adequate and safe for a seagoing yacht, I recommend no changes to the weight distribution of the yacht, as-is,

nor do I recommend addition of any ballast.

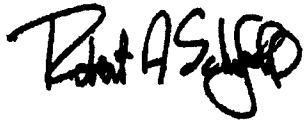
From the advice received, I understand that Wesmar is proposing increasing the area of the fin stabilizers from 11 to 16 square feet, and I wholeheartedly agree that this one change will take care of any feeling of initial tenderness in roll. Hard turns with a heeling wind can give passengers an uncomfortable feeling at times, even on the most stable of yachts. However, the proper sized fin stabilizers will eliminate any of that heeling tendency.

I noted that it is possible that the fuel tanks can be left cross-connected, with the existing arrangement of fuel transfer valves. Should a long-duration beam wind heel the yacht over a few degrees, with the valves left open the yacht could conceivably take on an even larger heel or list to the leeward side. This phenomenon may have been the item that precipitated the captain's initial concerns about stability for this yacht.

Therefore, I recommend that the cross connection transfer valves be closed, except when actively transferring fuel from one side to the other.

Please call if I can be of further assistance on these interesting technical matters.

Sincerely,



Robert A. Schofield
Eur. Ing.
CEng MRINA, BSc.

SUMMARY OF ALL CALCULATED LOADING CONDITIONS				
British Imperial Units	Displacement lbs	VCG inches	LCG inches	Free Surface ft^4
Full Load Condition, 100% consumables	166942	99.43	348.20	136.1710
Mid Voyage Condition, 50% consumables	156814	101.02	350.54	103.6902
Arrival Condition, 10% consumables	148856	103.37	352.68	48.4786
Light Ship Condition, 0% consumables	144472	104.12	352.85	0
Ship As Inclined	165670	104.12	352.85	44.0966

Systeme International Units	Displacement KG	VCG M	LCG M	Surface M^4
Full Load Condition, 100% consumables	75724	2.525	8.844	0.0000
Mid Voyage Condition, 50% consumables	71130	2.566	8.904	0.0000
Arrival Condition, 10% consumables	67521	2.626	8.958	0.0000
Light Ship Condition, 0% consumables	65532	2.645	8.962	0
Ship As Inclined	75147	2.645	8.962	44.0966

MY CALCULATIONS PER 46CFR170.170 (A) — CONDITION: FULL LOAD CONDITION

WEATHER CRITERION (WIND HEEL CONDITION)

OBTAINED GM =		0.420	meters	
REQUIRED GM =		0.840	meters	DOES NOT MEET REQUIREMENT
Where	P =	0.05528	tons/ sq.m	**Unlimited Ocean Service**
	L =	20.92	meters	
	A =	94.90	sq.meters	
	H =	3.026	meters	
	W =	75.72	metric tons	
	T =	14.00	lesser of 14 degrees, or angle to immerse 1/2 the freeboard	
	(	0.244345155	radians)	

FORMULA: GM >= P A H / W Tan(T)

MY CALCULATIONS PER 46CFR170.173: — CONDITION: FULL LOAD CONDITION

MAX. RIGHTING ARM= 0.270 OCCURS AT 50 DEGREES, WHICH IS MORE THAN THAN 30 DEGREES

THEREFORE, USE 170.173 (B)

MY CALCULATIONS PER 46CFR170.173 (B): — CONDITION: FULL LOAD CONDITION

RIGHTING ARM ENERGY CRITERIA — **FOR CASE OF MAX RA MORE THAN 30 DEGREES**

CRITERION (1)
INITIAL GM MUST BE GREATER THAN 0.15 METERS
WE HAVE 0.420 meters MEETS REQUIREMENT

CRITERION (2)
GZ MUST BE GREATER THAN 0.20m AT OR BEYOND 30 DEGREES
GZ = 0.27 meters MEETS REQUIREMENT

CRITERION (3)
MAX. GZ MUST OCCUR AT OR BEYOND 25 DEGREES HEEL.
OCCURS AT 50 DEGREES MEETS REQUIREMENT

CRITERION (4)
SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
1	0.000	0.003591745
4	0.166	5
2	0.175	10
4	0.578	15
2	0.357	20
4	0.767	25
1	0.198	30
		to 30, only
sum	2.240	

area 3.73 m-degrees
MEETS REQUIREMENT
NEED 3.15 (fixed)
up to 30 DEGREES

CRITERION (5)
SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
1	0.000	0.003591745
4	0.166	5
2	0.175	10
4	0.578	15
2	0.357	20
4	0.767	25
2	0.395	30
4	0.821	35
1	0.223	40
		to 40, only
sum	3.481	

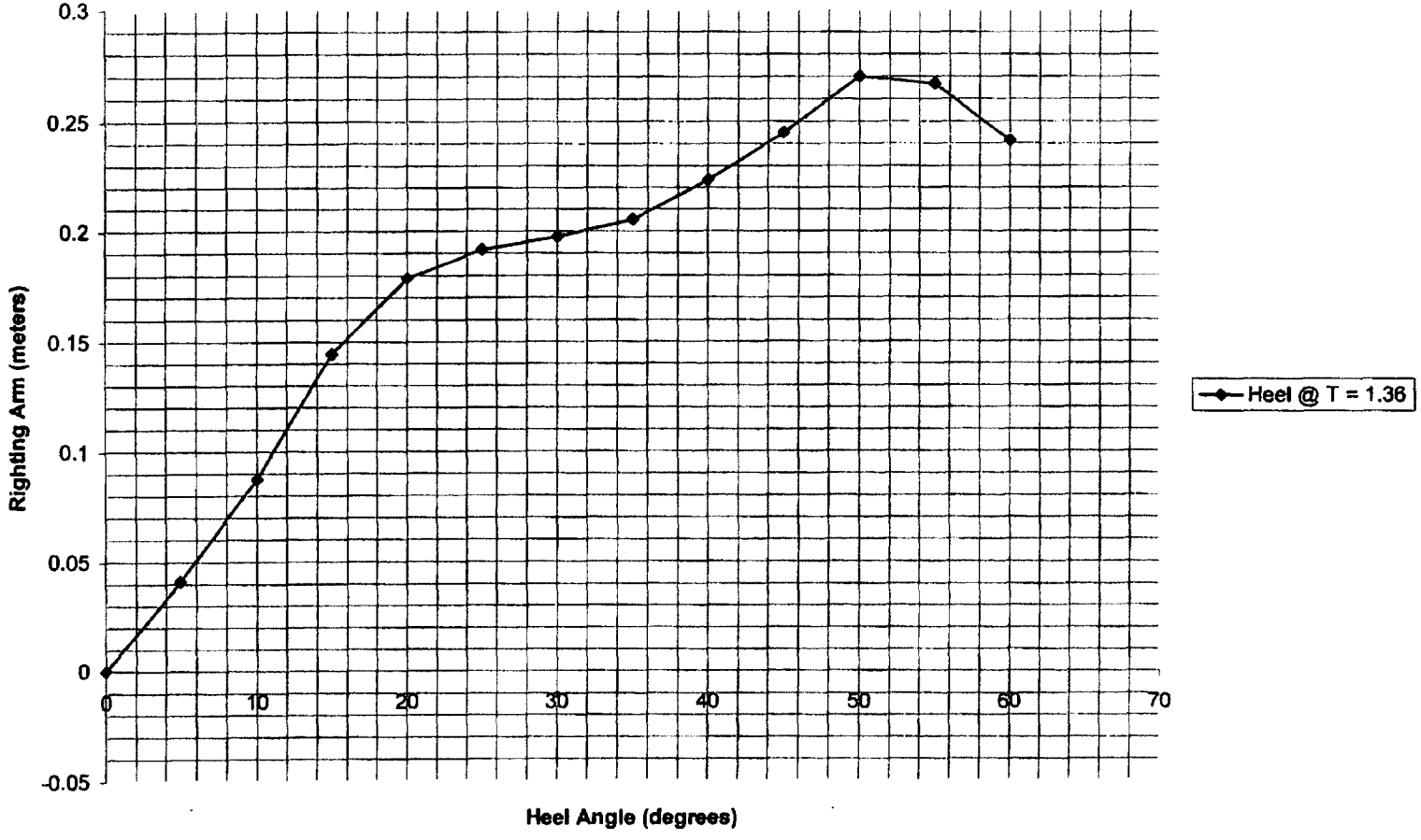
area 5.80 m-degrees
MEETS REQUIREMENT
NEED 5.15 (fixed)
up to 40 DEGREES

CRITERION (6)
SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
		between 30 - 40 degrees, only
1	0.198	30
4	0.821	35
1	0.223	40
sum	1.241	

area 2.07 m-degrees
MEETS REQUIREMENT
NEED 1.72 (fixed)
BETWEEN 30 AND 40 DEGREES

Righting Arm Curve
FULL LOAD CONDITION



MY CALCULATIONS PER 46CFR170.170 (A) — **CONDITION: 50% LOAD CONDITION**

WEATHER CRITERION (WIND HEEL CONDITION)

OBTAINED GM = 0.448 meters

REQUIRED GM = 0.995 meters — DOES NOT MEET REQUIREMENT

Unlimited Ocean Service

FORMULA: GM >= P A H / W Tan(T)

Where P = 0.05526 tons/ sq.m

L = 20.92 meters

A = 94.90 sq.meters

H = 3.026 meters

W = 71.13 metric tons

T = 14.00 lesser of 14 degrees, or angle to immerse 1/2 the freeboard

(0.244345156 radians)

MY CALCULATIONS PER 46CFR170.173: — **CONDITION: 50% LOAD CONDITION**

MAX. RIGHTING ARM= 0.247 OCCURS AT 55 DEGREES, WHICH IS MORE THAN THAN 30 DEGREES

THEREFORE, USE 170.173 (B)

MY CALCULATIONS PER 46CFR170.173 (B): — **CONDITION: 50% LOAD CONDITION**

RIGHTING ARM ENERGY CRITERIA — **FOR CASE OF MAX RA MORE THAN 30 DEGREES**

CRITERION (1)

INITIAL GM MUST BE GREATER THAN 0.15 METERS

WE HAVE 0.448 meters MEETS REQUIREMENT

CRITERION (2)

GZ MUST BE GREATER THAN 0.20m AT OR BEYOND 30 DEGREES

GZ = 0.25 meters MEETS REQUIREMENT

CRITERION (3)

MAX. GZ MUST OCCUR AT OR BEYOND 25 DEGREES HEEL

OCCURS AT 55 DEGREES MEETS REQUIREMENT

CRITERION (4)

SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
1	0.000	0.003576066
4	0.177	5
2	0.184	10
4	0.602	15
2	0.351	20
4	0.733	25
1	0.183	30
		to 30, only
sum	2.230	

area 3.72 m-degrees

MEETS REQUIREMENT

NEED 3.15 (fixed) up to 30 DEGREES

CRITERION (5)

SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
1	0.000	0.003576066
4	0.177	5
2	0.184	10
4	0.602	15
2	0.351	20
4	0.733	25
2	0.366	30
4	0.738	35
1	0.196	40
		to 40, only
sum	3.347	

area 5.58 m-degrees

MEETS REQUIREMENT

NEED 5.15 (fixed) up to 40 DEGREES

CRITERION (6)

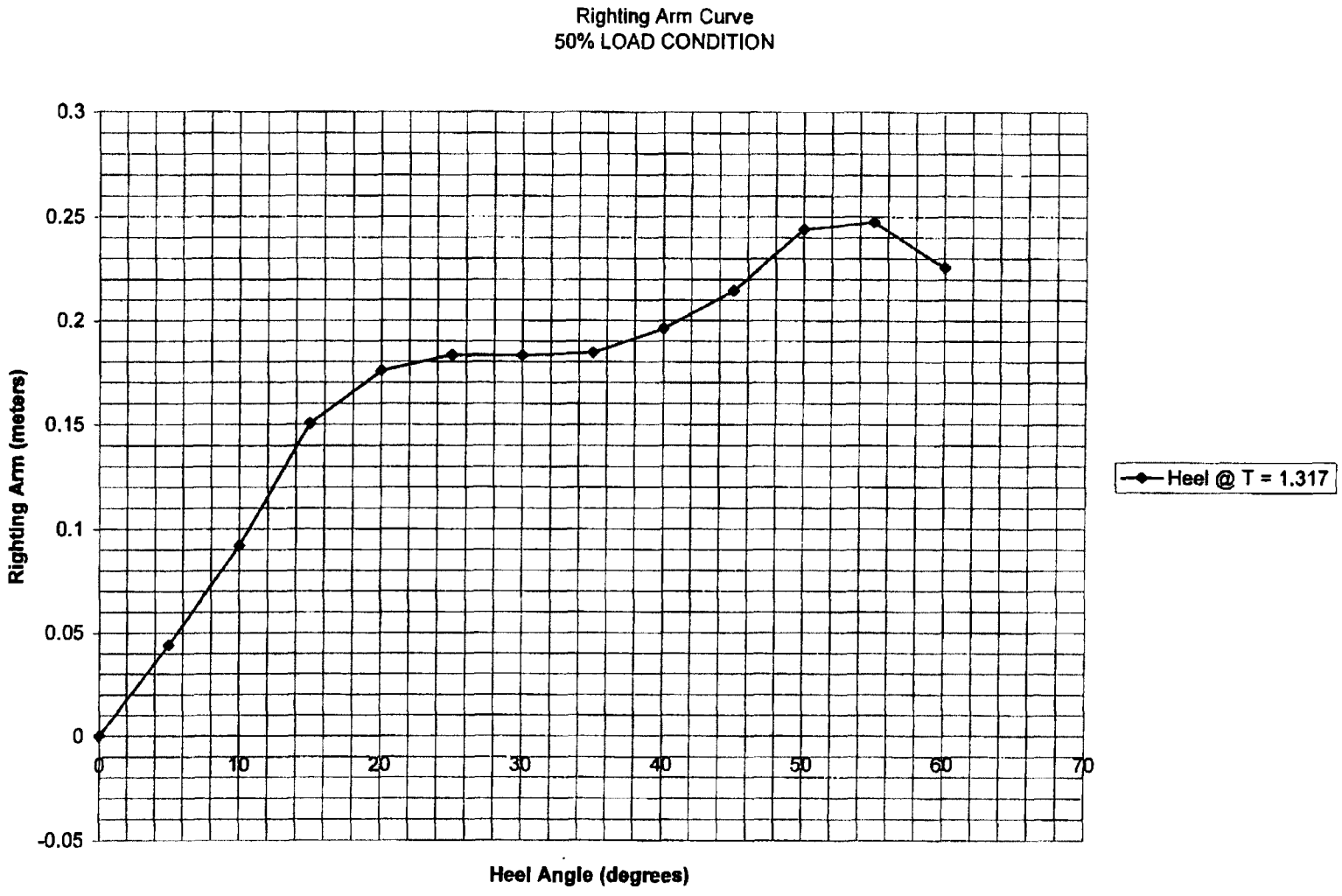
SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
		between 30 - 40 degrees, only
1	0.183	30
4	0.738	35
1	0.196	40
sum	1.117	

area 1.86 m-degrees

MEETS REQUIREMENT

NEED 1.72 (fixed) BETWEEN 30 AND 40 DEGREES


Righting Arm Curve
50% LOAD CONDITION
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
Righting Arm (meters)
0
10
20
30
40
50
60
70
Heel Angle (degrees)
Heel @ T = 1.317

MY CALCULATIONS PER 46CFR170.170 (A) — CONDITION: 10% LOAD CONDITION

WEATHER CRITERION (WIND HEEL CONDITION)

OBTAINED GM =		0.453	meters	
REQUIRED GM =		0.943	meters	DOES NOT MEET REQUIREMENT
Where	P =	0.05526	tons/ sq.m	**Unlimited Ocean Service**
	L =	20.92	meters	
	A =	94.90	sq.meters	
	H =	3.026	meters	
	W =	67.52	metric tons	
	T =	14.00	lesser of 14 degrees, or angle to immerse 1/2 the freeboard	
	(	0.24434515	radians)	

FORMULA:

$$GM >= \frac{P A H}{W \tan(T)}$$

MY CALCULATIONS PER 46CFR170.173: — CONDITION: 10% LOAD CONDITION

MAX. RIGHTING ARM= 0.209 OCCURS AT 55 DEGREES, WHICH IS MORE THAN THAN 30 DEGREES

THEREFORE, USE 170.173 (B)

MY CALCULATIONS PER 46CFR170.173 (B): — CONDITION: 10% LOAD CONDITION

RIGHTING ARM ENERGY CRITERIA — **FOR CASE OF MAX RA MORE THAN 30 DEGREES**

CRITERION (1)

INITIAL GM MUST BE GREATER THAN 0.15 METERS

WE HAVE 0.453 meters MEETS REQUIREMENT

CRITERION (2)

GZ MUST BE GREATER THAN 0.20m AT OR BEYOND 30 DEGREES H

GZ = 0.21 meters MEETS REQUIREMENT

CRITERION (3)

MAX. GZ MUST OCCUR AT OR BEYOND 25 DEGREES HEEL.

OCCURS AT 55 DEGREES MEETS REQUIREMENT

CRITERION (4)

SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
1	0.000	0
4	0.179	5
2	0.185	10
4	0.583	15
2	0.327	20
4	0.660	25
1	0.158	30
		to 30, only
sum	2.091	

area 3.49 m-degrees

MEETS REQUIREMENT

NEED 3.15 (fixed) up to 30 DEGREES

CRITERION (5)

SIMPSON'S 1/3 RULE:

SM	F(A)	heel angle
1	0.000	0
4	0.179	5
2	0.185	10
4	0.583	15
2	0.327	20
4	0.660	25
2	0.316	30
4	0.611	35
1	0.158	40
		to 40, only
sum	3.018	

area 8.03 m-degrees

DOES NOT MEET REQUIREMENT

NEED 5.15 (fixed) up to 40 DEGREES

CRITERION (6)

SIMPSON'S 1/3 RULE:

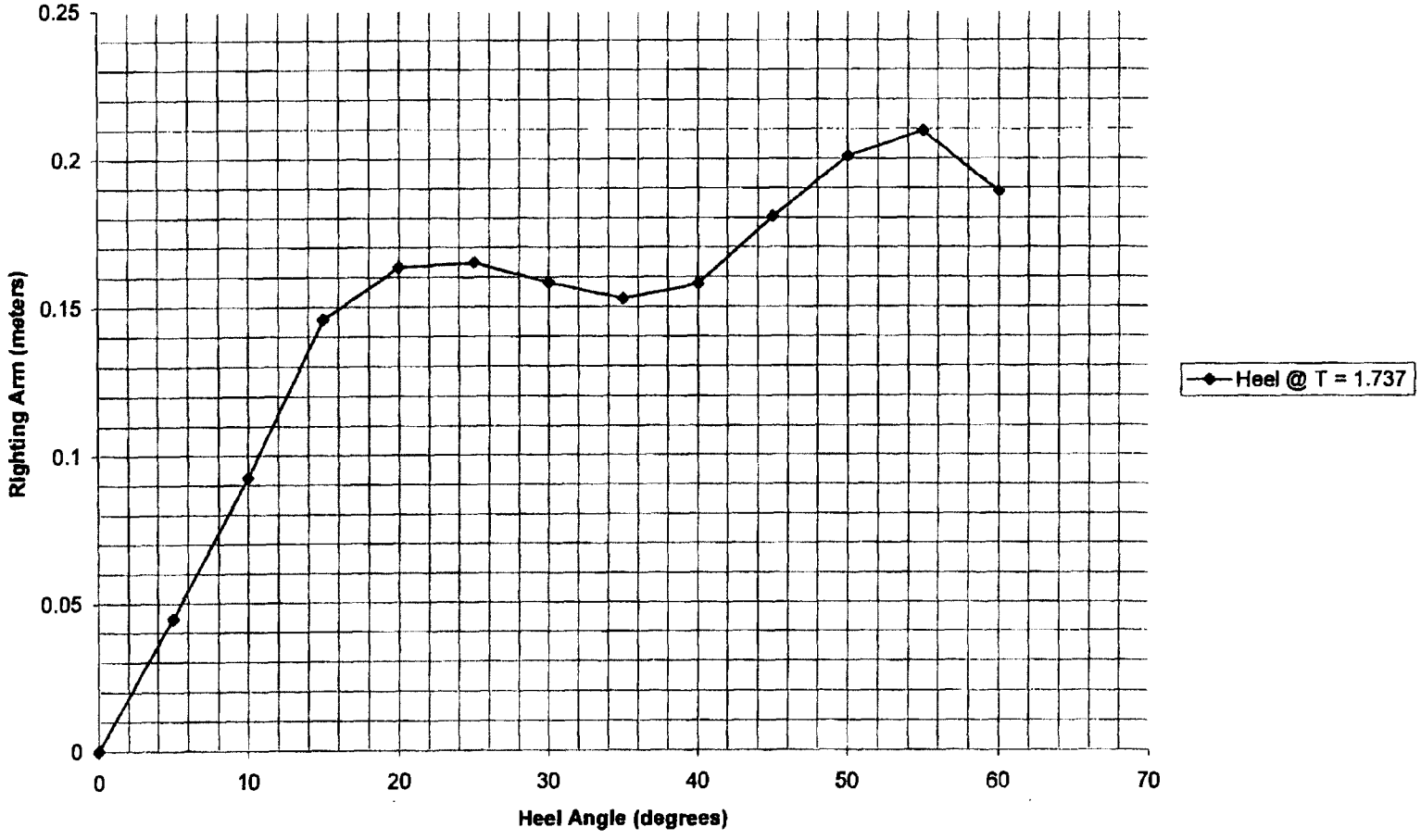
SM	F(A)	heel angle
		between 30 - 40 degrees, only
1	0.158	30
4	0.611	35
1	0.158	40
sum	0.926	

area 1.54 m-degrees

DOES NOT MEET REQUIREMENT

NEED 1.72 (fixed) BETWEEN 30 AND 40 DEGREES

Righting Arm Curve
10% LOAD CONDITION



ASTM F 1321

X3. STABILITY TEST DATA

Official Number: TBA
Gross Tons: TBD

Description of Vessel	MY "JUST RELAXING"	Owner	Larry Johnston
Type	Motor Yacht	Owner's Address	
Builder	Jefferson Yachts, Her Shine, Ltd.		
Hull Number	10 Date Built April 2003		
Hull	Hard chined, raked stem, raised pilothouse motor yacht Two tier deckhouse, with swim platform Walkaround weather deck, with 30" bulwarks	Vessel Inclined at	Ocean Reef Club, Key Largo, FL
		Date	1/18/07 Time 0845-1120
		Test Requested by	David Shaw, Jefferson Yachts
Machinery	2 x MTU 10V2000diesel engines, 1500 HP each conventional strutted propellers	Plans Furnished By	Jefferson Yachts
		Offsets Measured By	Her Shine Shipbuilding, Ltd.
		Curves of Form Computed By	Robert A. Schofield
Classed by	(none)	Test Conducted By	Robert A. Schofield, Naval Architect
Route:	Seagoing	Stability calculations made by	Robert A. Schofield
Specify Route, if Limited:	Category "A"	Sister Vessels	82' "Starship", Model - 12 built to-date

Fig. X3.1 STABILITY TEST DATA

Principal Dimensions

			feet	inches	decimal inches
Length Over All			82	0	984.00
Length between perpendiculars which are at the extremities of	51.75	waterline	64	8.5	776.50
Length between draft marks			no marks		no marks
Breadth, extreme, at	12.40	feet above Baseline	21	0	251.50
Breadth, molded, amidships at			21	0	251.50
Breadth at load waterline			16	8.35	200.35
Depth amidships, from			12	4.78	148.78
Apparent full-load mean draft for stability:		< molded base	2	10.5	34.54
		< bottom of keel	2	10.5	34.54
Displacement, sea water, lbs, at above full-load draft			166941 pounds		
Freeboard amidships at above full-load draft			9	6.24	114.24
Freeboard at low point of sheer,	26.41	ft abaft amidships	–	94.06	94.06
Location of ports in hull which may affect stability			(main deck governs)		

GENERAL INFORMATION

Names and duties of official observers	(none)
Stability Test Engineer	Robert A. Schofield, Naval Architect
Builder represented by	David Shaw, Jefferson Yachts
Owners represented by	Capt. "Mo" Skula, Chief Mate Tom Ripp
Weather, tide, and mooring conditions	Wind 10 knots, no current, moored per photos
Condition of ship as to completeness and as to water in boilers, machinery, and bilges	Operational Bilges dry.

Fig. X3.2 STABILITY TEST Principal Dimensions

ASTM F 1321

ITEMS TO BE ADDED

Description	@ each lbs	Weight	Vertical Center inches	Vertical Moment inches	Longitudinal Center inches	Moment inches	Transverse Center inches	(if needed)
One-half weight of Boarding Ladder	200	100	110.2	11020	576	57600		
Total- Weights to Add -		100	110.20	11020	576.00	57600	0	0

Fig. X2.2 Items to be Added

ASTM F 1321

ITEMS TO BE REMOVED

Description		@ each lbs	Weight	Vertical Center Inches	Vertical Moment Inches	Longitudinal Center inches	Moment Inches	Transverse Center inches		equiv. free surface ft^4
3 Personnel: Skula, Ripp & Shaw			615	150	92250	504	309960			
1 Person: Schofield			200	120	24000	79	15800			
sounding:	TANKS:									
69.00	#1P Fuel Tank		5375	69.89	375659	295	1585625	-60.50	-325188	41.8560
62.75	#1C Fuel Tank		5155	63.38	326724	295	1520725	0.00	0	40.2682
69.00	#1S Fuel Tank		5375	69.89	375659	295	1585625	60.50	325188	41.8576
16.00	C.L.Fuel Day Tank		715	16.00	11440	295	210925	0.00	0	4.7688
5.00	Port Upper FW Tank		244	36.50	8906	409	99796	-11.00	-2684	2.3915
19.00	Stbd Upper FW Tank		928	43.50	40368	409	379552	11.00	10208	2.3915
18.00	Port Lower FW Tank		708	17.00	12036	409	289572	-8.00	-5664	1.0490
18.00	Stbd Lower FW Tank		708	17.00	12036	409	289572	8.00	5664	1.0490
20 GAL	Crew MSD Tank		167	12.00	2004	32	5344	0.00	0	0.4868
EMPTY	Fore MSD Tank		0	12.00	0	583	0	0.00	0	0.8568
Inclining Weights			1208	120	144942	347	419124			
Total- Weights to Deduct -			21398	66.64	1426023	313.66	6711620	0.3516241	7524	136.9752

Fig. X2.3 Items to be Removed

ASTM F 1321

ITEMS TO BE RELOCATED

Description	@ each lbs	Weight	Vertical Center inches	Vertical Moment inches	Longitudinal Center inches	Moment inches	Transverse Center inches	(if needed)
(NO ITEMS TO RELOCATE)				0		0		
Total- Weights to Relocate -		0		0		0		0

Fig. X2.4 Items to be Relocated

BASIC TANK DATA

Sounding	Description	NOMINAL CAP. GALS	Weight lbs	Tank Bottom vert. Hgt.	Longitudina Center inches	Transverse Center inches	TANK HEIGHT VERTICAL	TANK DIMS - BASE INCHES TRANSV	LONGIT	TANK DIMS - TOP INCHES TRANSV	LONGIT
50%	#1P Fuel Tank	770	2734	32	295	-60.5	70	55	42	67	42
50%	#1C Fuel Tank	810	2876	32	295	0	70	86	42	(RECTANGULAR)	
50%	#1S Fuel Tank	770	2734	32	295	60.5	70	55	42	67	42
50%	C.L.Fuel Day Tank	100	355	8	295	0	16	31	48	(RECTANGULAR)	
FUEL OIL SUMARY -		2450	8698								
50%	Port Upper FW Tank	112	933	34	409.44	-11	19	21	66	(RECTANGULAR)	
50%	Stbd Upper FW Tank	112	933	34	409.44	11	19	21	66	(RECTANGULAR)	
50%	Port Lower FW Tank	85	708	8	409.44	-8	18	15.5	72	(RECTANGULAR)	
50%	Stbd Lower FW Tank	85	708	8	409.44	8	18	15.5	72	(RECTANGULAR)	
FRESH WATER SUMARY -		394	3282								
50%	Crew MSD Tank	45	375	8	31.5	0				(RECTANGULAR)	
50%	Fore MSD Tank	75	625	8	583	0				(RECTANGULAR)	
SEWAGE SUMARY -		120	1000								

49.55% FUEL 43.12% WATER

60% FUEL MID-VOYAGE CONDI Sounding	Description	VOLUME in^3	gals	Density lbs/gal	weight, lbs in tank	VCG	VMOM	LCG	LMOM	equiv.density to S.W. free surface (Ft^4)	bottom area in^2	top area in^2	bottom ltt	top ltt
16.00	#1P Fuel Tank	35039	152	7.1	1077	40.79	43923	295	317683	27.6058	2310	2814	28.082	50.765
70.00	#1C Fuel Tank	187113	810	7.1	5751	67.00	385296	295	1696452	40.2682	2772		48.526	
16.00	#1S Fuel Tank	35039	152	7.1	1077	40.79	43923	295	317683	27.6058	2310	2814	28.082	50.765
16.00	C.L.Fuel Day Tank	23280	101	7.1	715	16.00	11438	295	210890	4.7688	1488		5.747	
FUEL OIL SUMARY -			1214		8619	56.22	484580	295	2542706	100.2486				
0.00	Port Upper FW Tank	0	0	8.33	0	34.00	0	409.44	0	2.3915	1388		2.456	
0.00	Stbd Upper FW Tank	0	0	8.33	0	34.00	0	409.44	0	2.3915	1388		2.456	
18.00	Port Lower FW Tank	19626	85	8.33	708	17.00	12030	409.44	289751	1.0490	1116		1.078	
18.00	Stbd Lower FW Tank	19626	85	8.33	708	17.00	12030	409.44	289751	1.0490	1116		1.078	
FRESH WATER SUMMARY			170		1415	17.00	24061	409.44	579501	6.8811				
23 GAL	Crew MSD Tank	5313	23	8.33	192	12.00	2299	31.5	6035	0.4868			0.5	
38 GAL	Fore MSD Tank	0	38	8.33	317	12.00	3798	583	184543	0.8568			0.88	
SEWAGE SUMMARY			61		508.13	12.00	6097.56	375.06	190577.91	1.3435484				

Transcribe from above calcs, then cut and paste from following chart AT TIME OF STABILITY TEST: Description		Weight	Vertical Center inches	Vertical Moment inches	Longitudinal Center inches	Moment inches	Transverse Center inches	Moment inches	equiv. free surface ft^4
69.00	#1P Fuel Tank	5375	69.89	375659	295	1585625	-60.50	-325188	41.8560
62.75	#1C Fuel Tank	5155	63.38	326724	295	1520725	0.00	0	40.2682
69.00	#1S Fuel Tank	5375	69.89	375659	295	1585625	60.50	325188	41.8576
16.00	C.L.Fuel Day Tank	715	16.00	11440	295	210925	0.00	0	4.7688
5.00	Port Upper FW Tank	244	36.50	8906	409	99796	-11.00	-2684	2.3915
19.00	Stbd Upper FW Tank	926	43.50	40368	409	379552	11.00	10208	2.3915
18.00	Port Lower FW Tank	708	17.00	12036	409	289572	-8.00	-5664	1.0490
18.00	Stbd Lower FW Tank	708	17.00	12036	409	289572	8.00	5664	1.0490
20 GAL	Crew MSD Tank	167	12.00	2004	32	5344	0.00	0	0.4868
EMPTY	Fore MSD Tank	0	12.00	0	583	0	0.00	0	0.8568

Description	@ each lbs	Weight	Vertical Center inches	Vertical Moment inches	Longitudinal Center inches	Moment inches	Transverse Center inches	equiv. free surface ft^4

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SHIP AT TIME OF STABILITY TEST - CONDITION 0

MANOMETER WATER GAGES

Inclinometer No.	Location	Length between vertical tubes inches
1st	in cockpit	196.25
2nd	in cockpit	195.5
3rd	in cockpit	194.5

INCLINING WEIGHTS

Location: Main Deck at Amidships

Description: water-filled plastic tanks

Weight No.	lbs	Initial Position Port feet	Starboard feet
1	249.9	0.00	0.00
2	249.9	0.00	0.00
3	249.9	0.00	0.00
4	458.2	0.00	0.00

WEIGHT MOVEMENTS

	No.	lbs	Distance from Initial Positions Port feet	Starb'd feet	Moment ft-lbs	Total Inclining Moment ft-lbs
1st Trial	1	249.9	0.000	0.000	0.0	
	2	249.9	0.000	0.000	0.0	0.0
	3	249.9	0.000	0.000	0.0	
	4	458.2	0.000	0.000	0.0	
2nd Trial	1	249.9	7.995	0.000	-1998.0	
	2	249.9	7.881	0.000	-1969.5	-3967.4
	3	249.9	0.000	0.000	0.0	
	4	458.2	0.000	0.000	0.0	
3rd Trial	1	249.9	7.995	0.000	-1998.0	
	2	249.9	7.881	0.000	-1969.5	-9500.9
	3	249.9	7.768	0.000	-1941.2	
	4	458.2	7.840	0.000	-3592.3	
4th Trial	1	249.9	7.995	0.000	-1998.0	
	2	249.9	7.881	0.000	-1969.5	1566.1
	3	249.9	0.000	7.768	1941.2	
	4	458.2	0.000	7.840	3592.3	
					0.0	
5th Trial	1	249.9	0.000	7.995	1998.0	
	2	249.9	0.000	7.881	1969.5	9500.9
	3	249.9	0.000	7.768	1941.2	
	4	458.2	0.000	7.840	3592.3	
					0.0	

MANOMETER /INCLINOMETER DEFLECTIONS

	No.	Port inches	Starb'd inches	Tangents PORT = +	STBD = -	
1st Trial	1	0.000	0.000	0.00000		
	2	0.000	0.000	0.00000		Average:
	3	0.000	0.000	0.00000		0.00000
2nd Trial	1	1.516	-1.516	0.01545		
	2	1.555	-1.498	0.01561		Average:
	3	1.476	-1.496	0.01528		0.01545
3rd Trial	1	4.075	-4.232	0.04233		
	2	4.035	-4.094	0.04158		Average:
	3	3.839	-4.114	0.04089		0.04160
4th Trial	1	-0.728	0.472	-0.00611		
	2	-0.728	0.512	-0.00834		Average:
	3	-0.728	0.492	-0.00827		-0.00824
5th Trial	1	-4.016	3.701	-0.03932		
	2	-4.075	3.760	-0.04008		Average:
	3	-3.996	3.681	-0.03847		-0.03962

Figure X3.4 Condition 0 - Final Report

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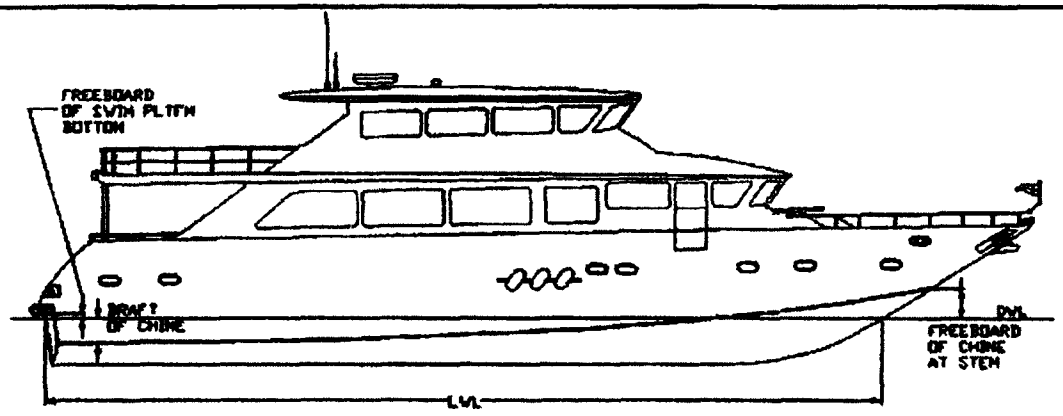
STABILITY TEST

All tons used in this calculation are of (not used) lbs

SHIP AT TIME OF STABILITY TEST - CONDITION 0

Height, Swim Platform Bottom, to Waterline:
8.5" Port
8.5" Stbd

Chine Drafts Aft:
25.5" Port
25.5" Stbd



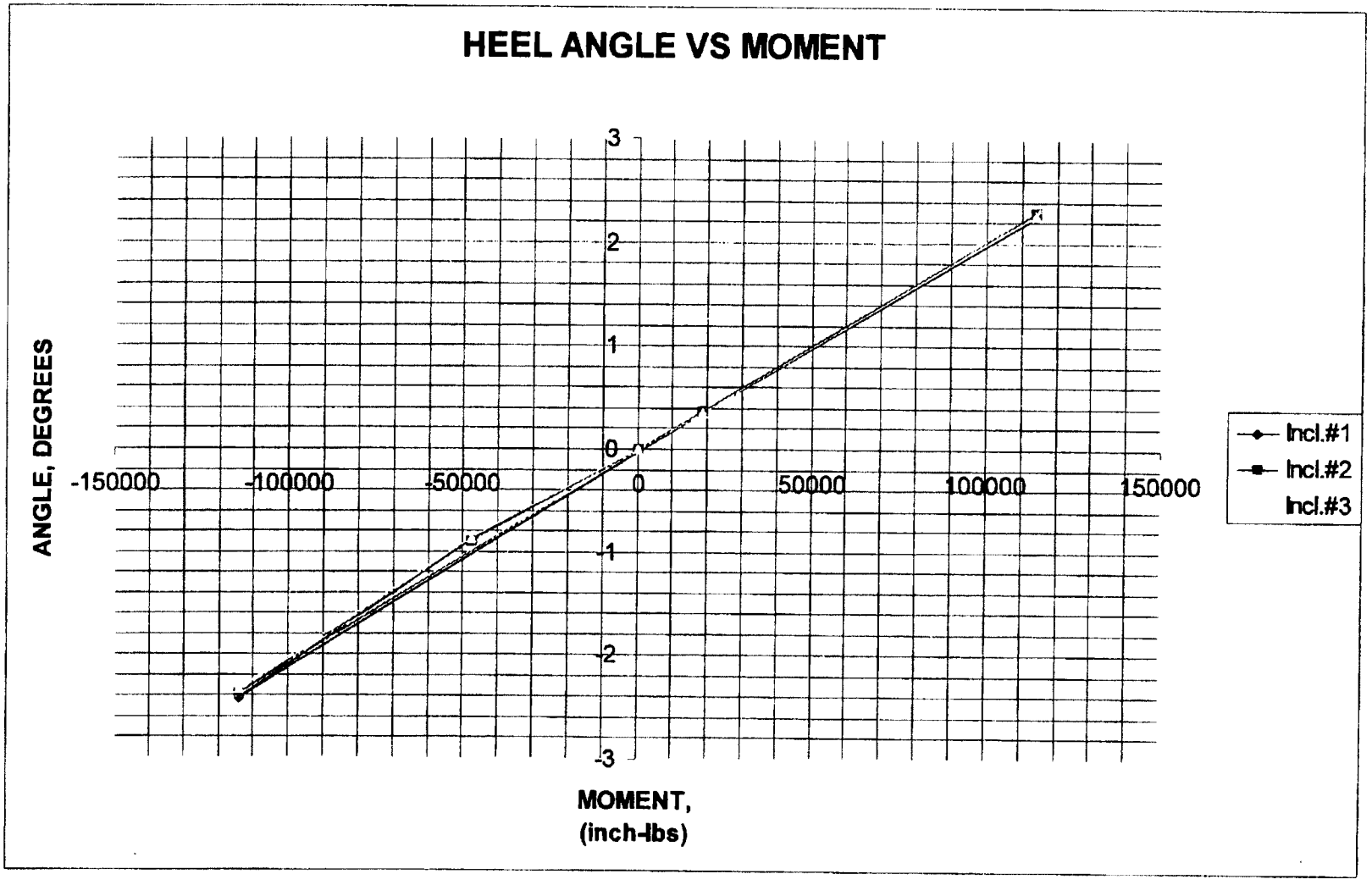
Chine at Stem
Emmersion = 15.5"

Sketch showing Hog, Sag, Trim, Drag, and Location of Draft Marks, Freeboards, and Perpendiculars

		feet	inches
Draft from draft marks when inclined	Forward		58.70
	Aft		44.80
	Amidships Port		- -
	Starboard		- -
Distance: (LWL) between "curves of form" perpendiculars -			776.50
Bottom of keel above Baseline			0
Drafts corrected to "curves of form" perpendiculars for use in calculations	Forward		58.70
	Aft		44.80
	mean, P/S		51.75

Mean of forward and after drafts		51.75	inches
Hog or sag		0.00	inches
Trim fwd.		-13.90	inches
Longitudinal Center of Flotation		361.85	inches
Molded keel draft at center of flotation		51.28	inches
Molded keel draft at L.C.F. corrected for hog or sag		51.28	inches
Total displacement at above draft	S.W.	165345	lbs
Specific Gravity of Water	1.0270 equals	63.98	lbs/cu.ft
Total displacement corrected for density		165668	lbs

Figure X3.3 Stability Test Sketch - Condition 0


HEEL ANGLE VS MOMENT
ANGLE, DEGREES
3
2
1
0
-1
-2
-3
-150000
-100000
-50000
0
50000
100000
150000
MOMENT,
(inch-lbs)
Incl.#1
Incl.#2
Incl.#3

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STABILITY TEST

SHIP AT TIME OF STABILITY TEST - CONDITION 0

	from Hydrostatic Curves:		by Independent Calculation:	
Corrected displacment	165668	pounds		pounds
Mean virtual metacentric height obtained from plot of inclining moments versus tangents of angles of heel -- Moment / displacement * tangent	1.412	ft		ft
Correction for free surface	0.00027	ft (see note a.)		ft (see note a.)
Mean metacentric height, GM =	1.412	ft		ft
Transverse metacenter above the Baseline corresponding to draft at L.C.F. (corrected for hog or sag)	9.685	ft (see note b.)		
Transverse metacenter above the Baseline corrected for trim, hog, and sag	9.685	ft		
Center of Gravity above Baseline	8.273	ft		ft (from figure, below)
Longitudinal metacenter above Center of Gravity (4) + (5) - (1) = (3)	101.016	ft		
Moment to alter trim by 1 inch, Longl. GM x displacement / Lwl	323375	ft - pounds		
Trim by Stern, Bow:	-1.158	ft (see note b.)		
Trimming Lever = Trim x moment to trim / displacement	-2.261	ft		
L.C.B. forward, abaft amidships, which is 39.00 inches aft, of Frame No. 32.21 ft midship	3.250	ft		
Center of Gravity abaft amidships	3.250	ft	28.96	ft

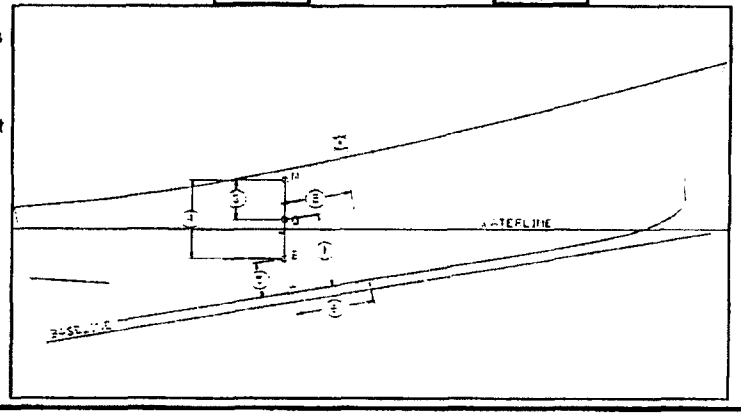
Dimensions for Chart, below:

1, VCG	8.273	ft
2, LCG	28.96	ft
3, GML	101.016	ft
4, BML	99.055	ft
5, VCB	2.674	ft
6, LCB	28.96	ft

Period of complete roll: NT seconds

Apparent radius of gyration of vessel, K = T * SQRT(GM) / 1.108 = NT feet

Rolling Constant, C = T * SQRT(GM) / B = NT constant



Notes:

a. Water in bilges: The bilges should be entirely free of water; but should this be impossible, correction should be made in the derived GM. The details of this correction should form part of this report.

b. If the trim is excessive, independent calculations should be made to obtain the positions of the center of buoyancy and transverse metacenter and the position of the center of gravity determined therefrom. The calculations should be incorporated in this booklet.

Figure X3.6 Stability Test Results at Condition 0 from Hydrostatic Curves and Independent Calculations

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STABILITY TEST

Data for Tanks						V.C.G. Above Baseline			L.C.G.		Transverse	
Liquid	Sounding	Net Inertia of free surface, ft^4		Weight lbs		Lever inches	vertical moments ft-lbs		distance inches	LONGL moments ft-lbs	Center inches inches	Moment inches ft-lbs
Diesel Fuel	69.00	0.0000	#1P Fuel Tank	5375		69.89	375659		295	1585625	-80.50	-325188
Diesel Fuel	62.75	40.2682	#1C Fuel Tank	5155		63.38	326724		295	1520725	0.00	0
Diesel Fuel	69.00	0.0000	#1S Fuel Tank	5375		69.89	375659		295	1585825	60.50	325188
Diesel Fuel	16.00	0.0000	C.L.Fuel Day Tank	715		16.00	11440		295	210925	0.00	0
Fresh Water	5.00	2.3915	Port Upper FW Tank	244		36.50	8906		409	99796	-11.00	-2684
Fresh Water	19.00	0.0000	Stbd Upper FW Tank	928		43.50	40388		409	379552	11.00	10208
Fresh Water	18.00	0.0000	Port Lower FW Tank	708		17.00	12036		409	289572	-8.00	-5664
Fresh Water	18.00	0.0000	Stbd Lower FW Tank	708		17.00	12036		409	289572	8.00	5664
Sewage	20 GAL	0.4868	Crew MSD Tank	167		12.00	2004		32	5344	0.00	0
Sewage	EMPTY	0.0000	Fore MSD Tank	0		12.00	0		583	0	0.00	0
Fresh Water	(varies)	0.9501	Inclining Weight Tanks	1208		120	144960		347	419176	0	0
TOTAL ALL LIQUIDS-		44.0966	ft^4	20583		63.63	1309791		310.25	6385912	0.37	7524

Figure X3.7 Stability Test - Data for Tanks

% full at test	max.free surf.	
pressed full	41.8560	#1P Fuel Tank
1	40.2682	#1C Fuel Tank
pressed full	41.8576	#1S Fuel Tank
pressed full	4.7688	C.L.Fuel Day Tank
0	2.3915	Port Upper FW Tank
pressed full	2.3915	Stbd Upper FW Tank
pressed full	1.0490	Port Lower FW Tank
pressed full	1.0490	Stbd Lower FW Tank
use max	0.4868	Crew MSD Tank
dry	0.8568	Fore MSD Tank

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STABILITY TEST

SHIP LIGHT - Condition 1

Ship complete in every respect, with liquids in machinery at operating levels and piping, but with all tanks and bunkers empty and no passengers, crew, cargo, stores, or baggage on board.

List of major equipment, etc., included in Condition 1 as Shown
Ballast, boats, rafts, cargo booms, anchors, guns, armor, etc.

Items	weight pounds	V.C.G. Above Baseline inches	L.C.G. from M.P. forward Inches	L.C.G. from M.P. aft Inches

Items	Displacement and Weight (lbs)	Vertical Lever (inches)	Moment (in-lbs)	Longitudinal Moments, (measured from Station No. 0) Lever Aft (inches)	Moment (in-lbs)	Lever Fwd. (inches)
Ship in Condition 0	165670	99.276	16447055			347.52
Weight to Add	200	110.2	22040			576.00
Weight to Relocate			(none)			
Weight to Remove	21398	66.64	1425963			313.66
Ship in Condition 1	144472	104.12	15043132			352.85

Molded Draft at longitudinal center of flotation corrsponding to abv displacement for SEA water	53.03
Transverse metacenter above baseline at L.C.F. draft, uncorrected for trim	
C.G. above Baseline	
Metacentric height, uncorrected for trim, G.M.	
Metacentric height, corrected for trim, G.M.	

Longitudinal metacenter above C.G. at L.C.F. draft ____ inches

Moment to alter trim 1 inch at LCF draft, $\frac{\text{longl.GM} * \text{displ.}}{\text{Lwl}}$ = 0 in-lbs

L.C.B. of ship, from A.P. measurement point - ____ inches

L.C.G. of ship, from A.P. measurement point - ____ inches

Trimming Lever (+ aft, - fwd.) = ____ inches

Trim (+ aft, - fwd.) - $\frac{\text{displ.} * \text{Lever}}{\text{moment to trim}}$ = #DIV/0! inches

(measured abaft stem heac

Longitudinal center of flotation ____

Distance between L.C.F. and Amidships - ____

Molded draft, amidships- #DIV/0!

Draft at fore reference point - ____

Draft at transom ____

Figure X3.8 Ship Light - Condition 1

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STABILITY TEST

SHIP IN CONDITION - **Full Load**

Description of Condition	Items	Displacement and Weight (lbs)	Vertical Moments: Lever (inches)	Vertical Moments: Moment (in-lbs)	Longitudinal Moments, (measured from Station No. 0): Lever Aft (inches)	Lever Aft Moment (in-lbs)	Lever Fwd. (inches)	Moment (in-lbs)
	Light Ship Weight	144472	104.12	15043132			352.65	50977142
	Wheels in Retracted Position							
Full Load Condition, 100% consumables								
Load items								
8 Passengers, @ 180 lbs, each		1440	139	200160			378.00	544320
2 Crew, @ 180 lbs, each		360	233	83880			378.00	136080
100% Fuel Oil 2451 gals.		17399	67.07	1166951			295.00	5132705
100% Fresh Water 393 gals.		3271	32.03	104770			409.44	1339278
0% Sewage Tanks 0 gals.								
TOTALS - FOR THIS LOADING CONDITION -		166942	99.43	16598893			348.20	58129525

Molded keel draft at longitudinal center of flotation corresponding to above displacment for sea water 45.57 inches — for actual keel, the draft is 30.57 inches

Transverse metacenter above baseline at L.C.F., draft, uncorrected for trim 122.86 inches

C.G. above Baseline - 99.43 inches

Metacentric Height, uncorrtd. for free surface (and uncorr.d for trim) GM = 23.43 inches

Correction for free surface:

Metacentric Height, corrected for free surface (uncorrected for trim) GM = 23.37 in, includes 0.0522 free surface correction

Longitudinal metacenter above C.G. at L.C.F. draft 836.18 in. Longitudinal center of flotation (measured abaft stem heac 216.32

Moment to alter trim 1 inch at LCF draft, $\frac{\text{longl.GM} * \text{displ.}}{\text{Lwl}} =$ 228891 ft-lbs

Distance between L.C.F. and Amidships - -15.68

L.C.B. of ship, abaft stemhead measurement point - 229.07 inches

L.C.G. of ship, abaft stemhead measurement point - 0.00 inches

Trimming Lever (+ aft, - fwd.) = -229.07 inches

Molded draft, amidships- 39.92

Draft at fore reference point - 123.46

Draft at transom -43.61

Trim (+ aft, - fwd.) - $\frac{\text{displ.} * \text{Lever}}{\text{moment to trim}} =$ -167.07 inches

Figure X3.9 Stability Test - Condition Description

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STABILITY TEST

SHIP IN CONDITION - Full Passengers, with 50% Consumables

Description of Condition	Items	Displacement and Weight (lbs)	Vertical Moments Lever (inches)	Vertical Moments Moment (in-lbs)	Longitudinal Moments, (measured from Station No. 0) Lever Aft (inches)	Moment (in-lbs)	Lever Fwd. (inches)	Moment (in-lbs)
	Light Ship Weight	144472	104.12	15043132			352.85	50977142
	Wheels in Retracted Position							
Full Load Condition, 100% consumables								
Load Items								
8	Passengers, @ 180 lbs, each	1440	139	200160			378.00	544320
2	Crew, @ 180 lbs, each	360	233	83880			378.00	136080
50%	Fuel Oil 1214 gals.	8619	56.22	484560			295.00	2542605
50%	Fresh Water 170 gals.	1415	17.00	24055			409.44	579358
50%	Sewage Tanks 61 gals.	508	12.00	6096			375.06	190530
TOTALS - FOR THIS LOADING CONDITION -		156814	101.02	15841883			350.54	54970035

Molded keel draft at longitudinal center of flotation corresponding to above displacment for [sea] water [45.32] inches

<< note - for trolley boat, this is bottom plane of extended tires (Baseplane)
for actual keel, the draft is [30.32] inches

Transverse metacenter above baseline at L.C.F., draft, uncorrected for trim [124.54] inches

C.G. above Baseline - [101.02] inches

Metacentric Height, uncorrtd. for free surface (and uncorr.d for trim) GM = [23.52] inches

Correction for free surface:

Metacentric Height, corrected for free surface (uncorrected for trim) GM = [23.47] in, includes [0.0423] free surface correction

Longitudinal metacenter above C.G. at L.C.F. draft [639.58] in.

Longitudinal center of flotation (measured abaft stem heac [215.78]

Moment to alter trim 1 inch at LCF draft, $\frac{\text{longi.GM} * \text{displ.}}{\text{Lwl}} =$ [216154] ft-lbs

Distance between L.C.F. and Amidships - [-16.23]

L.C.B. of ship, abaft stemhead measurement point - [229.25] inches

L.C.G. of ship, abaft stemhead measurement point - [0.00] inches

Trimming Lever (+ aft, - fwd.) = [-229.25] inches

Molded draft, amidships- [39.51]

Draft at fore reference point - [122.66]

Draft at transom [-43.65]

Trim (+ aft, - fwd.) - $\frac{\text{displ.} * \text{Lever}}{\text{moment to trim}} =$ [-166.31] inches

Figure X3.8 Stability Test - Condition Description

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STABILITY TEST

SHIP IN CONDITION - Full Passengers, with 10% Consumables (Arrival Condition)

Description of Condition	Items				Displacement and Weight (lbs)	Vertical Moments Lever (inches)	Vertical Moments Moment (in-lbs)	Longitudinal Moments, (measured from Station No. 0) Lever Aft (inches)	Lever Aft Moment (in-lbs)	Lever Fwd. (inches)	Lever Fwd. Moment (in-lbs)
	Light Ship Weight				144472	104.12	15043132			352.85	50977142
	Wheels in Retracted Position										
ARRIVAL Condition, 10% consumables											
Load Items											
8	Passengers, @	180	lbs, each		1440	139	200160			378.00	544320
2	Crew, @	180	lbs, each		360	233	83880			378.00	136080
10%	Fuel Oil		245	gals.	1742	29.12	50727			295.00	513890
10%	Fresh Water		40	gals.	334	10.13	3383			409.44	136753
100%	Sewage Tanks		61	gals.	508	12.00	6096			375.06	190530
TOTALS - FOR THIS LOADING CONDITION -					148856	103.37	15387379			352.68	52498715

Molded keel draft at longitudinal center of flotation corresponding to above displacment for: sea water: 45.12 inches

<< note - for trolley boat, this is bottom plane of extended tires (Baseplane) for actual keel, the draft is: 30.12 inches

Transverse metacenter above baseline at L.C.F., draft, uncorrected for trim: 126.87 inches

C.G. above Baseline - (and uncorr.d for trim): 103.37 inches

Metacentric Height, uncorrtd. for free surface: GM = 23.50 inches

Correction for free surface:

Metacentric Height, corrected for free surface (uncorrected for trim): GM = 23.48 in, includes 0.0208 free surface correction

Longitudinal metacenter above C.G. at L.C.F. draft: 842.15 in.

Longitudinal center of flotation (measured abaft stem head): 215.32

Moment to alter trim 1 inch at LCF draft, $\frac{\text{longl.GM} * \text{displ.}}{\text{LwI}} =$ 206007 ft-lbs

Distance between L.C.F. and Amidships - : -16.66

L.C.B. of ship, abaft stemhead measurement point - : 229.38 inches

L.C.G. of ship, abaft stemhead measurement point - : 0.00 inches

Molded draft, amidships: 39.16

Trimming Lever (+ aft, - fwd.) = -229.38 inches

Draft at fore reference point - : 122.03

Draft at transom: -43.71

Trim (+ aft, - fwd.) - $\frac{\text{displ.} * \text{Lever}}{\text{moment to trim}} =$ -165.74 inches

Figure X3.9 Stability Test - Condition Description

EXHIBIT C

Robert A. Schofield, Naval Architect
tel# 321 255-8331
fax# 321 255-3554
E-Mail: RASNA@attglobal.net
4105 Lake Washington Road
Melbourne, Florida 32934

Curriculum Vitae

Rob Schofield is a practicing naval architect and marine structural engineer with extensive experience in design of commercial, naval and military ships and craft in composite materials, as well as conventional design in steel, wood, and aluminium. He offers computer systems and engineering seminars for design of composite marine structures.

EDUCATION and QUALIFICATIONS:
Bachelor of Science in Engineering, University of Michigan - Naval Architecture and Marine Engineering. Rob also is currently registered as European Engineer (#08120GB) in the European Union and Chartered Engineer (#352565) in the United Kingdom.

EXPERIENCE:
10/86 to Present- Self-employed naval architect, providing consulting engineering for most (40+ companies) of the larger U.S. boat manufacturers and various naval and coast guard entities. Structural design for 100 - 155 ft motoryachts built by Fittipaldi Marine, Christensen Motoryachts, Westport, Westship World Yachts and Broward Marine Shipyards. Engineering consultant to the U.S. Navy for the MHC-51 program, and other recent composite surface ship programs. Designed several very successful 50-65 knot offshore sportboats for Regal, Switzercraft, Celebrity, and Sunsation Boats. The Switzer 250SS Model won POWERBOAT Magazine's 1991 "Performance Sterndrive of the Year" Award. Consulting and structural design for SeaRays' 63 ft and 65 ft models, and similar work for Atlantic Yachts, Grady White, Marlin Yachts, Nautica, OMC Boat Companies, ProLine, Regal Boats (222, 202, and 182 Models), Tollycraft, and Zodiac Hurricane (16 to 66 ft) Structural engineering for entire product line for several well-known boat manufacturers, including SeaCats, Cruisers, Marlin Yachts, New Water Boats, and World Class Catamarans.

Rob has performed structural design and analysis for a number of military versions of rigid hull inflatable boats for Nautica International and Zodiac Hurricane, two of the best-known RIBs builders.

Rob developed the U.S. marine industry's most commonly-used series of structural design computer program for powerboats: C-Shell and CLAM. These programs are the primary structural design tools of 47 of the best-known powerboat builders and designers in the U.S. The programs were developed through a decade's worth of at-sea instrumented testing and research. Sea Ray Boats alone has documented (for the ISO 12215 Standards Committee) the fact that they built over one hundred twenty thousand boats, ranging in size from 17 to 65 feet, produced between January 1990 and January 1997 with laminates and framing developed with the aid of C-Shell and CLAM.

Rob has also engineered structural composites for military training and civil aircraft and military trucks - Enstrom Helicopters, Maverick Jets, and Oshkosh Truck Corp.

The American Bureau of Shipping contracted Rob to develop Section 8 of the new Guide for Building and Classing High Speed Craft. Rob's input concerned structural design rules for large high-speed multihull, SES, and hydrofoil vessels, published early 1997.

Rob is the U.S. representative on the International Standards Organization (ISO) TC188 WG18 committee, and co-developed the new international boat structures standard, ISO 12215, for marine craft under 24 meters (79 ft). The European Union Parliament mandated in 1994 that all craft manufactured and sold in Europe after July 1998 be designed, built, and certified EU-wide

set of standards. The ISO committee was convened in response to that mandate. Rob's participation is funded by the National Marine Manufacturers Association and by the American Boat & Yacht Council, funded by a U.S. Coast Guard grant for that work.

In 2000, the Chinese government's Shanghai FRP Research Institute and the State Administration for Building Materials (SABMI) contracted Rob to assist in the development of the structural design for their new 33 meter (108 foot) fiberglass and wood fishing vessels, currently being series-built in Wei Hai Shipyard. Rob worked with the engineers of the FRP Research Institute to do the necessary drawings and specifications (in Mandarin Chinese, through a translator), pass the project through the PRC Fishing Boat Authority, and consulted with the shipyard in tooling up for the construction phase.

Greenwood Products Company, at the time was the largest-volume plywood manufacturer and supplier to the U.S. marine craft manufacturing industry, employed Rob as a consultant structural engineer and naval architect 1996-2003, supporting the sales effort to major U.S. and some Australian boat manufacturers with composite engineering and consultation on fabrication methods. Rob set up and conducted a test program for laminating various forms of FRP laminates to treated and untreated grades of boatbuilding plywood, varying the moisture contents from 12 to 22 percent. Literally all the usual boatbuilding resins and glass fabrics were tested in this series. The American Plywood Association (now called the APA Engineered Wood Association) extended this test series set up by Rob to incorporate other plywood grades and resins not tested in the Greenwood series, and had Rob consulted on the conduct of those tests. The testing in these series was supervised by Rob and performed under contract by the U.S. Navy's Center of Excellence for Composites, Structural Composites Inc., at Melbourne, Florida.

Since 1983, he has taught intensive, 40-hour lectures in the U.S. and Europe on ship and boat structural design in fiberglass, wood, and other composite materials. These seminars have been attended by many well-known naval architects, ship and boatbuilders, composite suppliers' technical staff, Navy and Coast Guard engineers. (sponsors: YDI Schools & Maine Maritime Academy, Wausaukee Inc., KRP Plastiques, Paris, and American Klegecell, Texas). Two of these were held at USCG Headquarters, Washington, DC., and Puget Sound Naval Shipyard, under government contracts to train USCG and navy engineers in design of wood and composite structures.

He is a Member of The Society of Naval Architects and Marine Engineers (SNAME) and was twice (1997-98 and 2004-05) a Vice Chairman for the Southeast Section of SNAME. He is also a member of the American Society of Naval Engineers, the Royal Institution of Naval Architects (U.K.), and Structures Committee of the American Boat and Yacht Council. He is presently a member of the American Bureau of Shipping Small Vessel Rules Committee (vessels under 200 feet). Formerly, he was Secretary and Education Committee Chairman of the Structural Plastics Research Council of the American Society of Civil Engineers, 1982-1988.

PREVIOUS EMPLOYMENT

4/85 to 10/86 - Wausaukee, Inc. Manager of Composites Engineering (and still consulting for them)- Supervised construction of two large fiberglass stacks, 23 tanks up to 3000 gals., and sonar domes for U.S. Navy's MCM-2 & 4 ships under subcontract (N00024-83-C-2142) to Marinette Marine Corp., shipbuilder for this class. Engineered, marketed, cost estimated and supervised fabrication of a large number of fiberglass and composite structural components for automotive, military truck, and industrial customers.

8/83 to 3/85 - Marinette Marine Corp. Deputy Program Manager and Project Engineer, Minesweeper-Hunter (MSH) Project. Design contract N00024-83-C-2163, for $1.25 million. MMC and Bell Textron were the two final selected shipyards for this fiberglass ship design and construction Program. MMC developed the MSH design from concept to contract design, using technology from license agreement with Intermarine SPA. of Sarzana, Italy. A complete fiberglass production facility was designed, with the cooperation of specialist architects and environmental engineers. Sophisticated dynamic analyses of fiberglass composite structures for hull and machinery foundations were performed for this project to meet shock and acoustic signature criteria. Rob was responsible for all engineering, budgets, cost estimating and planning for this project. A subsequent construction contract was awarded to Bell, but was cancelled and replaced with Intermarine U.S.A.'s MHC Project.

3/81 to 8/83 - Gibbs and Cox, Inc. Section Manager, Naval Architecture and Structural Engineering, Washington Division. (Rob supervised 13 engineers)

(8/81) Minesweeper-Hunter (MSH) Concept Design - NAVSEA (Naval Sea Systems Command) Contract N00024-80-C-4507, Task# 30711 (PMS 303)- Rob did concept structural design for hull, decks, bulkheads, and deckhouse for this 600 ton ship. Three fiberglass structural configurations were developed: monocoque, transverse framed, and sandwich core, as well as one conventional wood design. 12 ft X 12 ft test panels of each structural configuration were built and explosive-charge tested underwater.

(8/83) Application of Advanced Lightweight Composites to Naval Surface Ships- for NAVSEA Code 05R (H. Vanderveldt) - Rob was G&C Program Manager for this $180,000 joint project with Fiber Materials Inc and Bath Iron Works shipyard. It entailed structural design for shock, nuclear airblast, and vibration for topside structures for the CG-47 and DDG-51 class ships. Carbon and other composite component structural designs were developed and evaluated for weight and cost impact under the study. A quadropod tubular mast, stack, and weapons director foundation were developed and costed to the level of contract drawings.

(7/82) DDG-51 Preliminary Structural Design - Contract #N00024-80-C-4458 Task 30799 for NAVSEA Code 3231 - Rob was G&C Program Manager for all Preliminary Level structural design. Hull, decks and deckhouse scantlings were developed and analyzed for sea loads, nuclear airblast and weapons effects. Topside structures, such as the phased array radar foundations, mast, stack, and illuminator and weapon director foundations were designed for shock, airblast, vibrations, and dynamic ship motions. A complete weight estimate for all SWBS 100 items was completed for the PMS400 Project Office.

(7/82 to 7/83) DDG-51 Destroyer and CG-47 Cruiser Class Topside Weight Reduction Studies - Producibility Studies - for PMS 400 under NAVSEA Contract #N00024-80-C-4458 - Several fiberglass and other composite and High-Strength, Low Alloy Steel structural design projects were completed for the surface combatant programs of PMS 400 (Project Office) over this interval. Rob was the G&C contractor Program Manager for the David Taylor Naval Ship R & D Center portions of the work under these tasks. A complete fiberglass deckhouse design was investigated for DDG-51, as well as HSLA. Shipyards and G&C participated in investigations of

GRP piping and resin chocking for machinery foundations, also. Shock and vibration response of structures were investigated.

(9/82 and 4/83) Reinforced Plastic Preventive Maintenance and Repair Manual, and Inspection Manual for Fibrous Glass Reinforced Plastic, written under NAVSEA Contract #N00024-80-C-4507, task 5AO50 for Code 05E3 - These manuals were rewritten by this group under his supervision as a state of the art update of earlier MIL-HDBK navy manuals prepared by G&C.

(1983) COBRA JUDY Phased Array Radar Installation on the USNS OBSERVATION ISLAND - Subcontract to Raytheon under Air Force Contract #F-19628-82-C-0099.
Rob was Program Manager for this project, which entailed extensive ship surveys, engineering design, preparation of working drawings and cost estimate for the installation of a 100 ton phased array radar antenna upon the fourth tier of the deckhouse of an existing MARINER Class ship. Very extensive finite element computer analyses of heavy foundation structures were required for vibration and deflection checks of this extremely alignment-critical installation.

6/76 to 2/81 Bethlehem Steel Corporation Shipbuilding Central Technical Division - Naval Architect and Hull Group Chief (Rob supervised 15 in design department) Bethlehem Steel Corporation's Key Highway/Fort McHenry Shipyards, was a structural engineer for Sparrows Point Shipyard, and a project engineer for the $47M T-ARC-6 USNS ALBERT J MEYER cable ship project. At the Baltimore Shipyards, he had responsibility for all drydocking calculations, dock/ship structures and stability condition for ships in the yard, as well as heavy lifts and crane inspections. He was a licensed crane inspector under the Dept. of Labor requirements. During the A.J. Meyer project, he had responsibility for the design agent, Morris Guralnick Associates, in the preparation of over 300 working drawings.

Previously, in BSC's Basic Design Group, CTD, he had developed numerous preliminary tanker designs (lines, weights, arrangements, resistance & propulsion) to support the sales department.

Rob has been also employed as an expert witness in 59 marine related lawsuits, in the capacity of naval architect, structural engineer, accident reconstructionist, and marine surveyor. He has testified at court 17 times, and 25 times at deposition. Prior to his returning to university engineering studies, 1972 to 1976 he was a full-time marine surveyor for the Lloyd's Agent at Detroit, Toplis & Harding, Inc. Also during that time, he completed several IIA sanctioned Insurance and Risk Management courses from Wayne State University. Since 1976, he has been regularly performing marine surveys for various clients, usually for damage surveys and repair cost estimating for insurance underwriters and litigation, but occasionally for vessel value & condition.

RECENT PROJECTS

Rob presently has engineering consulting and structural design projects with the following well-known production boat building companies: Fittipaldi Yachts (Brazil), SeaRay Boats, Zodiac, Tracker Marine, VectorWorks Marine, Hatteras, Luhrs and Hunter Marine, Grady White, Cobalt Boats, Cruisers Yachts, Doral Boats, Marlin Yachts, and many former OMC Boat Group companies, including Chris Craft, Donzi, HydroSports, and Javelin. These clients provide an ongoing substantial monthly workload for Rob.

Fittipaldi Marine shipyard, Sao Paolo, Brazil – Hull design, engineering of propulsion components, weight estimates, intact & damaged stability analysis, and structural design for ABS Class Approval – 95 ft. and 108 ft. aluminium long-range motoryachts, (2 new designs) 2004 – present. Luiz deBasto Design was architect and stylist for these two projects, and Rob performed all engineering, including hull design.

Sea Master Yachts, Ft. Lauderdale, FL – Structural design, engineering of propulsion components, intact & damaged stability analysis, for 54 foot catamaran, 49 passenger diving vessel, for U.S. Coast Guard SubChapter "T" inspection certificate. All structures are fiberglass lightweight composites. Owner/Operator will be Divers Unlimited, Ft. Lauderdale and the Keys.

WestShip World Yachts shipyard, Tampa, FL - Structural design for ABS and Lloyds Class Approval – 80 to 143 ft. fiberglass motoryachts, (3 new designs) 2000 - present

Westport Shipyard, Westport, WA - Structural design for production series-built 130 ft. fiberglass motoryachts, joint design project with Greg Marshall of Victoria, British Columbia, 1998-1999.

Christensen Motoyachts Shipyard, Vancouver, WA - Structural design for ABS Class Approval - CMY Hulls No. 12-14 (145 ft), Hulls No. 18, 19, & 20 (155 ft) fiberglass motoryachts, 1993, 1995, and 1996/7.

Broward Marine Shipyard, Ft. Lauderdale, FL - Structural design for ABS Class Approval - BMI Hulls No. 534 & 535 (155 ft) aluminium motoryachts, 1994. Introduced a unique corrugated structural deck and bulkhead design which saved large costs in welding and fabrication. A composite panel sound-attenuating system was adhesively bonded to the corrugated panels, making for exceptionally quiet yachts.

Offshore Shipping Corp. "Seminole 62", 80 passenger, 62 ft. fiberglass catamaran ferries (2 built) Rob performed all naval architecture functions, stability calculations and tests for obtaining seaworthiness certificates from Bureau Veritas for French West Indies passenger service.

Complete design and engineering for 65 to 90 foot fiberglass high speed catamaran ferries for South Coast Catamarans (90'), Offshore Shipping (65'), Ven & Associates (Hong Kong)(75'), and Carry Craft (57'). Most of these craft have been built, while several have been for proposals to commercial and government operators.

Structural Design for 35 knot AirRide Craft/Able Boat Co. 65 foot and 108 foot catamaran surface effect ferries, for U.S. Coast Guard SubChapter "T" inspection certificate, for 149 passengers. The 65 foot hull was sea trialed in May '98, and 108 footer began construction. Fort Lauderdale, Florida. All structures are fiberglass lightweight composites. The 108 project was cancelled for a company bankruptcy, but the ISLAND ROCKET II is presently in open sea operation carrying passengers between Ft. Myers and Key West, Florida. Due to the uniqueness of the Airide surface effect ship design, the U.S. Navy chartered the ISLAND ROCKET II for a series of rough water performance tests before delivery to the owner/operator.

Trolley Boats, LLC, Ormond Beach, FL –Rob's most unorthodox design to-date– a 38 ft., 42 passenger amphibious passenger bus, certified for both U.S. highway transit at 50 mph, and

waterborne operation as a Semi-Protected Waters marine vessel. See www.bigappleducks.com for photos and a short video of this very unique "character" vessel. Rob developed the overall design "from scratch", carrying it through to production of 6 craft to-date, and he did all engineering and supervision of many contractors for this very difficult project.

Rob has a stock design and tooling for a 31 foot, 65 knot, open sea patrol boat which was considered for the customs and coast guards of the governments of Thailand, Malaysia, and Singapore. SwitzerCraft Boats built the prototype, which is still based in South Florida.

American Bureau of Shipping - ABS contract exclusively to Rob for his development of High Speed Catamaran, SES, and Foil-Borne Ship structural design classification rules. These rules have been published in the new High Speed Craft Guide by ABS, February 1997.

MHC-51 GRP Ship Structures Repair Manual - Rob Schofield and Bill Seeman each provided GRP composite structures damage assessment and repair expertise to the writing of a new fiberglass ship structures repair and inspection manual for this ship class, for NAVSEA. Each wrote sections and reviewed all drafts for the proposed manual.

MHC-51 Minehunter Lead Ship Shock Test - Rob participated as fiberglass damage ship survey and repair expert under contract to the U.S. Navy's NAVSEA engineering group for this series of underwater explosion shock tests of the lead ship of the class.

Carderock Contracts No. N00167-94-R-0008 Vacuum Assist Resin Transfer Molding of GRP composite Ship Section, and No. N00167-94-R-0071 PrePreg Fabrication of GRP Ship Section, Subcontract under SunRez Corporation, San Diego, CA. Performed structural and tooling design, materials selection, fabrication cost and tooling cost estimating, and on-site fabrication assistance for a half-scale ship section, which was built at Intermarine USA, Inc. shipyard at Savannah, GA.

DTRC Integrated Technology Deckhouse Program, Subcontract to CASDE Corp. for NAVSEA. Consulting on structural design, fabrication techniques, bonded and bolted connections design of GRP DDG deckhouse.

MHC-51 Construction, Subcontract to Intermarine U.S.A., Subtier contract to Industrial Plastics, Wisconsin Rapids, WI. Rob did structural design of fiberglass filament wound tanks, Grade "A" shock qualification by finite element analysis, and provided assistance during fabrication. 2 shipsets built for MHC Program.

Ship Stack, U.S. Navy Contract No. N00167-88-C-0051, for David Taylor Research Center ($85K): Rob was engineering subcontractor to Hercules Aerospace Company, Magna, UT. Project was for design and fabrication of a panel-built fiberglass skin/fiberglass honeycomb cored naval destroyer ship stack structure for simulated nuclear airblast test. A large-scale test was performed under actual FAE airblast by the Government at White Sands, NM in May 1989. Structure survived intact and functional. Rob developed the structural configuration and assisted in fabrication.

MHC Contract Design, U.S. Navy Contract N00024-84-D-4013, T.I. No. 6.03.01.05, from NAVSEA, the Naval Sea Systems Command ($57K): Subcontract through J.J. McMullen Associates. Rob Schofield and Earl Zion developed material specifications and qualification test and fabrication procedures for the fiberglass fabrics and resins used in the construction of the MHC-51 Class minesweeping ships. These 184 ft., 800 ton fiberglass ships were being built with commercial specification Italian and French fiberglass and Dutch resins.
The structural materials were being procured with only supplier stock numbers and incomplete commercial performance specifications. Schofield and Zion enlisted the technical assistance of 18 U.S. fiberglass and resin companies, and developed a complete specification and qualification procedure for U.S. domestic procurement of the materials.

Intermarine U.S.A. Shipyard: Hercules Aerospace retained Schofield 1985-1990 as consultant for forming the joint venture with Intermarine Spa., assisting in locating, planning, and construction of a shipbuilding facility in the U.S. (Intermarine U.S.A., Savannah, GA), writing the proposal to build the MHC-51 Class ship, and developing future markets for composite structural components for naval surface combatant ships and submarines.

Oshkosh Truck Corporation, Oshkosh, WI, in the design and prototype fabrication of most of the composite components of their military trucks:

P-19 Air Force Crash/Rescue Fire Truck
TA3000 Navy Crash/Rescue Fire Truck
R-11 Army Refueler
"S" Series Aircraft Runway Snowplow
"F" Series Front-End Loader Concrete Truck

These vehicles have either large fiberglass tanks, engine hoods, fenders, or other components. Finite element dynamic structural analysis was used during for heat transfer, vibration, impact, torsional rigidity, or fluid pressure loadings. The larger fire trucks have 3000 gallon water and AFFF tanks. The frames of these vehicles are contributing members in the suspension systems, and consequently large deflections had to be considered in design of the attached structures.

Enstrom Helicopters TH-28: Schofield engineered and assisted in prototype fabrication of advanced lightweight composite fuselage, firewall, and cabin structures for the proposed TH-28 Army Trainer. A net 31% weight saving from the baseline design was realized for these components. The F-28 commercial model's previous fiberglass laminate doors were flexing in flight and leaking rainwater. Schofield developed new laminates and structural configuration and supervised fabrication of alternative design carbon fiber/vinyl ester and Kevlar doors which met the stiffness and weight requirements for that model.

Maverick Jets, LLC, and Maverick TwinJet LLC – Vice President of Engineering (Part time capacity while marine consulting business continued) Responsible for all engineering and performed structural engineering and flight testing of structures for all-composite 5-place, pressurized 31,000 ft capable, 400 knot kit airplane. Rob set up the initial production plant at Melbourne, FL. 2 aircraft flying as of present, 12 kits sold. Project was divided and moved to Poland for certification and for kit production in the former Soviet Georgia. Schofield joined the project in August 2000 to supervise engineering and set up production, but left the company in July of 2002 to resume full-time his own marine consulting business.

Hover Systems Inc. HUSKY 400 Model Police, Search & Rescue Hovercraft:
Schofield performed structural design, arrangements, weight estimate, construction drawings, and consulted during fabrication of the prototype by Hovermarine, Ltd., Southampton, England. This lightweight, but rugged craft proved to be very inexpensive to build, achieved 35 knots in trials, and was found to be within 2 lbs. of the original weight estimate. Licensing arrangements are presently being made to manufacture the model in the U.S.

Marine Survey Experience

Before returning to the University of Michigan to complete his degree in Naval Architecture and Marine engineering, from 1971 to 1976 he was a full-time marine surveyor for the Lloyd's Agent at Detroit, Toplis & Harding, Inc. Since 1976, he has been regularly performing marine surveys for various clients, usually for damage surveys for insurance underwriters and accident reconstruction, but occasionally for determination of vessel value & condition.

Publications and Professional Society Lectures

Composites Institute of Australia: 1998 July/August Lecture Series, 8 hours each, held in Melbourne, Adelaide, Perth, Brisbane, and Sydney/Newcastle, Australia, on "Design of Efficient Laminates for Light Weight, Highest Strength, and Least Cost".

Participated in the development of the "Structural Plastics Selection Manual", American Society of Civil Engineers Manual No.66 (1985)

Society of the Plastics Industry Technical Paper, "An Economics Study for the Engineering and Use of Fiberglass Combination Materials in Marine Construction" (October, 1987)

Composites Fabrication Association
Annual Convention and Industry Conference, October 1989, and Society publication, January, 1990: "Setting Up an In-House Testing Program for Characterizing and Evaluating Laminates", which was also republished in Professional Boatbuilder Magazine, August/September 1997.

Suppliers of Advance Composites Materials Association (SACMA) 1989 Annual Convention - "State of Advanced Composites in the U.S. Pleasure Boat Market."

Society of Naval Architects and Marine Engineers, "Structural Design of Power Boats - A Dynamic Problem", presented at the 6th Bienniel Power Boat Symposium, October, 1995

Rob has been a Contributing Editor to the Composites Fabricators Association's journal, Composites Fabrication, since mid-1996. Articles written include:
Society publication, Composites Fabrication, September, 1995: "Thickness Considerations in Design of Laminates"", which was also republished in Professional Boatbuilder Magazine, February/March 1998.

Composites Fabrication, September 1996: "Create an In-House Resin Test Lab"

Composites Fabrication, October 1996: "Just How Will We Manage?" (Article on production management versus project management of manufacturing companies)

Composites Fabrication, January 1997: "The Ruggedness Factor" (Article on engineering considerations for product abuse and impact in structural design)

Composites Fabrication, February 1997: "Fire Performance of Composites"
Also reprinted in the Australian publication, Composites, July 1997
Composites Fabrication, July (September?) 1997: "FRP Toolmakers" (Article on marine mold and tool builders in the U.S.)

Composites Fabrication, October 1997: "What About Plywood?" (Article on engineering properties and advantages of plywood)

Composites Fabrication,October 1997: "Rational Design With Core Materials" (Article on engineering design of sandwich cored composite structures)

Composites Fabrication, November 1997: "Rational Selection of Core Materials" (Article on engineering approach to selection of core materials)

Composites Fabrication, July 1998: "Proper Evaluation of New Core Materials" (A second article on engineering approach to selection of core materials)

Composites Fabrication, September 1998: "Cosmetic versus Structural Performance of Laminates"

Composites Fabrication, September 1998: "High Temperature Performance of Laminates"

Composites Fabrication, October 1998: "Design of FRP Joints"

Composites Fabrication, March 1999: "FRP Joints - Part II: Structural Adhesives and Mechanical Fasteners"

Composites Fabrication, October 2001: "One-Stop Shopping – How to determine Laminate Properties for Different Resin Type, Fiber Material Type, Or Fabric Type"

Composites Fabrication, September 2002: "Is it Safe? –How to Build a Fire Resistant Laminate.", Vol. 18, Issue No. 9

Professional Boatbuilder Magazine, April/May 1996: "The Case For Plywood Structure"

Professional Boatbuilder Magazine, October 2003: "Pseudo-Cores and Bulker Plies"

International Boat Builders Exhibition and Conference (IBEX):
1992 through 2005 - One to three 1.5 hour lectures for each symposium series, on structural design of powerboats, high speed hull design, marine design and dynamic stability of powerboats, and international standards for structural design of marine craft.

Composites Fabrication Association 1994, 1995, 1996, 1997 and 2000 Annual Convention lectures on engineering design of Composite Structures.

FLORIDA BOARD OF PROFESSIONAL ENGINEERS

February 5, 2008

Michael Flury, Esq.
Office of the Attorney General
PL-01, The Capitol
Tallahassee, FL 32399-1050

RE: Complaint against Robert Schofield/"Marine Structural Engineer"
Complaint No. 2007002965

Dear Mr. Flury:

FBPE Prosecutor John Rimes has asked that I forward the attached case file to you. Please contact me if I can be of further assistance.

Sincerely,

Jack Beamish
Investigator
Florida Board of Professional Engineers

FLORIDA BOARD OF PROFESSIONAL ENGINEERS

February 4, 2008

Drew B. Hains, PE
Murray and Associates, LLC
4101 Ravenswood Rd., #210
Fort Lauderdale, FL 33312

VIA Email: dhains@murrayna.com

Re: Complaint against Robert A. Schofield

Case No. 2008002965

Dear Mr. Hains:

As we discussed earlier today on the telephone, please be advised that on January 25, 2008 we sent via certified mail to Robert A. Schofield a Notice to Cease & Desist from identifying himself as a "marine structural engineer." We have not yet received the certified mail return receipt and the case remains open.

I understand that you will be sending me additional information in which the Florida Board of Professional Engineers previously issued a Notice to Cease & Desist to another engineer who was performing a scope of work similar to the work you allege is being performed by Mr. Schofield. We appreciate it that you are sending the documents so that our prosecutors can review them. After the prosecutors review this information, we will contact you and inform you of any changes in the status of the case.

Thank you for bringing this matter to our attention.

Sincerely,

Jack Beamish
Investigator
Florida Board of Professional Engineers

cc: John Rimes

Jack Beamish

From: Jack Beamish
Sent: Friday, February 29, 2008 4:53 PM
To: Rob Schofield
Cc: John J. Rimes III
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

Mr. Schofield:

Per Chapter 455.225(10), complaints in which unlicensed activity is alleged are public information. Therefore, per your request, we are providing you with the additional information and allegations we recently received regarding the complaint filed against you. As I explained to you earlier today on the telephone, the Notice to Cease & Desist that you received on February 27, 2008 is still in effect. After receipt of additional information from the complainants, we will review that information and notify you if the Notice stands or may be rescinded.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

-----Original Message-----
From: Jack Beamish
Sent: Friday, February 29, 2008 2:34 PM
To: 'wmurray@murrayna.com'
Cc: John J. Rimes III; Patrick Creehan
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

Mr. Murray:

As you and Mr. Hains are filing this complaint, we look to you to provide evidence that support your allegations that Mr. Schofield is practicing engineering or offering engineering services in the State of Florida. Please see Mr. Rimes' earlier response to you on February 28, 2008 if you need further guidance.

As we cannot leave this matter open indefinitely, please provide all documentation that you want us to consider by March 15, 2008.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

-----Original Message-----

From: John J. Rimes III
Sent: Friday, February 29, 2008 9:26 AM
To: Jack Beamish
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

-----Original Message-----
From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Thursday, February 28, 2008 5:12 PM
To: John J. Rimes III
Cc: Hains, Drew
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

Mr. Rimes,

I do have loads of other documents and drawings but I am unclear of what exactly you are looking for. I am assuming that you are going to look the other way for now on the performing engineering without a license issue for now and you want to only enforce the "structural engineer" title to the Public. If this is true I can give you a client that hired him to perform Structural engineering services in a different matter and he had to fire him for deficient drawings and not disclosing a relationship with a subcontractor performing the construction. I do not know if you realized that in the case Mr. Hains filed all the work was performed in Florida either at his office or at the vessels dock in the Keys. In addition, in this particular case we have never seen such gross negligence. This is not just this vessel but we have seen it on a Ford Family vessel that he gave an opinion with out doing calculations and he was wrong and we had to deal with structural design that he completed for Broward Marine M/Y Coco Bean that was so deficient that the American Bureau of Shipping (ABS) did not allow a certificate to be issued due to the structural issues. I believe I can give you what you are looking for if you give me some guidance.

Regards,

William Murray

-----Original Message-----
From: John J. Rimes III [mailto:jrimes@FBPE.org]
Sent: Thursday, February 28, 2008 4:20 PM
To: Murray, William
Cc: Jack Beamish
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

Initially, I want you to know that nothing has been done at this time. Secondly, since this issue relates to the question of unlicensed practice the decision is not a Board decision but rather has been delegated to FEMC to decide whether to enter cease and desist orders. Of course, FEMC does adhere to Board pronouncements and rulings in taking action and will continue to do so here. Finally, my concern with this issue in this case is whether there actually is evidence that the subject utilized the term "structural engineer" in any manner that involves "holding out" that the

subject is a "structural engineer" in communications to the public in any manner that could lead someone in Florida to believe that the subject is using the title while offering or performing services. If you have any evidence that the subject is doing so then please get it to Mr. Beamish. Otherwise, I am left with a vita attached to a deposition in a case in federal court in another state involving no apparent activity by the subject in Florida at all.

-----Original Message-----
From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Thursday, February 28, 2008 3:03 PM
To: John J. Rimes III; Patrick Creehan; Jack Beamish
Cc: jburke@hazenandsawyer.com; henn@rebane.com; Hains, Drew; ejp@trippscott.com
Subject: FW: Robert Schofield Complaint (Johnston/KYS)
Importance: High

Mr. Rimes,

It is my understanding that you are rescinding a letter sent out to Mr. Schofield. Can use please explain how and why you are doing this with out having the Board meeting in April as discussed. I would like to remind you that the Board served my Company (or employee's) 4 times and forced the issue on us. I would say at the least you owe us is a meeting with the Board to discuss the matter before you start making a flip flop on the enforcement of Engineering. I hope you realize how big of an issue you are opening up! I look forward to you explanation.

Regards,

William Murray

William Murray
Murray & Associates, L.L.C.
4101 Ravenswood Road
Suite 210
Fort Lauderdale, FL 33312
(954) 527 5505 ext. 20
(954) 791 6923 fax
(954) 673 0366 mobile

Jack Beamish

From: Jack Beamish
Sent: Friday, February 29, 2008 2:34 PM
To: 'wmurray@murrayna.com'
Cc: John J. Rimes III; Patrick Creehan
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

Mr. Murray:

As you and Mr. Hains are filing this complaint, we look to you to provide evidence that support your allegations that Mr. Schofield is practicing engineering or offering engineering services in the State of Florida. Please see Mr. Rimes' earlier response to you on February 28, 2008 if you need further guidance.

As we cannot leave this matter open indefinitely, please provide all documentation that you want us to consider by March 15, 2008.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

-----Original Message-----
From: John J. Rimes III
Sent: Friday, February 29, 2008 9:26 AM
To: Jack Beamish
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

-----Original Message-----
From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Thursday, February 28, 2008 5:12 PM
To: John J. Rimes III
Cc: Hains, Drew
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

Mr. Rimes,

I do have loads of other documents and drawings but I am unclear of what exactly you are looking for. I am assuming that you are going to look the other way for now on the performing engineering without a license issue for now and you want to only enforce the "structural engineer" title to the Public. If this is true I can give you a client that hired him to perform Structural engineering services in a different matter and he had to fire him for deficient drawings and not disclosing a relationship with a subcontractor performing the construction. I do not know if you realized that in the case Mr. Hains filed all the work was performed in Florida either at his office or at the vessels dock in the Keys. In addition, in this particular case we have never seen such gross negligence. This is not

just this vessel but we have seen it on a Ford Family vessel that he gave an opinion with out doing calculations and he was wrong and we had to deal with structural design that he completed for Broward Marine M/Y Coco Bean that was so deficient that the American Bureau of Shipping (ABS) did not allow a certificate to be issued due to the structural issues. I believe I can give you what you are looking for if you give me some guidance.

Regards,

William Murray

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From: John J. Rimes III [mailto:jrimes@FBPE.org]
Sent: Thursday, February 28, 2008 4:20 PM
To: Murray, William
Cc: Jack Beamish
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

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Robert A. Schofield, Naval Architect

TEL# 321 255-8331
FAX# 321 255-3554
E-MAIL: rasna@attglobal.net

4105 Lake Washington Road
Melbourne, Florida 32934

14 September 2004

Schuberth Real Estate & Builders
2502 N. Clark Street
Chicago, IL 60614-1850

Attn: Mr. Conrad Schuberth, CEO

Subject: "CAP II"
QueenShip Hull No. 121
68 Ft Model, Built 2000

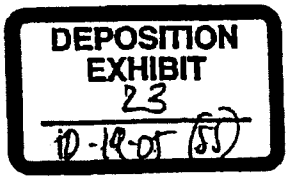
Dear Conrad:

Attached is my repair specification which is intended to restore the yacht's hull bottom to a full oceangoing seaworthiness.

Robert A. Schofield

Tel# 321 255-8331
Fax# 321 255-3554
Mobile# 321 917-5100
Mobile# 321 951-4838

cc:
Mike McLeod, Esq.



APPENDIX A

REPAIR SPECIFICATIONS

Queenship 68 Ft. Hull No. 121

CAP'S II

15 September 2004

Specifications for Repair of GRP (Glass Reinforced Plastic) Structural Items

Appendix "A" is a repair specification to restore the yacht to a structural condition suitable for seagoing use in yacht service.

Appendix "B" is a material and workmanship specification which shall be used by the repairer to assure that the completed GRP laminates will match or exceed the quality of laminate used in the original construction of the subject yacht.

A repair and engineering inspector, herein called the "Surveyor", shall be jointly designated and agreed by the repair facility and the yacht's owner. At certain designated milestones in the repair project, the Surveyor shall be called to witness the conditions found of the existing ship's structure and the proposed repair materials and methods. Final inspection of the repairs shall be made by the Surveyor prior to application of finish-covering gelcoats or bilge paint.

Main Longitudinal Girders

One of the critical factors in accomplishing this repair is that the main longitudinal hull bottom girders in the Owner's Stateroom must be demonstrated to be "MicroLam" Douglas fir. If they are found to be foam cored rather than "MicroLam", then the repair specification will be modified by the naval architect to include increasing the GRP laminate overlay on these girders. In this regard, a 1 inch diameter test bore in the girder side at mid-height shall be made of one inboard and one outboard girder in the Owner's Cabin compartment and the results of the test bore shall be communicated to the Surveyor.

It is most likely that the existing main longitudinals were, in fact, built with "MicroLam", and that no further work need be accomplished on this item.

Catalyzed vinylester resin shall be used for all laminates in this work scope.

Repair of Existing Hull Bottom Damages

The existing transverse frames terminate approximately 1 inch short of all intersections with the four main longitudinal hull bottom girders, and also terminate some distance short of the yachts centerline: Many of these intersections and terminations were found to have cracks in the frame overlay laminate and possibly in the hull bottom shell in the vicinity of the frame endings.

All interior gel coat (bilge paint) shall be ground off the hull shell for a distance of 8 inches all around the edges and ends of the existing hat-section frame, and back from the transverse terminations for a distance of 18 inches over the entire surface of the transverse frame, and 10 inches to each side of the transverse frame centerline (20 inches total width) clear of the transverse frame on the four main longitudinal girders. The hull bottom laminate shall be carefully inspected

at the transverse frame ends to determine whether these cracks extend into the hull bottom shell laminate. If such shell laminate cracks are found to exist, they shall be ground away down to intact, uncracked laminate, the area surrounding the cracks shall be ground back to a 16:1 bevel surrounding the crack.

These areas shall be ground by 80 grit disk sandpaper, removing all damaged material down to intact laminate, and bevelling out to the exterior hull surface surrounding the damaged area in a 16 to 1 straight-line bevel. All previously-applied repair putty found shall be removed by sanding prior to the application of new laminate. The Surveyor shall inspect the area prior to any plies of laminate being applied over it.

The Surveyor shall be called to inspect each location where such cracks are found, after the grinding to intact laminate is accomplished.

After obtaining a signed list from the Surveyor detailing each of these locations, new laminate shall be applied to restore the hull bottom and transverse frame laminate to original lamination schedule. Edges of successive plies of replacement laminate shall be stepped back at least 1 inch per ply of fabric applied.

The surface shall be primed and one ply of CSM laid, per the last section of this specification. The gouged area shall have mat-woven roving ply groups laminated in-situ, in vinyl ester resin, mat side down, no more than two plies at a time "wet-on-wet", in successive layers with 1 inch edge step-back per ply, until the resulting surface is slightly proud of the surrounding exterior hull bottom. The repair patch shall then be ground flush, with a slight margin for the thickness of the finishing ply, which shall be one ply of 1.5 oz/sq.ft. CSM, laid in vinyl ester resin. The resulting surface shall then be finish sanded to fair with the hull bottom.

In all locations were the transverse frame itself is cracked where it turns vertical at the chine, these cracks shall be ground away down to the foam frame former. The frame laminate surrounding the cracks shall be ground back to a 12-inch bevel all around the edge of the crack.

Laminate used for these repairs shall be alternating plies of 1.5 oz/sq.ft chopped strand mat (CSM) and 18 oz/sq.yd woven roving. The first ply laid down in a repaired area shall always be 1.5 oz CSM. Transverse frames shall receive a minimum of four ply-groups, and the hull bottom shell as repaired shall have sufficient plies to restore to original thickness (0.44", or twice this at chine and keel) at each location.

Reinforcement of Each Transverse Frame/Longitudinal Girder Intersection
After the damaged laminate repairs are completed, new foam formers for every transverse frame/longitudinal girder intersection shall be fabricated and installed,

as per Drawing "A", attached. The intent is to make each transverse frame capable of carrying its full strength and stiffness completely across the intersections with the longitudinals.

All gelcoat in way of the intended new laminate shall have been ground away and removed. Small traces or patches of remaining gelcoat shall not be permitted in the intended bonding area larger than 3/8 inch in any direction. Laminate shall not be applied anywhere over gelcoat, other than these few small patches.

Three plies of Knytex CDM 1808 shall be laminated on each intersection in the pattern shown by Drawing "A". Extend new laminate 12 inches back onto and overlapping existing frame sections.

Reinforcement of Each Transverse Frame At the Crossing of the Keel
After the damaged laminate repairs are completed, new foam formers for every location of keel crossing shall be fabricated and installed, as per Drawing "B", attached. The intent is to make each transverse frame capable of carrying its full strength and stiffness completely across the intersection with the keel.

All gelcoat in way of the intended new laminate shall have been ground away and removed. Small traces or patches of remaining gelcoat shall not be permitted in the intended bonding area larger than 3/8 inch in any direction. Laminate shall not be applied anywhere over gelcoat, other than these few small patches.

Three plies of Knytex CDM 1808 shall be laminated in the pattern shown by Drawing "A". Extend new laminate 12 inches back onto and overlapping existing frame sections.

Addition of New Hull Bottom Framing
The intent herein is to double up the numbers of transverse "hat-section" frames on the hull bottom from the engine room bulkhead, to the fore bulkhead of the Owner's Stateroom, Station No. 22. Longitudinal hat-section frames, 18 inches on-center, shall be fitted from that bulkhead at Station #22, all the way forward to the bow, keel to chine. The existing frame spacing is 36 inches, center to center, which is not sufficient for structural integrity. After the modification is completed, there shall be no location of the hull bottom plating where the short-distance span across any hull bottom plate is more than 18 inches.

In addition to the frame number increase, there shall be transverse frames, 18 inches on center, where there were no transverse frames before – between the inboard and outboard longitudinal girders. These new frames will impede the outboard walking area of the Owner's Cabin, and shall be sheathed over with a decorative plate material satisfactory to the yacht's owner. Headroom in this

compartment will necessarily be reduced by the frame height, plus sheathing thickness.

New frame foam formers shall be bonded to the yacht's hull bottom shell by syntactic foam putty, such as ATC Chemicals' "CoreBond", or equal.

The foam formers for the new frames shall be fabricated and fitted as per the attached Drawing "B"

Three plies of Knytex CDM 1808 shall be laminated over these foam formers, double-lapping the top face of the foam former, and lapping a minimum of 4 inches onto the hull bottom, to each side of the foam former. Each additional ply of frame laminate shall then extend an additional 1 inch beyond its predecessor ply, forming a ply step-back pattern onto the hull bottom.

In way of all new framing members and intended new laminate, the hull bottom plating and the existing crossing framing shall be sanded to good secondary bonding condition for a distance of 8 inches minimum from the edges all around, removing ALL traces of gelcoat and interior paint in the process.

The Surveyor shall inspect both exterior and interior areas prior to any plies of laminate being applied over them. The surface shall be primed with catalyzed resin and one ply of CSM first laid, per the last section of this specification.

The cabin sole shall be retabbed to the hull shell between the Owner's Stateroom after bulkhead to the fore bulkhead of the compartment

The Surveyor shall inspect and approve all interior hull surfaces prior to the spraying of bilge paint and or interior gelcoat.

Sufficient joinerwork and cabinetry shall be removed to allow full access for this work. Refit after structural repairs shall be to the same standard and method as original construction.

Cracks and open seams of cabin panelling, cabinets, and built-in furniture shall be repaired by a qualified joinerworker. No such damage is now apparent, but if such seams open up during removal or refit, they shall be repaired to the Surveyor's satisfaction.

TERMINOLOGY:

WR 18 OZ:
18 oz/sq yd (600 gm/m^2) Woven Roving

1 1/2 oz CSM:
Mat Fabric, 1.5 oz/sq ft (450 gm/m^2) Chopped Strand Mat

KNYTEX CDM 1808:
Combination Fabric, 18 oz/sq yd (600 gm/m^2) Stitched ("Knitted") 0/90 degree Bi-directional Fabric + 3/4 oz/sq ft (225 gm/m^2) Chopped Strand Mat

APPENDIX B

MATERIAL AND FABRICATION SPECIFICATIONS

Queenship 68 Ft. Hull No. 121

CAP'S II

15 September 2004

STANDARD LAMINATION PROCEDURES

General GRP Repair Guidelines

GRP repair work shall be carried out only under dry weather conditions. All standing moisture shall be removed from the surfaces to be repaired, and any dampness of laminate shall be removed by heat gun prior to the commencement of grinding or laminating work.

GRP surfaces sanded for secondary bonding of repair laminate shall in all cases be wiped clean with Reichhold Chemicals' "ATPRIME II" surface treatment, to insure a solid secondary bond, with chemical crosslinking made possible by the use of this surface treatment. Laminate shall be laid within the RCI recommended time frame after the surface preparation.

The first ply of secondary bonding laminate shall be 1.5 ounces per square foot chopped strand mat CSM), in catalyzed vinyl ester resin, ATLAC 580, or Ashland 922, or equal. While this layer is still wet, the main structural laminate as specified in the repair lamination schedule shall be laminated directly onto the wet CSM.

General GRP Lamination Guidelines

Fabrication of structural components shall be by the use of hand layup, room temperature cure, contact molding against rigid surfaces, or against urethane foam cores which are rigidly bonded to the underlying GRP structure receiving the repair. In no case shall wet laminate be laid to bridge a gap or opening. Shop temperatures shall not exceed 90 degrees Fahrenheit (32 degrees Celsius) nor shall temperatures fall below 55 degrees Fahrenheit (13 degrees Celsius) during the molding process.

Resin exotherm during cure shall not be permitted to exceed 122 degrees Fahrenheit (50 degrees Celsius) in the mold. Recommended maximum exotherm for a 100 gram cup mass is 200 degrees F (93 degrees C) for the base resin system.

Fiberglass roll goods or fabrics, where used, shall be lapped a minimum of 2 inches (5 cm) at seams and butt joints. No two seams or butt joints shall occur at any one place, unless specifically required by the drawings.

The finished laminate shall exhibit no unwetted strands of fiberglass, jackstrawing, "white laminate", or air bubbles larger than 1/8 inch (3mm) in maximum extent. Connected air bubbles shall be considered to be one air bubble for this measurement. Repairs to any area of laminate shall have been made of the same materials as the original laminate, and shall have been laminated only after a 12 to 1 bevel (width to depth measurement) have been ground in the previously cured substrate. No more than 20 percent of the total part surface shall be a repaired area.

Surfaces shall be smooth insofar as the woven textiles will allow, and there shall be no loose or projecting fibers, jagged edges, or resin pools or drips on the surface. Cut edges of fiberglass shall be painted with catalyzed resin to seal against moisture damage to exposed glass fibers.

FIBERGLASS REINFORCEMENT MATERIAL SPECIFICATIONS:

All fiberglass materials used in the fabrication of each part shall consist of E-glass with a polyester or vinylester resin compatible vinyl silane sizing.

CSM, where specified, shall be roll goods made with polyester compatible binder of the specified weight per square foot. Weights of glass fibers per square foot per layer shall not deviate from the specified weight by more than ten per cent. The chopped glass fibers shall not be less than 1 1/2 inches (40 mm) in length.

RESIN MATERIAL SPECIFICATIONS:

All resin matrix materials used in the lamination and repair processes shall consist of a non styrene suppressed, non fire retardant vinylester resin suitable for contact or hand lay up molding under room temperature cure conditions. The resin used shall meet the specified cured resin modulus and elongation test values stated below.

There shall be no wax, paraffin, fish oil, or DCPD used in the constituancy of the resin. Cure shall be initiated by methylethylketone peroxide (MEKP) in no more than 1 1/2 percent of resin weight quantity. Promoter and copromoter shall be cobalt napthanate or octoate and dimethylaniline at no more than 2 percent of resin weight quantity.

Thixotropic materials may be added to enhance workability, such as fumed silica. However, these shall not be added in such quantities that cast resin elongation falls below the required minimum.

Minimum cast and post cured resin specimens shall not deviate from the following mechanical properties. Post curing prior to testing shall have been accomplished by maintaining the resin sample at no less than 160 degrees F (70 C) for four hours. The original resin manufacturer's laboratory tests of the resin type, not necessarily the particular lot used in fabrication of these parts, may be used as evidence of compliance to these specifications.

* Specific Gravity - 1.15 to 1.20
* Barcol Hardness (casting) - 45 to 55
* Tensile Elongation to failure - 4% min.
* Modulus of Elasticity greater than 450ksi (0.315 GPa)

ROBERT A. SCHOFIELD, NAVAL ARCHITECT

TEL# 321 255-8331
FAX# 321 255-3554
E-MAIL: rasna@attglobal.net

4105 Lake Washington Road
Melbourne, Florida 32934

Schuberth Real Estate & Builders
2502 N. Clark Street
Chicago, IL 60614-1850

16 September 2004

Attn: Mr. Conrad Schuberth, CEO

Subject: "CAP II"
QueenShip Hull No. 121
68 Ft Model, Built 2000

Dear Conrad:
Attached is my repair specification which is intended to restore the yacht's hull bottom to a normal "yacht-service" seaworthiness.

The intent herein is to double up the numbers of transverse "hat-section" frames on the hull bottom, from the engine room bulkhead, Station No. 36, to the fore bulkhead of the Owner's Stateroom, Station No. 22. Longitudinal hat-section frames, 18 inches on-center, shall be fitted forward of that bulkhead at Station #22, all the way to the bow, between the existing longitudinal girder and the chine.

The existing transverse frame spacing in the Owner's Stateroom is 36 inches, center to center, which is not sufficient for normal structural integrity. The new transverse framing shall cross and be connected to the existing longitudinal girders.

Forward of the Owner's Stateroom, the centerline keel does not require a longitudinal frame because of the knuckle formed by the hull and the existing longitudinal is approximately where the next longitudinal frame should be, so no change is required out to 18 inches outboard of the existing MicroLam longitudinal girder. Measuring out from that girder, the first pair of new longitudinal frames shall be located 18 inches away from and parallel to it. The second pair shall be located 18 inches outboard of the first, and so on, until the chine is reached. It is okay to "toe-in" the fore ends, or to shorten up the 18 inch measurement of these new longitudinals to suit the hull shape and the run of cabin outfittings.

After the framing modification are completed, there shall be no location of the hull bottom plating forward of the engine room bulkhead where the short-distance span across any hull bottom plate is more than 18 inches.

The bottom design pressure for a planing boat decreases from midships to points aft. The existing yacht's bottom framing is closer-spaced from engine room bulkhead to the stem, and the unorthodox frame configuration will actually carry the sea loads. There is some question about the complete lack of transverse frames under the fuel tanks in the engine room, but it could be argued that the weight of fuel contained in the tanks counteracts the hull bottom wave slap from underneath. Therefore, I do not recommend a major rework of the structure in the engine room. There are two locations of unframed bottom plate abaft the fuel tanks, but it appears that the exhaust piping stiffens the hull

DEFENDANT'S EXHIBIT
Case 12
9.21.05 BP

bottom in those penetrating areas. In the after cabins and lazarette space, the frame spacing is smaller, and the weird framing configuration seems up to the sea loads, for those spaces, only.

The yacht can definitely NOT be wave-jumped, but calculates sufficiently strong for about a 2 G impact from operation at higher speeds in choppy sea conditions AFTER the recommended structural alterations are made.

Robert A. Schofield
Tel# 321 255-8331
Fax# 321 255-3554
Mobile# 321 917-5100

cc:
Mike McLeod, Esq.

Boca Raton, Florida 33431
on behalf of the Plaintiff.

HAYDEN & MILLIKEN, P.A.
(BY MR. WILLIAM B. MILLIKEN)
Suite 63
5915 Ponce de Leon Boulevard
Coral Gables, Florida 33146
on behalf of the Defendant.

INDEX

EXHIBITS

0003

Thereupon:

ROBERT A. SCHOFIELD

was called as a witness, and after having been first duly sworn, was examined and testified under oath as follows:

DIRECT EXAMINATION BY MR. MILLIKEN:

Q. Please state your full name.

A. My name is Robert Alan Schofield.

Q. Mr. Schofield, have you ever been deposed before?

A. Yes.

Q. I'm still going to give you a couple of hints about our deposition.

Let me finish my question. If there are objections, let the attorney for the plaintiff make his objection before you answer so we only have one person talking at a time.

If I ask you something you don't understand, let me know. The purpose here is to obtain information from you that we don't have, and that's why we're here, so it doesn't help if you don't understand my question and you try to answer something that, you know, we're not on the same wavelength. Okay?

A. Yes. My hearing is a little bad this

0004

morning because of a cold in my ears or something.

Q. I will speak up.

First of all, give me your background, education and training.

A. Background, I started at the University of Michigan, naval architecture and marine engineering in 1966.

I dropped out short of a couple years of finishing, got a job as a marine surveyor for the Lloyds settling agent in Detroit, Toplis & Harding. I worked for them until– from 1971 through 1976. Last year and-a-half, I commuted to Ann Arbor, finished my engineering degree in naval architecture, marine engineering.

1976 I took a job in Bethlehem Ship Building, central technical division. Worked with them till 1981. With Bethlehem I did structural engineering, naval architecture. I was the hull department chief in the Key Highway repair yards, Baltimore repair yard, and also worked on new tanker designs, propulsion systems, dock structures, stability conditions of the yard, heavy lifting and cranes.

When they closed the yard in, I believe it was '81, I took a job with Gibbs & Cox in

0005

their Washington division, and subsequently became group chief for the structural engineering group and the naval architecture group. I handled two groups, actually, some 13 engineers.

My specialty was fiberglass structures, and I did a lot of work for the Navy, and also did the structural design concept and

testing for Naval Sea Systems Command, NAVSEA, destroyer class, the DDG-51 and CG-47, did the deck house design for current minesweepers, block of minesweepers.

I took a job as deputy program manager and project engineer, was the vice president of the shipyard, but I was in charge of the Marinette Marine Shipyard in Wisconsin. I moved to Wisconsin in-- we did the engineering and design work for that shipyard for the minesweeper project, which later became the MSH project, was built in Savannah and Pascagoula, 154 foot fiberglass ship, and when the program went south for Marinette Marine, it was handed to Intermarine in Italy.

I went to work for Hercules Aerospace as a consultant to form a joint venture with Intermarine Spa., and we bought the Savannah shipyard for the construction of the MHC-51

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minesweeping class ships for the Navy, and I was offered the technical director's job, but turned it down.

Since 1983 I have been a consultant to the U.S. Navy as an engineering consultant, 50 some U.S. boat manufacturers, a couple of foreign boat manufacturers.

I become a registered European engineer, registered charter engineer in the United Kingdom.

I do a lot of work in Europe and the Far East, doing structural engineering, yacht design, some naval designs, but it's more of a consultant role for the U.S. Navy.

I attend a lot of seminars and I have been representing the U.S. boat manufacturers in the European boat safety standards, particularly on Working Group 18 for ISO, the International Standards Organization, Standard Number 12215, which all boat structures, any boat sold in Europe, must adhere to since 19-- July 1998. They had to have some sort of a certification, and this design standard was set up to respond to the European parliament's recreational craft directive, established that one unified set of standards shall

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be used for all European Union countries.

I'm funded in that by the National Marine Manufacturers Association here in the U.S., and American Yachting Council, and I'm the sole vote, U.S. vote on that committee.

Let's see. I have taught seminars-- I am supposed to be an adjunct professor at the Florida Institute of Technology at this time, but only six students signed up for my course, so I got a semester off here.

I must be missing some things, but that's the main-- I do a lot of mega yacht designs.

Q. For a particular company or companies, or is it for individuals?

A. It's mainly for companies.

I don't like to work for individuals much. They will ring your phone off the hook and never get anywhere, and that is handled by Luis "Devasto" & Associates in Miami, and I do all the propulsion, engineering aspects for them.

We have been working with the Fittipaldi race car family, who is venturing out in the yacht business, large yachts, and, in fact we should be meeting with some of them tomorrow.

Q. When did you actually get your degree

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from the University of Michigan?

A. In August of 1976. Finished classes in May of '76, but there was a requirement that we had to meet, and I can't remember what that was.

Q. What's the nature of business at Gibbs & Cox?

A. Gibbs & Cox is a consulting naval architectural firm, working mainly as a contractor for the U.S. Navy. There are about 500 employees in this group, and I worked in the Washington office.

Q. Am I correct, basically since 1986, you have been engaged as a consultant, as opposed to being a direct employee of a shipyard or a naval architectural firm?

A. Yes. Since about August of 1983, actually, I have been fully an independent consultant.

Well, there was another thing I did run four years ago, the-- the Maverick Jet Kit Company, pressurized, 400 knot fiberglass airplane, and moved it to Melbourne, Florida. Then the owner

showed up and just destroyed-- just destroyed the company in-- I lasted two months after that. We found we couldn't work with him.

Q. And your business address at the present time?

A. I have an office in my house, 4105 Lake Washington Road, Melbourne, Florida 32934.

Q. And would you, based upon your background, education, training and work experience, hold yourself out as a fiberglass expert?

A. Yes.

Q. With respect to our deposition today, you received a subpoena to bring any and all records pertaining to your inspection of the CAP'S II.

Have you brought records with you today?

A. Yes.

Q. And can you just go ahead and identify those records for me, as far as what you brought?

MR. SEIDEN: Let me just state something for the record, something I discussed with you off the record, Bill.

The witness has been retained basically in two capacities. The first capacity the witness was retained in was as an expert witness, not for purposes of litigation, an expert witness to review certain repair plans relative to the vessel.

The witness has also been retained as a consultant expert by my client, through me and my firm, and as a consulting expert, we have not yet made any determination if we're going to call the witness as an expert witness to testify at trail.

Therefore, we are invoking the work product privilege with respect to any and all aspects of his retention that have dealt with consultation, and not dealing with his appearance as a fact witness relative to the repair, so I need to make sure that any documents that are being produced do not go to the consultation retention, but, in fact, go to the retention as a fact witness to come in and give opinions relative to the repair issues.

So maybe-- and also, just so the

record is clear, there are other potential matters for which Mr. Schofield may well be retained with regard to this vessel, this client, so we're going to be very careful relative to privilege.

MR. MILLIKEN: I guess we can address that as we come across the documents, number one, and then number two, with respect to the specific questions.

MR. SEIDEN: Sure. If you have documents, Bob, you want to let me see them first and--

THE WITNESS: Sure. Here's the technical file.

BY MR. MILLIKEN:

Q. I'll tell you what-- while Mr. Seiden is going through some of the records you just handed him, it looks to me like you have different grouping of documents.

Am I correct?

A. Yes and no.

Q. Okay. Well, you referenced, when you handed this folder to Mr. Seiden, that is a technical file?

A. Yes.

Q. And within your organization, what does the technical file comprise of, generally?

A. Generally, it is drawings, specification, photographs, previous correspondence, having to do with the-- in this case, the structure of the vessel and--

Q. Okay. And you're looking at a file in front of you right now (indicating).

How would you title that or describe that file?

A. I would call that my-- as I said, yes and no, some of it is simply together here, billings, consulting discussions, time charges and that sort of thing.

The third thing is notes.

Q. And that is a little notebook that you have?

A. Yes, and I haven't identified the specific dates of survey, but my inspection, my inspection notes are contained in these notes.

Jack Beamish

From: Rob Schofield [rasna@attglobal.net]
Sent: Thursday, February 28, 2008 10:53 AM
To: Jack Beamish
Subject: FBPE Case No. 2008002965
Attachments: FBPE.DOC

to: Jack Beamish, Investigator

Hi Jack:
Thanks for taking the time to answer my telephone call of yesterday.
I am attaching a formal response to your inquiry, and I hope that this clears up the matter.

I would also like to emphasize that I am aware of what specific engineering titles to avoid with Florida clients, until such time as when we are able to obtain a legislative resolution of the "Naval Architect/Naval Engineer" matter.
You will also note that my e-mail and answering message reads, "Naval Architect & Aero Engineer". For work under the latter title, I have just enough composites structures design experience for Enstrom Helicopters, Maverick Jets, Hercules Aerospace, and current kitplane companies to qualify under that exempted engineeering specialty.

Best regards,
Rob Schofield

Robert A. Schofield, Naval Architect

tel# 321 255-8331
email: rasna@attglobal.net

4105 Lake Washington Road
Melbourne, Florida 32934

transmitted by E-Mail

Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303

27 February 2008

Attn: Jack Beamish, Investigator

Subject: Notice to Cease & Desist
Case No. 2008002965

Gentlemen:

Thank you for taking the time to discuss this case with me today.
In accordance with your directions, I am outlining the background and specific contact information that, I hope, will help you to resolve this case.

The complaint, as I understand it, was originated by Mr. Drew Hains, PE, who alleged that I represented myself as a "marine structural engineer" in violation of 455.228 and 471.038 of the Florida Statutes. I am a member of the marine industry ad hoc committee who are drafting proposed legislation for exemption of Florida-based yacht designers, naval engineers and naval architects who work solely on floating craft and marine structures. Our committee members have met with the FBPE on this matter several times, and I am quite aware of the specific terminology that may and may not be used to represent ourselves to clients in the State of Florida. I agree that the terms "marine structural engineer" would violate current Florida statutes if represented to a Florida client. I have not represented myself to any Florida client using those terms.

The resume submitted by Mr. Hains to you as evidence for the FBPE complaint was one transmitted to the Court with my expert report for a Federal Court Case: Johnston Family Louisville, LLC v. Kentuckiana Yacht Sales, Inc. et al, Case No. 3:07CV-122-S, Western District of Kentucky. My client is attorney Mark Smedal for the defendant, Jefferson Yachts and Kentuckiana Yacht Sales. None of those parties reside in Florida or do business in Florida. All fees for my work and my consulting and research for that case have been paid out of Louisville, Kentucky. I am listing contact information below that will allow you to directly verify my working relationship with those clients.

I do not use that resume for my work in Florida, so there is no violation of Florida statutes.

Opposing expert in the federal case is Bill Murray, of Murray & Associates, Ft. Lauderdale, Florida. Murray came by a copy of my resume as part of his review of the facts in that case, as would be expected for such an expert. Drew Hains is the sole P.E. in the Murray yacht design office, and he apparently obtained the filed court documents from Murray.

Bill Murray represented to Plaintiff's counsel, who subsequently represented to the Court, that "Mr. Schofield is not licensed in the State of Florida and is unqualified to provide opinions in this matter". The attorney for that side stated as such in his correspondence, and we are in process of obtaining copies of correspondence from Murray/Hains for documentation of statement of those allegations. Obviously, my credibility to the Court in that case, and my business relationship with my client has been adversely attacked by Murray. Preliminarily however, it appears that the Murray allegations have been overcome by simple documentation of my professional education and experience as contrasted to his, but we will not know if there is real damage to my

professional reputation until final settlement or trial of that Federal case.

Meanwhile, here is a list of my clients for that case in which the mentioned resume was submitted:

Attorney, Mark Smedal
Law Offices, Smith & Helman
600 West Main Street, Suite 100
Louisville, Kentucky 40202
Tel# 502 540-5700

CEO, Leon Shaw
Kentuckiana Yacht Sales, Inc.
600 East Market Street, P.O. Box 1585
Jeffersonville, Indiana 47130
Tel# 812 282-7579

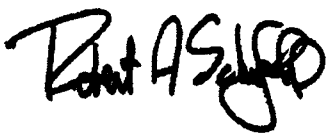
Vice President, David K. Shaw
Jefferson Yachts, Inc.
600 East Market Street, P.O. Box 790
Jeffersonville, Indiana 47130
Tel# 812 282-8111

Obviously, my registration as a European Engineer and British Chartered Engineer must be represented by my stamps, correspondence, proposals, etc. for work in those nations, and obviously also, my particular specialty is naval structural engineering, particularly for composite structures, and that fact will be outlined in my proposals to clients everywhere outside of Florida. It may initially appear difficult for me to specify that specialty without using the term "structural engineer" to clients in the state of Florida, but my reputation was already established years ago with the industry and particularly with the larger boat manufacturers here in this state. I only have to specify "naval architect" on my resume to them, and list my designs. No loss of business is anticipated, and I can live within the guidelines that the FBPE have established for handling the "naval architect" situation. Until we obtain the legislative relief, I have to be careful with the specific verbiage handed to each Florida client.

I hope that this responds sufficiently to resolve the complaint case that you have to handle. I believe that we can continue to work to a satisfactory solution for the 370+ unregistered practicing yacht designers, naval architects and naval engineers here in the state of Florida. A very large percentage of us, including myself, moved our business here under the previous administration of the Florida Department of Licensing & Regulation, who confirmed to us that registration was not required for our specialty of engineering. The recent legislative move to govern engineering practice by the FBPE caught us in a bit of a quandary – particularly those of us 35 years out of the university who would be faced with the EIT exam. The new NCEES Naval Architecture PE exam frightens few of us, since we do that type of work everyday.

Please call me if you need any further information, and please also confirm resolution in this case.

Regards,
Robert A. Schofield



Jack Beamish

From: Jack Beamish
Sent: Monday, February 04, 2008 5:35 PM
To: John J. Rimes III
Subject: FW: Robert Schofield Complaint

John-

FYI

Please advise.

Jack

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Jack Beamish
Sent: Monday, February 04, 2008 5:34 PM
To: 'Hains, Drew'
Subject: RE: Robert Schofield Complaint

Mr. Hains:

Thank you for your thoughtful letter. I have forwarded it to John Rimes for review.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Hains, Drew [mailto:dhains@murrayna.com]
Sent: Monday, February 04, 2008 5:28 PM
To: Jack Beamish
Cc: Murray, William; Kelly, Don
Subject: RE: Robert Schofield Complaint

Jack:

Thanks for your time today. As per our phone conversation today, it appears the only issued covered in the order is the protected title of "marine structural engineer."

While this is a start, I would like to kindly point out, the following:

FLORIDA BOARD OF PROFESSIONAL ENGINEERS

February 4, 2008

Drew B. Hains, PE
Murray and Associates, LLC
4101 Ravenswood Rd., #210
Fort Lauderdale, FL 33312

VIA Email: dhains@murrayna.com

Re: Complaint against Robert A. Schofield

Case No. 2008002965

Dear Mr. Hains:

As we discussed earlier today on the telephone, please be advised that on January 25, 2008 we sent via certified mail to Robert A. Schofield a Notice to Cease & Desist from identifying himself as a "marine structural engineer." We have not yet received the certified mail return receipt and the case remains open.

I understand that you will be sending me additional information in which the Florida Board of Professional Engineers previously issued a Notice to Cease & Desist to another engineer who was performing a scope of work similar to the work you allege is being performed by Mr. Schofield. We appreciate it that you are sending the documents so that our prosecutors can review them. After the prosecutors review this information, we will contact you and inform you of any changes in the status of the case.

Thank you for bringing this matter to our attention.

Sincerely,

Jack Beamish
Investigator
Florida Board of Professional Engineers

cc: John Rimes

Jack Beamish

From: Jack Beamish
Sent: Monday, February 04, 2008 4:08 PM
To: 'dhains@murrayna.com'
Subject: Robert Schofield Complaint
Attachments: Complainant-Hains-Schofield- C&D issued.docx

Mr. Hains:

Please see attached letter.

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

1. Paul Martin, the former Executive Director, stated the following in an email to Mr. Eric Sponberg regarding the activities of Naval Architecture and Marine Engineering:

"The Board determined at its meeting in December, 2004 in Tallahassee that the activities encompassed in marine engineering/naval architecture are engineering as defined in state statutes and subject to licensure requirements. "

I have attached this email which was copied to me at the time (10/12/05). At the time, both myself and Mr. Murray had spoken at length with Mr. Martin regarding the issue, and I personally spoke to Bob Matthews as well. I understood the issue was clear, that Naval Architecture and Marine Engineering are Engineering under the definition under 471. Please advise if the board has changed it position in this regard.

2. The board issued an order to Barbeito and Associates regarding the unlicensed practice (attached). The services provided by Barbeito are identical in nature to the services provided by Schofield. Specifically providing an stability test or incline test on a vessel. Thus I believe the precedence is clear.

I understand that this case was handled by Mr. Rimes and the Barbeito complaint was handled by Patrick Creehan. In addition to the Barbeito complaint, I understand you are aware of the order against Mr. Sponberg. Additionally board records should include information on a similar matter against a Mr. Charles A. Rahn.

Based on the above two points, I would request that board/ Prosecuting Attorney review again my complaint and advise accordingly with respect to nature of the cease and desist order, as I believe the order should include not only the protected title issue, but also unlicensed activity or services.

Further, I wish to point out that as we discussed that both "structural engineer" and "marine engineer" are covered in FS 471.031 (1) (b).

Additionally, your letter does not cover my allegation that Schofield reports are violative of 471.033 (g). It is my review that the board should make some determination with respect to this issue.

Please kindly advise.

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
954-527-5505 EXT 42
954-527-5504 FAX

954-632 4810

-----Original Message-----
From: Jack Beamish [mailto:jbeamish@FBPE.org]
Sent: Monday, February 04, 2008 4:08 PM
To: dhains@murrayna.com
Subject: Robert Schofield Complaint

Mr. Hains:

Please see attached letter.

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

Jack Beamish

From: Jack Beamish
Sent: Tuesday, February 05, 2008 2:58 PM
To: Carrie Flynn
Cc: John J. Rimes III
Subject: FW: Robert Schofield Complaint

Importance: High

Carrie-

FYI. Patrick said to forward this on to you. John is aware of it also. Mr. Hains did not contact John Rimes as John suggested, but instead sent emails out stating that we are not enforcing the practice act.

Jack

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Tuesday, February 05, 2008 2:11 PM
To: Jack Beamish
Cc: jburke@hazenandsawyer.com; dcharland@trcww.com; Patrick Creehan; Hains, Drew
Subject: FW: Robert Schofield Complaint
Importance: High

Mr. Jack Beamish,

So I would like to get a clear answer. My company no longer needs to be Licensed if I work on boats/ships and do structural calculations and drawings, electrical calculations and drawings, mechanical calculations and drawings engineering ? Can I now get rid of my certificate of authorization? Since the Board forced me to become legal and made me incur additional salary, training etc. you can understand how upset I am! What happens when their is a loss of life in Florida by an unlicensed consultant (and there are many!)????

This week we took over a project being completed by a person who is not licensed in FL but Licensed in LA (his degree is not ABET). He is operating out of Fort Lauderdale and his drawing were structurally deficient. The welders brought the deficiency to the owners attention and when we looked at the work we told the owner to start over, the drawings had no value. Many firms have spent the time and money to become legal and now you are going to toss all the hard work out the window. Why do you offer the exam??????

Regards,

William Murray

William Murray
Murray & Associates, L.L.C.
4101 Ravenswood Road
Suite 210

Fort Lauderdale, FL 33312
(954) 527 5505 ext. 20
(954) 791 6923 fax
(954) 673 0366 mobile

-----Original Message-----
From: Hains, Drew
Sent: Tuesday, February 05, 2008 11:24 AM
To: Murray, William
Cc: dchapman@UDel.edu; pkimball@sname.org; MacleanWalter@aol.com; Bill@atlashovercraft.com
Subject: FW: Robert Schofield Complaint

Apparently the FL is not going to inforce the practice statute.....

Drew

-----Original Message-----
From: Jack Beamish [mailto:jbeamish@FBPE.org]
Sent: Tuesday, February 05, 2008 10:58 AM
To: dhains@murrayna.com
Cc: John J. Rimes III
Subject: FW: Robert Schofield Complaint

Mr. Hains:

I could not reach you be telephone this morning. Prosecutor John Rimes has reviewed the information you provided. He stated that he is placing the issue on the Agenda for the April Board Meeting in Orlando for discussion. Apparently, there was further discussion by the Board since Mr. Martin's 10/12/05 email. Mr. Rimes said that you are welcome to participate in this discussion at the Board Meeting. However, as it currently stands, the Notice to Cease & Desist issued to Mr. Schofield as to use of title will stand, rather than scope of work. John Rimes stated that you can discuss this issue with him if you want to call him. His phone number is 850-521-0500.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Jack Beamish
Sent: Monday, February 04, 2008 5:34 PM
To: 'Hains, Drew'
Subject: RE: Robert Schofield Complaint

Mr. Hains:

Thank you for your thoughtful letter. I have forwarded it to John Rimes for review.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Hains, Drew [mailto:dhains@murrayna.com]
Sent: Monday, February 04, 2008 5:28 PM
To: Jack Beamish
Cc: Murray, William; Kelly, Don
Subject: RE: Robert Schofield Complaint

Jack:

Thanks for your time today. As per our phone conversation today, it appears the only issued covered in the order is the protected title of "marine structural engineer."

While this is a start, I would like to kindly point out, the following:

1. Paul Martin, the former Executive Director, stated the following in an email to Mr. Eric Sponberg regarding the activities of Naval Architecture and Marine Engineering:

"The Board determined at its meeting in December, 2004 in Tallahassee that the activities encompassed in marine engineering/naval architecture are engineering as defined in state statutes and subject to licensure requirements. "

I have attached this email which was copied to me at the time (10/12/05). At the time, both myself and Mr. Murray had spoken at length with Mr. Martin regarding the issue, and I personally spoke to Bob Matthews as well. I understood the issue was clear, that Naval Architecture and Marine Engineering are Engineering under the definition under 471. Please advise if the board has changed it position in this regard.

2. The board issued an order to Barbeito and Associates regarding the unlicensed practice (attached). The services provided by Barbeito are identical in nature to the services provided by Schofield. Specifically providing an stability test or incline test on a vessel. Thus I believe the precedence is clear.

I understand that this case was handled by Mr. Rimes and the Barbeito complaint was handled by Patrick Creehan. In addition to the Barbeito complaint, I understand you are aware of the order against Mr. Sponberg. Additionally board records should include information on a similar matter against a Mr. Charles A. Rahn.

Based on the above two points, I would request that board/ Prosecuting Attorney review again my complaint and advise accordingly with respect to nature of the cease and desist order, as I believe the order should include not only the protected title issue, but also unlicensed activity or services.

Further, I wish to point out that as we discussed that both "structural engineer" and "marine engineer" are covered in FS 471.031 (1) (b).

Additionally, your letter does not cover my allegation that Schofield reports are violative of 471.033 (g). It is my review that the board should make some determination with respect to this issue.

Please kindly advise.

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
954-527-5505 EXT 42
954-527-5504 FAX

-----Original Message-----
From: Jack Beamish [mailto:jbeamish@FBPE.org]
Sent: Monday, February 04, 2008 4:08 PM
To: dhains@murrayna.com
Subject: Robert Schofield Complaint

Mr. Hains:

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Jack Beamish

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Naval Architect/Marine Engineer
Murray and Associates, LLC.
4101 Ravenswood Road Suite 210
Fort Lauderdale, FL 33312
954-527-5505 EXT 42
954-527-5504 FAX

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Sent: Monday, February 04, 2008 4:08 PM

To: dhains@murrayna.com
Subject: Robert Schofield Complaint

Mr. Hains:

Please see attached letter.

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

FOR REVIEW

Return to: Jack, ~~[redacted]~~, Jerry

Date sent to Atty:

RE: Name Monhglan
Case # 2008-01533

Reviewed/Signed Off By: **Date**

Corrections/Changes:

John - C+D? Anything else? I am returning to Dept. of Insurance Board. JS

Schofield Case Notes

From: Rob Schofield [mailto:rasna@attglobal.net]
Sent: Tuesday, March 18, 2008 12:48 PM
To: Jack Beamish
Subject: Re: FW: Communications

Hi Jack:
There are some rather serious defamations against my character in Murray's correspondence to you. I should probably address those in litiguous fashion, and when you hear all the facts you will be surprised that Murray brings them up at all. There are a lot of embarrassing facts for his design firm buried in the allegations that he made against me. Many of us in the marine design business are getting tired of his antagonism, and feel that a complaint for professional harrassment should be lodged against Murray & Associates. Since Drew Hains is the sole PE in that office, I suppose that that complaint should be lodged against Hains. The real problem is Murray - not Hains, however. Hains seems to be a decent sort of fellow - on his own.

I will probably let Murray's two wronged clients, whose Florida agents work with me weekly, do the complaining. Up until now, they were not aware of a venue for such complaints, except through the usual tort system.
I will refer their complaints to you. Let me emphasize that I did not solicit their complaints, but casually mentioned Murray's complaint against me to the FBPE. Boy, did that elicit a response from them!!

These constant harrassments by Murray against his perceived competitors has got to stop, and I'm sure that your office would appreciate the reduction in workload. Bill Murray has been a constant thorn in the side for many of our colleagues in the naval architecture business: Andy Lebet, Paul Leske, Peter Gimpel, Michael Peters, Kevin Kerwin, and Eric Sponberg, to name a few who have been harrassed by Bill Murray through complaints to your office. All these gentlemen are competitors, but we are good friends, all of us. I cannot say the same for Bill Murray. None of us will refer any business to him, nor will work with him any more on our projects, because of the constant harrassment and interference and unprofessional allegations he makes to our existing and potential clients. This has to stop. He is not a member of our societies, such as the Society of Naval Architect & Marine Engineers, ASNE or RINA, and we therefore aren't able to impose peer restraint on his behavior.

Two years ago, in response to the FBPE recommendations that we seek legislative relief for settling the Naval Architect-PE matter, we proposed and drafted legislation through four FL house members and two senators. Somehow, Murray got wind of this and deluged those FL legislative members with letters which essentially arrested our legislative effort at that time. The opposition letters were essentially identical, were full of inaccurate and alarmistic innuendo, and were signed by Murray's mostly civil engineer friends (a couple of marine types, registered PE's, also wrote). Our local senator told me that the proposed legislation was previously a "shoo-in", but suddenly the atmosphere changed because of Murray's getting a crowd riled up in opposition. we expected no opposition, as in the case of Rep. Bob Allen's exemption for aerospace engineers, his Cape Canaveral constituents.

Please call me back on this, as I need to work out with you the specific requirements for laying out each of these cases. I'm going to be out of the office, tomorrow through Monday, and today would be the best time to discuss this matter.
Further, lawyers for my client in Indiana on the federal case have requested that they be provided with a

copy of your letter rescinding the "cease & desist" order to me. Murray is trying to use that order against me to impeach my testimony. This is quite unfair on his part, since a simple comparison of our respective resumes will show large differences between us, in experience and education. Preliminarily, I think that the Federal Court will sort this out without problem, but if I'm wrong in my assessment, it will cost my client several million dollars in that case.

Best regards,
Rob Schofield
tel# 321 255-8331

From: Jack Beamish
Sent: Tuesday, March 18, 2008 10:41 AM
To: Rob Schofield
Subject: FW: Communications

Mr. Schofield:

I received your voice message this morning. Are you saying that you will be filing a complaint against Mr. Murray and Mr. Hains?

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Jack Beamish
Sent: Friday, March 14, 2008 12:10 PM
To: Rob Schofield
Subject: Communications

Mr. Schofield:

If you have information that you feel will better inform us of your position, please send it in writing to my attention. I have asked Mr. Hains to do the same and have yet to hear from him. I am out of town and will be back Monday.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

From: Jack Beamish
Sent: Monday, March 03, 2008 10:45 AM
To: John J. Rimes III
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

John-

FYI

Jack

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

-----Original Message-----
From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Monday, March 03, 2008 8:34 AM
To: Jack Beamish
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

Thank you, we will forward additional information.

-----Original Message-----
From: Jack Beamish
Sent: Friday, February 29, 2008 2:34 PM
To: 'wmurray@murrayna.com'
Cc: John J. Rimes III; Patrick Creehan
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

Mr. Murray:

As you and Mr. Hains are filing this complaint, we look to you to provide evidence that support your allegations that Mr. Schofield is practicing engineering or offering engineering services in the State of Florida. Please see Mr. Rimes' earlier response to you on February 28, 2008 if you need further guidance.

As we cannot leave this matter open indefinitely, please provide all documentation that you want us to consider by March 15, 2008.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers

2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

-----Original Message-----
From: Jack Beamish
Sent: Friday, February 29, 2008 4:53 PM
To: Rob Schofield
Cc: John J. Rimes III
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

Mr. Schofield:

Per Chapter 455.225(10), complaints in which unlicensed activity is alleged are public information. Therefore, per your request, we are providing you with the additional information and allegations we recently received regarding the complaint filed against you. As I explained to you earlier today on the telephone, the Notice to Cease & Desist that you received on February 27, 2008 is still in effect. After receipt of additional information from the complainants, we will review that information and notify you if the Notice stands or may be rescinded.

Sincerely,

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

-----Original Message-----
From: John J. Rimes III
Sent: Friday, February 29, 2008 9:26 AM
To: Jack Beamish
Subject: FW: Robert Schofield Complaint (Johnston/KYS)

-----Original Message-----
From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Thursday, February 28, 2008 5:12 PM
To: John J. Rimes III
Cc: Hains, Drew
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

Mr. Rimes,

I do have loads of other documents and drawings but I am unclear of what exactly you are looking for. I am assuming that you are going to look the other way for now on the performing engineering without a license issue for now and you want to only enforce the "structural engineer" title to the Public. If this is true I can give you a client that hired him to perform Structural engineering services in a different matter and he had to fire him for deficient drawings and not disclosing a relationship with a subcontractor performing the construction. I do not know if you realized that in the case Mr. Hains filed all the work was performed in Florida either at his office or at the vessels dock in the Keys. In addition, in this particular case we have never seen such gross negligence. This is not just this vessel but we have seen it on a Ford Family vessel that he gave an opinion with out doing calculations and he was wrong and we had to deal with structural design that he completed for Broward Marine M/Y Coco Bean that was so deficient that the American Bureau of Shipping (ABS) did not allow a certificate to be issued due to the structural issues. I believe I can give you what you are looking for if you give me some guidance.

Regards,

William Murray

-----Original Message-----
From: John J. Rimes III [mailto:jrimes@FBPE.org]
Sent: Thursday, February 28, 2008 4:20 PM
To: Murray, William
Cc: Jack Beamish
Subject: RE: Robert Schofield Complaint (Johnston/KYS)

Initially, I want you to know that nothing has been done at this time. Secondly, since this issue relates to the question of unlicensed practice the decision is not a Board decision but rather has been delegated to FEMC to decide whether to enter cease and desist orders. Of course, FEMC does adhere to Board pronouncements and rulings in taking action and will continue to do so here. Finally, my concern with this issue in this case is whether there actually is evidence that the subject utilized the term "structural engineer" in any manner that involves "holding out" that the subject is a "structural engineer" in communications to the public in any manner that could lead someone in Florida to believe that the subject is using the title while offering or performing services. If you have any evidence that the subject is doing so then please get it to Mr. Beamish. Otherwise, I am left with a vita attached to a deposition in a case in federal court in another state involving no apparent activity by the subject in Florida at all.

-----Original Message-----
From: Murray, William [mailto:wmurray@murrayna.com]
Sent: Thursday, February 28, 2008 3:03 PM
To: John J. Rimes III; Patrick Creehan; Jack Beamish
Cc: jburke@hazenandsawyer.com; henn@rebane.com; Hains, Drew; ejp@trippscott.com

Subject: FW: Robert Schofield Complaint (Johnston/KYS)
Importance: High

Mr. Rimes,

It is my understanding that you are rescinding a letter sent out to Mr. Schofield. Can use please explain how and why you are doing this with out having the Board meeting in April as discussed. I would like to remind you that the Board served my Company (or employee's) 4 times and forced the issue on us. I would say at the least you owe us is a meeting with the Board to discuss the matter before you start making a flip flop on the enforcement of Engineering. I hope you realize how big of an issue you are opening up! I look forward to you explanation.

Regards,

William Murray

William Murray
Murray & Associates, L.L.C.
4101 Ravenswood Road
Suite 210
Fort Lauderdale, FL 33312
(954) 527 5505 ext. 20
(954) 791 6923 fax
(954) 673 0366 mobile

From: Rob Schofield [mailto:rasna@attglobal.net]
Sent: Thursday, February 28, 2008 10:53 AM
To: Jack Beamish
Subject: FBPE Case No. 2008002965

to: Jack Beamish, Investigator

Hi Jack:
Thanks for taking the time to answer my telephone call of yesterday.
I am attaching a formal response to your inquiry, and I hope that this clears up the matter.

I would also like to emphasize that I am aware of what specific engineering titles to avoid with Florida clients, until such time as when we are able to obtain a legislative resolution of the "Naval Architect/Naval Engineer" matter.
You will also note that my e-mail and answering message reads, "Naval Architect & Aero Engineer". For work under the latter title, I have just enough composites structures design experience for Enstrom Helicopters, Maverick Jets, Hercules Aerospace, and current kitplane companies to qualify under that exempted engineeering specialty.

Best regards,
Rob Schofield

FLORIDA BOARD OF PROFESSIONAL ENGINEERS

CHARLIE CRIST, GOVERNOR

CHUCK DRAGO, INTERIM SECRETARY
DEPARTMENT OF BUSINESS
AND PROFESSIONAL REGULATION

March 14, 2008

Beth Friedman, Paralegal
Wyatt, Tarrant & Combs, LLP
500 West Jefferson Street, Suite 2800
Louisville, Kentucky 40202-2898

RE: FEMC v. Schofield; Case #2008002965

Dear Ms. Friedman:

Pursuant to your public records request of March 5, 2008, enclosed is a copy of the investigative file for Mr. Schofield.

Should you have any questions or need anything further, please call me.

Sincerely,

Wendy Gregory
FEMC Public Records Clerk
Legal Assistant to
Patrick Creehan & John J. Rimes, III

/wsg
Enclosures

WYATT
WYATT, TARRANT & COMBS, LLP

500 West Jefferson Street, Suite 2800
Louisville, Kentucky 40202-2898
502.589.5235
Fax: 502.589.0309

Beth Friedman
502.562.7280
bfriedman@wyattfirm.com

March 5, 2008

VIA FACSIMILE AND FIRST CLASS MAIL

Wendy Gregory
Legal Department
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303-5268

RE: Robert Schofield, Case File #2008-002965

Dear Ms. Gregory:

In a phone conversation I had last week with Jack Beamish, he told me that I should contact you to get a copy of the above-referenced case file on Robert Schofield.

Please send to my attention a copy of the entire case file at your earliest convenience. If you should require payment of copying charges before sending it, please let me know and I will forward a check to you immediately.

Thank you.

Very truly yours,

WYATT, TARRANT & COMBS, LLP

Beth Friedman
Paralegal

cc: Donald J. Kelly, Esq.

RECEIVED

20296127.1

1

FLORIDA BOARD OF
PROFESSIONAL ENGINEERS

WYATT

WYATT, TARRANT & COMBS, LLP

500 WEST JEFFERSON STREET, SUITE 2800
LOUISVILLE, KENTUCKY 40202-2898
PHONE: 502.589.5235
FAX: 502.589.0309

FAX TRANSMITTAL SHEET

DATE: MARCH 5, 2008

DELIVER TO: WENDY GREGORY
FLORIDA BD. OF PROFESSIONAL ENGINEERS
(850) 521-0521

FROM: BETH FRIEDMAN
PARALEGAL
DIRECT DIAL: 502.562.7280
BFRIEDMAN@WYATTFIRM.COM

MESSAGE: **PLEASE CALL ME WITH ANY QUESTIONS OR COMMENTS YOU MAY HAVE.**

CLIENT NAME:
MATTER NAME:
CLIENT.MATTER NO.: **17022-1**

TOTAL NO. OF PAGES INCLUDING COVER SHEET: 2

The original of this document will be sent by:

- ☒ Ordinary Mail
- ☐ Messenger
- ☐ Certified Mail
- ☐ Overnight Courier
- ■ This will be the only form of delivery
- ☐ InterOffice Mail

TIME SENT: _____ A.M./P.M. BY: _____

WYATT, TARRANT & COMBS, LLP

500 West Jefferson Street, Suite 2800
Louisville, Kentucky 40202-2898
502.589.5235
Fax: 502.589.0309

Beth Friedman
502.562.7280
bfriedman@wyattfirm.com

March 5, 2008

VIA FACSIMILE AND FIRST CLASS MAIL

Wendy Gregory
Legal Department
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303-5268

RE: Robert Schofield, Case File #2008-002965

Dear Ms. Gregory:

In a phone conversation I had last week with Jack Bea ıish, he told me that I should contact you to get a copy of the above-referencec case file on Robert Schofield.

Please send to my attention a copy of the entire case file at your earliest convenience. If you should require payment of copying ch ırges before sending it, please let me know and I will forward a check to you imme liately.

Thank you.

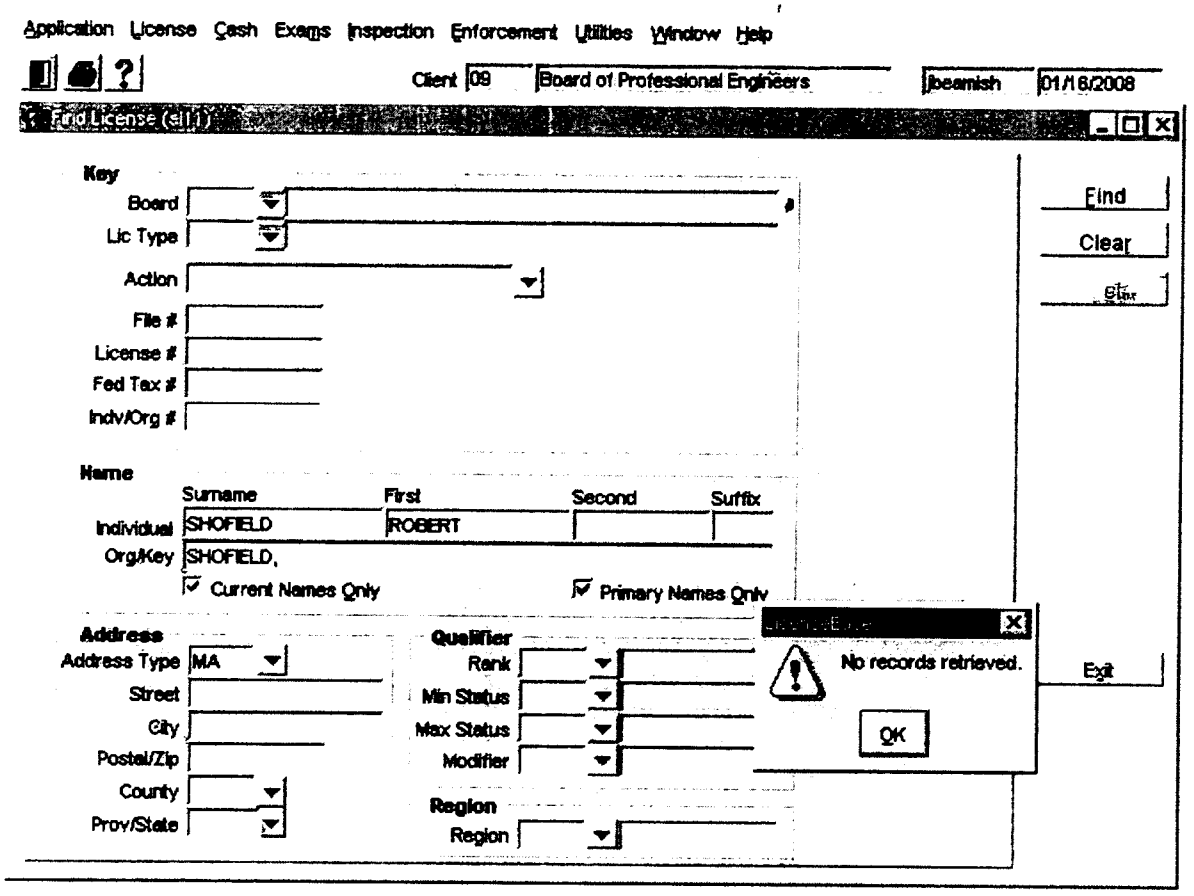
Very truly yours,

WYATT, TARRANT & COMBS, LLP

Beth Friedman
Paralegal

cc: Donald J. Kelly, Esq.

29296127.1



Address Type

Record: 1/1 ... <OSC>

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

November 5, 2014

Robert A. Schofield
4105 Lake Washington Road
Melbourne, Florida 32934

Re: Case #2014031544

Dear Mr. Schofield:

In regard to the complaint filed with the Florida Board of Professional Engineers (Board) you, please be advised that the case listed above has been closed by the issuance of the Cease & Desist and receipt of the Affidavit from you agreeing to refrain from unlicensed activity.

Failure to refrain from said unlicensed activity until such time that you receive proper licensure, or adherence to the order to Cease and Desist will force the Board to seek the remedies available to it under Section 455.228, Florida Statutes, which may include an administrative penalty not to exceed $5,000 per incident, as well as attorney's fees and court costs.

Thank you very much for your cooperation in this matter.

Sincerely,

Wendy Anderson
Investigator

/wsa

R.A. Schofield, Naval Architect

TEL# 321 255-8331
Mobile# 321 917-5100
E-MAIL: rasna@RASchofield.com

4105 Lake Washington Road
Melbourne, Florida 32934

Florida Board of Professional Engineers
2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303

31 October 2014

Attn: Wendy Anderson, Investigator

Subject: Complaint regarding Use of "Naval Structural Engineer" Title

Dear Wendy:
Attached is the signed original Affidavit that you asked me to execute and return. I promised that I would return this document to you before the end of the month.

I've been travelling a lot, and have had difficulties getting it back to you in a timely manner. Therefore, I'm e-mailing this copy to you today, and am sending the original by surface post this morning.

Please call back if further information is required.

Regards,

Robert A. Schofield

European Engineer, FEANI Registry, No. 8120 GB
Chartered Engineer, United Kingdom, No. 352565
MRINA, BSc.
Society of Naval Architects and Marine Engineers
American Boat & Yacht Council
Royal Institution of Naval Architects (UK), and Member of RINA Small Craft Committee
International Standards Organization Technical Committee 188,
Working group 18 (Marine Craft Structures)
American Bureau of Shipping Small Vessel Committee

Subject: C&D Affidavit.doc
From: Wendy Anderson <WAnderson@fbpe.org>
Date: 9/15/2014 09:55
To: "rasna@attglobal.net" <rasna@attglobal.net>

Mr. Schofield:

As you know, a complaint was filed against you for utilizing the protected title of Structural Engineer. We discussed this complaint in early August 2014. In order to bring closure to this matter, I have attached an Affidavit for your review. If you agree with the contents of the Affidavit, please sign in the presence of a Notary Public and return to me. Upon receipt of the fully executed Affidavit, the complaint will be closed and no further action taken. In the alternative, if you choose not to sign the Affidavit, please let me know so that this complaint can be prepared for presentation to the Board's Probable Cause Panel. Thank you.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

Attachments:

C&D Affidavit.doc	24.0 KB

AFFIDAVIT

STATE OF Florida
COUNTY OF Brevard

BEFORE ME, the undersigned authority, personally appeared Robert Schofield, who, being duly sworn, deposes and says:

1. Affiant acknowledges receipt of the Notice to Cease and Desist from the Board of Professional Engineers, with Case No #2014031544.

2. Affiant agrees to refrain from the specifically described conduct listed in the notice to Cease and Desist.

3. Affiant will not use the protected title of "Structural Engineer" in any form, including Naval Structural Engineer.

by: Robert Schofield

Sworn to and subscribed before me this 30TH day of October, 2014, by Robert Schofield. Affiant is personally known to me or provided _____ as identification.

NOTARY PUBLIC

Print name Beecher Larson

Notary Public State of Florida
Beecher A Larson
My Commission EE121708
Expires 08/15/2015

Wendy Anderson

From: Wendy Anderson
Sent: Monday, September 15, 2014 9:56 AM
To: 'rasna@attglobal.net'
Subject: C&D Affidavit.doc
Attachments: C&D Affidavit.doc

Mr. Schofield:

As you know, a complaint was filed against you for utilizing the protected title of Structural Engineer. We discussed this complaint in early August 2014. In order to bring closure to this matter, I have attached an Affidavit for your review. If you agree with the contents of the Affidavit, please sign in the presence of a Notary Public and return to me. Upon receipt of the fully executed Affidavit, the complaint will be closed and no further action taken. In the alternative, if you choose not to sign the Affidavit, please let me know so that this complaint can be prepared for presentation to the Board's Probable Cause Panel. Thank you.

Wendy Anderson
Investigator &
Public Records Requests

FBPE
FLORIDA BOARD OF

2639 North Monroe Street
Suite B-112
Tallahassee, FL 32303
850-523-1619

AFFIDAVIT

STATE OF _____
COUNTY OF _____

BEFORE ME, the undersigned authority, personally appeared Robert Schofield, who, being duly sworn, deposes and says:

1. Affiant acknowledges receipt of the Notice to Cease and Desist from the Board of Professional Engineers, with Case No #2014031544.

2. Affiant agrees to refrain from the specifically described conduct listed in the notice to Cease and Desist.

3. Affiant will not use the protected title of "Structural Engineer" in any form, including Naval Structural Engineer.

_____
by: Robert Schofield

Sworn to and subscribed before me this _____ day of _____, 20___,

by _____. Affiant is personally known to me or

provided _____ as identification.

_____
NOTARY PUBLIC

Print name _____

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

July 30, 2014

Robert A. Schofield
4105 Lake Washington Road
Melbourne, Florida 32934

Re: Case #2014031544

Dear Mr. Schofield:

Pursuant to Sections 455.225 and 471.038, Florida Statutes, the Board of Professional Engineers is required to investigate legally sufficient complaints that allege violations of the Engineering Practice Act. Section 455.225(1), Florida Statutes, further states that when an investigation is undertaken, the Board shall promptly furnish to the person or his/her attorney a copy of the complaint or document which resulted in the initiation of the investigation.

Attached for your review is a copy of the complaint or document received by the Board. Also attached is a Notice to Cease & Desist. You have the option of submitting a written response to the complaint for consideration by the Board's legal staff and by the Probable Cause Panel for the Board. Please submit this response to the Board office within twenty (20) days. You may also submit a written request for a copy of the Board's investigative file. This file will be provided to you once the investigation is completed.

Thank you for your cooperation in this matter.

Sincerely,

Wendy Anderson
Investigator

/wsa
Enclosure

Florida Board of Professional Engineers
2639 N. Monroe St., Suite B-112
Tallahassee, Florida 32303
850-521-0500 Tel.
850-521-0521 FAX
www.fbpe.org

NOTICE TO CEASE AND DESIST
Section 455.228(1), Florida Statutes

To: Robert A. Schofield
4105 Lake Washington Road
Melbourne, Florida 32934

FEMC Complaint #: 2014031544

The Florida Board of Professional Engineers ("FBPE") notifies you that it has probable cause to believe that you may be utilizing a protected title without the professional license required by Florida law, specifically Chapter 471, Florida Statutes. Probable cause is based on the following facts:

Florida Statute 471.031(1)(b)1. says:

(1) A person may not:
(b)1. Except as provided in subparagraph 2. or subparagraph 3., use the name or title "professional engineer" or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer when the person is not licensed under this chapter, including, but not limited to, the following titles: "agricultural engineer," "air-conditioning engineer," "architectural engineer," "building engineer," "chemical engineer," "civil engineer," "control systems engineer," "electrical engineer," "environmental engineer," "fire protection engineer," "industrial engineer," "manufacturing engineer," "mechanical engineer," "metallurgical engineer," "mining engineer," "minerals engineer," "marine engineer," "nuclear engineer," "petroleum engineer," "plumbing engineer," "structural engineer," "transportation engineer," "software engineer," "computer hardware engineer," or "systems engineer."

In a report for *Kakawi Yachting, Inc. v. Marlow Marine Sales, et al.*, you utilized the title of naval structural engineer. The title "Structural Engineer" is protected pursuant to Florida Statute 471.031(1)(b)1.

Our records show that you do not currently have a license as required by section 471.003, FS. If the above facts are true, they establish probable cause for FBPE to believe you are violating Florida law by utilizing a protected title without the required license.

This Notice to Cease and Desist is not final agency action by the FBPE. If you have any questions, please call the Investigator at the number listed below. For information on the law, go to www.leg.state.fl.us/statutes.

The FBPE is giving you this Notice to Cease offering engineering services without a certification as required by law. However, if the FBPE finds in the future that you have not ceased the above discussed unlicensed activity, the FBPE has the authority to issue a citation against you or bring an administrative action and pursue penalties up to $5,000.00 for each incident of unlicensed activity. Please govern your future behavior accordingly.

ISSUED this 29th day of July, 2014.

By: Zana Raybon, Executive Director

Wendy Anderson
Investigator
850-523-1619
FBPE Form 001
Revised: 12/9/2008

ORIGINAL-Field

COPY-Subject

Wendy Anderson

From: John Rimes
Sent: Monday, July 28, 2014 3:41 PM
To: Wendy Anderson
Subject: FW: Complaint 20080022965 - Robert A. Schofield
Attachments: Robert Schofield Expert Report.pdf; Robert Schofield Complaint

This is the Board's position from the April 2008 Bd Mtg. So if he is using the title "structural engineer' then he has a problem-not with marine engineer or with what he is doing but just the title

Upon a motion by Mr. Rebane, seconded by Dr. Bauer, it was moved uphold the laws and rules dealing with protective titles and to refrain attempting to regulate naval architecture and marine engineering in Florida

---

From: Drew Hains [mailto:dhains@murrayna.com]
Sent: Monday, July 28, 2014 3:20 PM
To: John Rimes
Subject: Complaint 20080022965 - Robert A. Schofield

Mr. Rimes:

I hope this message find you well. I am following up on very old matter where I have recently discovered new information. Specifically, I am in receipt of a letter from Mr. Jack Beamish dated Feb 4, 2008 (see attached email transmitting the subject letter me), whereby I was notified that a Notice to Cease & Desist from identifying himself as "marine structural engineer" was issued to Mr. Robert A. Schofield . Further, I am in receipt of the attached recent report of Mr. Schofield whereby on page 9 he states:

> All of the structure is marine grade and suitable for years of immersion in sea water. This is one of those categories of structural details where using the class rules verbatim without disgression can border on the ludicrous. As a naval structural engineer, I can see that the beam cut thus is just fine structurally, and the cutout is nicely finished. The beam obviously is grossly oversized, and might even be structurally redundant. The deck plating there is heavy thick-cored fiberglass

I note the slight change in the wording from "**marine** structural engineer" to "**naval** structural engineer." I further note the wording of FS 471.031 (1) which states (bold emphasis added):

(1) A person may not:
(a) Practice engineering unless the person is licensed or exempt from licensure under this chapter.
(b)1. Except as provided in subparagraph 2. or subparagraph 3., use the name or title "professional engineer" **or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer when the person is not licensed under this chapter**, including, but not limited to, the following titles: "agricultural engineer," "air-conditioning engineer," "architectural engineer," "building engineer," "chemical engineer," "civil engineer," "control systems engineer," "electrical engineer," "environmental engineer," "fire protection engineer," "industrial engineer," "manufacturing

engineer," "mechanical engineer," "metallurgical engineer," "mining engineer," "minerals engineer," "**marine engineer**," "nuclear engineer," "petroleum engineer," "plumbing engineer," "**structural engineer**," "transportation engineer," "software engineer," "computer hardware engineer," or "systems engineer."

Considering the wording of the above and specifically the language I have placed in bold type, it would appear, at least to me, that Mr. Schofield has not only violated the aforementioned Florida State Statue but also the intent of your organization's January 25, 2008 Notice to Cease and Desist. Therefore, I kindly ask you to review the attached, take appropriate action and advise me of your findings and the outcome accordingly. If Mr. Schofield, sought and received permission to use the term, "**naval** structural engineer," my apologies as I have been unable to obtain an public record of such action.

In the interest of public safety,

Drew B. Hains, PE
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC.
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IN THE CIRCUIT COURT, MIDDLE DISTRICT OF FLORIDA
CASE NO. 8:13-CV-01408

KAKAWI YACHTING, INC, PLAINTIFF
VS.
MARLOW MARINE SALES, INC. ET AL, DEFENDANTS

Rule 26(a)(2)(B) Report of Robert A. Schofield

Name of Expert: Robert A. Schofield

I, Robert A. Schofield, have been retained by Counsel for the Defendant in this case. This is my written report as required by Rule 26(a)(2)(B), FRCP, prepared and signed by me. I am being compensated for my work in this case at my usual billing rate of $180 per hour, and in testimony and preparation for testimony at the rate of $200 per hour.

I have been asked by the Defendant to analyze the technical issues of the subject Case and to render opinions regarding those technical issues.

I. Qualifications:

A. Professional Overview:

I am a practicing naval architect and naval engineer with extensive experience in design, engineering, and operation of pleasure craft, fishing boats, commercial and naval ships of steel, wood, aluminum and composite materials. I offer computer systems and engineering seminars for design of composite marine structures.

I am knowledgeable in boat, yacht, and ship design, construction, operation and performance of marine craft, including yachts.

B. Education & Licensing Background:

I have a Bachelor of Science degree in Naval Architecture and Marine Engineering from the University in Michigan (1976). I am registered as a European Engineer in the European Union (FEANI Registry, #08120GB, held for 23 years) and as a Chartered Engineer in the United Kingdom (MRINA, #352565, held for 27 years). A Chartered Engineer is the highest ranking of the three levels of registered engineer in the U.K.

These registrations entitle the bearer to open an independent engineering office in most member countries of the European Union, without having to apprentice to or partner with another engineering company or senior engineer.

U.S. licenses are generally not required for Naval Architecture and Marine Engineering practice, as the design and construction for safety, stability, and structures of ships and boats is governed under U.S. Federal requirements (46CFR and 33CFR), and these rules are administrated by the U.S. Coast Guard. We do not have a national registration for naval architects and marine engineers.

I have been certified by trial judges as expert in the fields of naval architecture, fiberglass, wood and composite materials construction, seakeeping and stability, marine structural engineering, and accident reconstruction, and have testified at trial 33 times and had my deposition taken 51 times. I am expert in marine craft design, performance and operation in the possible range of sea conditions, shallow and deep water.

Despite the fact that it has never been more than 13.8 percent of my logged hours for any one year, I have worked as an expert on 102 legal cases to-date over a 38 year interval. I have published numerous technical articles and papers in the technical journals and trade publications.

A copy of my **Curriculum Vitae, List of Publications,** and **List of Court Cases** in which I have testified, are attached as **Appendices A, B, and C**, respectively.

II. Information Considered and Relied Upon:

In preparation for my expected testimony, I have read or reviewed the following:

A. Pleadings:

1. Complaint by KAKAWI YACHTING, INC against Marlow Marine Sales, Inc., et al and Bureau Veritas;
2. Answer and Affirmative Defenses by Marlow Marine Sales, Inc., et al;
3. Defendant Marlow Marine Sales, Inc. Third Party Complaint against Bureau Veritas Marine, Inc.;

B. Discovery:

1. Murray & Associates, LLC letter to Colin Adams of Bureau Veritas, dated 24 September 2012, clarifying measurement datum, main deck line assumed versus draft measurements, and free surface of tanks during stability test;
2. Bureau Veritas "EXAMINATION OF INTACT AND DAMAGE STABILITY FILE", dated 11 November 2011

3. Hydrostatics Model Comparison, dated 3 April 2012, by Murray & Associates

C. **Expert Reports:**

1. Murray & Associates, LLC Expert Opinion (Report), dated 14 April 2014;
2. International Yacht Bureau Expert Witness Report, dated 5 May 2014;

D. **Other Items Reviewed:**

1. Bureau Veritas Publication, "VeriSTAR Info Survey Status Report, BV Nr. 17872D" Generated 27 August 2013;

III. **Basis and Reasons for Opinions:**

A. **General Testimony:**

Conditions of Class and facts pertaining to the MY KAKAWI:
The report of the International Yacht Bureau (IYB) surveyor comports with the facts in this Case, except for his opinions beginning Page 15 through 20 regarding the responsibilities of Marlow Yachts. I otherwise agree with his outline on the role and function of a classification society, in this case, Bureau Veritas.

The surveyor faults both the shipyard and BV for a large number of original inclining experiment deficiencies, pages 15 and 16.

The IYB surveyor faults Bureau Veritas for apparently approving an incomplete Stability Booklet, his section 6.2.

The IYB surveyor faults Bureau Veritas for an insufficient number of inspections of vessel under construction at the Builder's yard. He recommends a minimum of 7 inspections, and cites BV inspections on only 3 occasions, one of which was a cursory survey in conjunction with a visit to another vessel being built at the yard, his section 6.3, Page 17.

I noted several discrepancies or faults concerning the stability experiment performed by Murray & Associates on the subject vessel on 23 May 2012. Several of these render as moot the arguments put forth in the Complaint of this case. The Bureau Veritas Ft. Lauderdale office also took issue with some of these discrepancies. Murray & Associates letter of September 24, 2012 (Bates MA000486 – 487) alleges that the fuel and water tanks were "pressed up", that is, completely full of fluid, based on tank gauge readings and "liquid starting to escape the fuel vents" (Bates MA000487). The inclining test report (Bates MA000292) shows no free surface

correction at all.

However, no inspection accesses were opened up nor physical soundings of the respective tanks were made. Tank FOT C particularly has a large transverse surface waterplane, and therefore large free surface magnitude. Fuel will frequently squirt out of tank vents due to waves and splashing in fuel tanks, and electrical gauging is notoriously unreliable, in my experience. This could substantially prejudice the calculation of the vessel's vertical center of gravity by a significant amount, due to the extensive free surface of partially-full tanks.

It is much more likely that the main fuel oil tank, FOT C, was manifesting a full free surface during the flawed stability test conducted by Murray & Associates on 23 May 2012. The effect of this large free surface would prejudice the calculations and "show" a vertical center of gravity of the yacht which numerical value would be much higher than reality. ASTM F1321 requires the opening and/or sounding of all tanks to establish the actual weight of fluid in each tank and the free surface of each tank. This extremely important requirement of ASTM F1321 was not complied with.

The waterline as plotted for displacement calculations showed substantial undulations along the length of the vessel (plot on Bates MA000306). Physically, that is impossible, and it directly evidences the inaccuracy of the Murray & Associates stability test. Plotted drafts will always be a straight line in all vessel stability test reports, with the exception of a very large ship with substantial hog or sag.

For two principal reasons, Murray & Associates did not accurately measure afloat drafts of the vessel for this latest stability test.

(1) Measurement of **freeboards**, rather than in-water immersion or emersion of precise vertical locations along the hull such as chines at transom and stem, is an obvious culprit for imprecise draft measurements. Deck sheathing thickness, undulations in deck to hull joints, and the large vertical distance and inability to keep the tape in vertical orientation contributes to the notorious inaccuracies of trying to spot waterline on hull by the freeboard method. A small boat in the water and measurement alongside of chines or physical permanent draft marks is an essential factor and the only way to accurately measure for this type of experiment. Further, a draft gauge with small orifice is frequently required to dampen out small wave effects affecting draft measurement in most harbors.

(2) Further, the longitudinal point of draft measurement along the vessel's length, as was done for this stability experiment, is obviously very questionable and very imprecise. Measurement of such intermediate-

position drafts, and unthinkingly following the format of the ASTM F1321 for a vessel of the size of the subject yacht, indicates a certain lack of judgment of the person doing the inclining experiment.

ASTM F1321 was written for conduct of stability experiments of full-sized steel ships which usually have significant measureable hog or sag. For the subject yacht, which would have an immeasurable hog or sag in normal afloat condition, the imprecise measurement of midships or other intermediate-position drafts along the length, as opposed to bow draft and transom draft, inaccuracies in displacement calculation will surely result. Those inaccuracies will result from the measurer's inability to accurately measure his fore and aft position along the hull. The plotted drafts shown on Page 21 of the report, deviating from a straight line, clearly show this inaccuracy. Geometrically, the draft plot must **absolutely** be a straight line, and any deviation from such graphically depicts the inaccuracy of the measurements.

Murray & Associates published a report, "Hydrostatics Model Comparison", dated 3 April 2012, (Bates MA 001738-1749), for comparing the yacht's geometry using the results of a laser photogrammetry survey of the drydocked hull, reportedly performed in March 2012, and comparing the geometry results to the original builder's hull lines. Upon review of the results of this comparison, I find that the actual hull does not actually differ substantially from the original builder's hull lines, excepting for the vertical position of the main weather deck in certain locations and the exhaust sponsons and rubbing strakes. If the data is adjusted for the position of the drawing origin, the geometry is quite close and in keeping with the usual liberties of shipyard construction practice.

According to Murray & Associates reply letter to the BV local office, dated September 24, 2012 (Bates MA000486-487), the main deck vertical location of the as-built yacht matched the builder's hull lines for the longitudinal locations X = 16 meters and X = 20 meters (within 2 mm, which is excellent shipyard tolerance for conformance to a lines plan. Other longitudinal locations had deviations from builder's lines plan of 60 to 150 mm (2.4 to 5.9 inches), according to that Murray letter.

The Main Deck has steps up and down along its length which confuse the issue for comparison of geometry for the Murray & Associates analysis.

It is noteworthy that Murray & Associates stability test report calculates the hull stability including the volume of the exhaust sponsons. These are free-flooding volumes when the yacht is not operating. Therefore, Murray's calculation for the derived yacht's center of gravity for the

results of the inclining experiment would be derogatorily prejudiced by the "stabilizing effect" of these apparent volumes. In reality however, these cowl volumes would NOT be contributing buoyant volume enhancing stability during the inclining experiment. The exhaust sponsons could be visualized by the layman as long "pontoons" attached each side of the yacht's hull. The calculated buoyancy and contribution of those "pontoons" should not have been used by Murray in estimating the righting arm of the ship.

That mistake would "show" an erroneous whole-ship center of gravity higher than reality, per the Murray calculations.

The neglected free surface of tanks plus the erroneous inclusion of the exhaust sponsons makes Murray's calculated stability of the yacht worse than actual. In other words, the actual yacht, as built, is more stable than what the Murray report represents. Further, the inaccurate measurement of drafts by the freeboard-measurement technique makes the entire stability experiment results suspect. In my opinion, to obtain the yacht's actual center of gravity and its conformance or otherwise to the BV applicable stability standard, the entire inclining experiment would have to be done over.

I have not seen sufficient evidence that the original builder's inclining experiment was somehow invalid or inaccurate. With the evidence produced so far in this Case, that demonstration has not yet been made. Further, that stability test has been reviewed and approved by several offices, and the yacht has been operating successfully since delivery.

The downflooding points for large heel angles, as pointed out by Murray & Associates re-written Stability Information Booklet page 7 (Bates MA000241) was reported to be the after corners of the engine room ventilation openings on the deckhouse sides. The report states "The angle of downflooding varies from 35.00 when the vessel is fully loaded and 45.54 degrees in the lightship condition." These assumptions are incorrect.

The Expert Opinion of Murray & Associates, LLC's Drew B. Haines PE #58631, page 2, states that the measured height of the ventilation sill above the main deck is approximately 250 mm. Mr. Haines reportedly advised the attending BV surveyor that the BV rule required 760 mm sill height. Mr. Haines was correct regarding the BV rule, but he did not account for the watertight ventilator plenum which does in fact comply with the BV rule requirement for 760 mm (see below). That watertight plenum is hidden from view by the grille covering the ventilator opening in the deckhouse side. Mr. Haines supposedly used the incorrect height as the "downflooding point" at large angle of heel in his calculations of

stability requirements for the subject yacht.

These assumed downflooding angles by Murray are incorrect, and the assumption grossly penalizes the ability of the vessel to demonstrate sufficient righting energy to satisfy the BV rules for intact stability.

The approved drawing by BV (Bates BV00002) discussed in the Haines report was not proposed as a "fix" by the builder, but is the standard water-excluding plenum customarily fitted to all the larger Marlow yachts for their engine room ventilation systems. It is in fact structural and watertight, and was designed to provide the required 760 mm sill height for water exclusion. Further, the subject yacht is actually built this way. Haines comments about impacting window locations, cabinetry or interior noise are consequently moot. Reviewing the record of correspondence exchanged on this item, there obviously had been some lack of communication between BV and the yacht's builder.

Section 2.7 of the Murray & Associates Stability Information Booklet page 9 (Bates MA000243) alleges that the yacht as built does not comply with the BV rules for intact stability. Of course, the calculations in the Murray report are based on the questionable stability test report mentioned earlier, and the too-shallow angles of inclination to an incorrect downflooding point. The original builder's intact stability report showed compliance with BV intact stability rules, and it was approved by Bureau Veritas staff.

Murray & Associates ignores the vertical distance provided by the watertight engine air intake plenum, but simply uses the distance of the air intake grille opening above the main deck. BV approved Drawing "Engine Room Ventilator 97.02, dated 2012-10-23, with BV Dubai approval stamp 17472D dated 24 October 2012 (Bates00002) shows the downflooding height as 760 mm above the main deck. Murray distance is recorded as 250 mm, as mentioned above.

Murray & Associates included a Damage Stability calculation and section in the Stability Information Booklet re-written and re-published by them (BatesMA000243). It is noteworthy that there is no Bureau Veritas requirement for damage stability for private yachts under the 300 UMS BV specified size. The subject yacht is measured at 112 Gross Registered Tonnage. The fact that the yacht still meets all requirements for damage stability under all loading conditions is also noteworthy, as this indicates a safe and seaworthy yacht in excess of any such standards regardless of the codified requirements for private yachts of this size. That "compliance" with damage stability standards meant for larger ships was obtained even against the errors in calculated vessel's center of gravity and the other

errors of the Murray report.

Submittal, review and approval by Bureau Veritas of an earlier damage stability calculation during construction of the yacht is moot. It is certainly acceptable to most classification societies that demonstration by the builder demonstrates compliance of a vessel in excess of requirements.

Murray & Associates faults the yacht's builder for not incorporating the Bureau Veritas required opening area of freeing ports on the yacht's main deck. Freeing port requirements are calculated in Article 5, Section 5.1.2 of the Bureau Veritas Yacht Rules. Cutting such freeing ports into the existing bulwarks, and installing them with proper dimensions is not that expensive a proposition at this late stage in the litigation. Those freeing ports are intended to shed water in a timely fashion when green seas are shipped onto the main deck areas, and they are a stability safety consideration. The builder offered to provide open latticework stainless steel tubing boarding gates in lieu of the solid fiberglass doors originally supplied with the yacht. The open type would provide the necessary open area required by the BV rules. Those latticework gates were shipped to Marlow's Florida facility. However, the yacht's owner refused to permit their installation.

The BV surveyor in the builder's shipyard would ordinarily be expected to discover that discrepancy (insufficient area of freeing ports) between structural drawings and "as-built" configuration. The BV surveyor would customarily write an exception report to the builder, and would withhold issuance of the Class certificate pending correction of that discrepancy.

I consider the lack of such a discrepancy report to be negligence by the attending BV surveyor during construction of the yacht. It may also be that the plan approval authority of BV is at fault for missing this item.

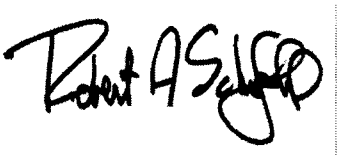
I disagree with the Haines/Murray expert report statement on Page 24 that a portable pilothouse door sill cannot be fitted to the pilothouse sides in that location. This is not the "foredeck area". That area by common industry nomenclature would be the deck area before the Portuguese bridge. Therefore, a portable door sill can be fabricated, stowed in an appropriate bracket near the doors, and used at sea in heavy weather.

I also disagree with the Haines/Murray expert report statement on Page 27 regarding the holes cut in deck beams. First of all, there is nothing,

especially the polyurethane foam former inside the beam – a non-structural element – that would be damaged by any moisture ingress. All of the structure is marine grade and suitable for years of immersion in sea water. This is one of those categories of structural details where using the class rules verbatim without disgression can border on the ludicrous. As a naval structural engineer, I can see that the beam cut thus is just fine structurally, and the cutout is nicely finished. The beam obviously is grossly oversized, and might even be structurally redundant. The deck plating there is heavy thick-cored fiberglass laminate which is quite likely to be close to the overall panel structural requirements without framing at all. Haines quotes part of the BV structural rules where it says that you can't cut out more than half the depth of any beam. For ABS (and other class societies) we cut away more than half of frames quite frequently, and such designs get approved and function well for decades afterward in sea service. Just because the rulebook says you can't do it, doesn't mean that everybody – surveyor, plan approval office, and owner's rep can't all agree that cutting that much out of a lightly-stressed beam is just fine.

IV. **Statement of Other Opinions to be Expressed:**

If called to testify during the trial of this case, I would expect to testify based on my education, training, background and experience that the yacht as built conforms with the industry standard for non-classed pleasure yachts of comparable size and type, and that it is substantially fit for the intended purpose and safe for use at sea.



Signed: Robert A. Schofield

Dated: 14 July 2014

Appendix A
Curriculum Vitae of Robert A. Schofield, Naval Architect & Naval Engineer

V. **Qualifications:**

A. **Professional Overview:**

Robert A. Schofield is a practicing naval architect and naval engineer with extensive experience in design of pleasure craft, fishing boats, commercial, naval and military ships and in composite materials, as well as conventional design in steel, wood, and aluminum. He offers computer systems and engineering seminars for design of composite marine structures.

He has been certified at trial as expert for 33 legal cases to-date over a 38 year interval, in the fields of naval architecture, fiberglass, wood and composite materials construction, seakeeping and stability, marine structural engineering, and accident reconstruction. He has testified at trial 33 times and had his deposition taken 51 times.

He has been employed as a naval architect, structural engineer, drydocking and stability expert for two shipyards, Bethlehem Steel Corporation and Marinette Marine shipyards, managed a structural, stability, and construction drawing department and had overall engineering responsibility for several shipbuilding projects at those shipyards, he managed the Naval Architecture and Structural Engineering Departments (2 hats) for Gibbs & Cox, Inc. Washington Office, supporting the U.S. Navy for overall engineering of the DDG-51 Class destroyer design and ongoing class development for the CG-47 Class cruisers. In addition, he personally developed the structures development for the MSH Class Fiberglass Minehunter Program (MSH). He worked for Hercules Corporation, acquiring and setting up the shipyard and interfacing with the US Navy for the MHC Class fiberglass minehunters, and for the U.S. Navy and the U.S. Coast Guard in teaching 40 hour lectures in composite structural engineering for the government's naval engineers for the minesweeper and minehunter shipbuilding class ships.

Schofield has designed a number of popular smaller pleasure boats and several successful large yachts and commercial passenger vessels, and has performed structural engineering and stability analysis as an engineering consultant for over 60 boat manufacturing clients, worldwide.

Schofield has published numerous technical articles and papers in technical journals and trade publications.

B. **Education & Engineer's Registration Background:**

Robert A. Schofield has a 5-year Bachelor of Science in Engineering degree, majoring in Naval Architecture and Marine Engineering (both options) from the University of Michigan. Economic necessity required his studying during 3 intervals, September 1966 through May 1976.

Schofield is registered as a European Engineer in the European Union (FEANI Registry, #08120GB, held for 23 years) and as a Chartered Engineer in the United Kingdom (MRINA, #352565, held for 27 years). A Chartered Engineer is the highest ranking of the three levels of registered engineer in the U.K.

These registrations entitle the bearer to open an independent engineering office in most member countries of the European Union, without having to apprentice to or partner with another engineering company or senior engineer.

U.S. licenses are generally not required for Naval Architecture and Marine Engineering practice, as the design and construction for safety, stability, and structures of ships and boats is governed under U.S. Federal requirements (46CFR and 33CFR), and these rules are administrated by the U.S. Coast Guard. Individual states do not have statuatory requirements or regulations concerning the design and construction of boats, ships, submarines or other marine craft. However, the U.S. government does not have a national registration for naval architects and marine engineers.

C. **Organizational Memberships:**

For nine years Schofield was the principal U.S. representative on the International Standards Organization (ISO) TC188 WG18 committee developing a structural design standard for marine craft under 24 meters, ISO 12215. Sea Ray Boats also hired him for a time to participate in the same technical committee in development of the new international stability standard, ISO 12217. The European Union Parliament mandated in 1994 that all craft manufactured and sold in Europe after July 1998 must be designed, built, and certified to a EU-wide set of standards. The ISO committee was convened in response to that mandate. My participation was primarily funded by the National Marine Manufacturers Association and by the American Boat & Yacht Council under funding by a U.S. Coast Guard grant for that work.

Schofield is a Member of the Society of Naval Architects and Marine Engineers (SNAME) and was twice (1997-98 and 2004-05) a Vice Chairman for the Southeast Section of SNAME. He is also a member of the Royal Institution of Naval Architects (U.K.), a member of the RINA Small Craft Committee, and the American Boat and Yacht Council. He is presently a member of the American Bureau of Shipping Small Vessel Rules Committee (vessels under 200 feet).

Formerly, he was Secretary and Education Committee Chairman of the Structural Plastics Research Council of the American Society of Civil Engineers, 1982-1988.

During 1996-97, Schofield worked under contract as a consulting engineer for the American Bureau of Shipping in developing the Guide for Building and Classing High Speed Craft. He wrote the structural loads and analysis sections for catamaran and multi-hull ships, surface effect ships, and hydrofoil craft, and wrote the initial draft with formulae which became the structural loading section for all craft (originally Section 8).

D. **Experience:**

(August 1972 – May 1976) Prior to and during completion of his engineering degree at the University of Michigan, he was employed as a Marine Surveyor and licensed Ocean Marine Loss Adjustor for Toplis & Harding, Inc., Detroit Michigan Office. Toplis & Harding was the Great Lakes Settling Agent for Lloyd's of London. Schofield also completed the Insurance Institute of America's Risk Management Course at Wayne State University through several night courses.

Between scheduled work periods at Toplis & Harding at downtown Detroit, Schofield commuted and attended engineering classes full-time at the University of Michigan, Dearborn Campus and Ann Arbor Main Campus locations, completing his engineering degree in May 1976.

(May 1976 to February 1981) Bethlehem Steel Corporation Shipbuilding Central Technical Division, employed as Naval Architect, Structural Engineer, and first 18 months as a Piping System Design Engineer. Schofield was eventually promoted to Baltimore Yards Hull Group Chief. In that capacity, he was responsible for a design group of 15, and for the drydocking calculations, inclining experiments, stability analysis, and all structural engineering for ships being worked on in the two Baltimore shipyards, Fort McHenry and Key Highway Shipyards.

(February 1981 - August 1983) Naval Architecture Section Head and also Structural Engineering Section Head (two hats) for Gibbs & Cox, Inc. (G&C) Washington Office, a professional naval architecture and design firm with three offices and 500 employees, primarily doing ship design and engineering for the U.S. Navy. His responsibilities included supervision of 13 engineers and designers.

July of 1982 through August 1983, Schofield was the G&C Program Manager for all Preliminary Level structural design and structural engineering of the Arleigh Burke Class Destroyer (DDG-51), which included design and engineering of all

structural parts of the ship. (7/82) DDG-51 Preliminary Structural Design - Contract #N00024-80-C-4458 Task 30799 for NAVSEA Code 3231 - Schofield was G&C Program Manager for Preliminary Level structural design. Hull, decks and deckhouse scantlings were developed and analyzed for sea loads, nuclear airblast and weapons effects.
Topside structures, such as the phased array radar foundations, mast, stack, and illuminator and weapon director foundations were designed for shock, airblast, vibrations, and dynamic ship motions. A complete weight estimate for all SWBS 100 items was completed for the PMS400 Project Office.

(7/82 to 7/83) DDG-51 Destroyer and CG-47 Cruiser Class Topside Weight Reduction Studies - Producibility Studies - for PMS 400 under NAVSEA Contract #N00024-80-C-4458 - Several fiberglass and other composite and High-Strength, Low Alloy Steel structural design projects were completed for the surface combatant programs of PMS 400 (Project Office) over this interval. Schofield was the G&C contractor Program Manager for the David Taylor Naval Ship R & D Center portions of the work under these tasks. A complete fiberglass deckhouse design was investigated for DDG-51, as well as HSLA. Shipyards and G&C participated in investigations of GRP piping and resin chocking for machinery foundations, also. Shock and vibration response of structures were investigated.

(9/82 and 4/83) Reinforced Plastic Preventive Maintenance and Repair Manual, and Inspection Manual for Fibrous Glass Reinforced Plastic, written under NAVSEA Contract #N00024-80-C-4507, task 5AO50 for Code 05E3 - These manuals were rewritten by this group under his supervision as a state of the art update of earlier MIL-HDBK navy manuals prepared by G&C.

Schofield personally did engineering projects while at G&C Washington Office, including structural design of a 108 foot fiberglass composite crewboat for Desco Marine, and completed four different hull structural designs for NAVSEA's in-house MSH minehunting ship designs. (8/81) Minesweeper-Hunter (MSH) Concept Design - NAVSEA (Naval Sea Systems Command) Contract N00024-80-C-4507, Task# 30711 (PMS 303)- Schofield did concept structural design for hull, decks, bulkheads, and deckhouse for this 600 ton ship. Three fiberglass structural configurations were developed: monocoque, transverse framed, and sandwich core, as well as one conventional wood design. 12 ft X 12 ft shock test panels were later built and shock tested, using his developed structural configurations.

In early to mid 1983, Schofield was Program Manager for a project for the Air Force (COBRA JUDY Phased Array Radar Installation on the USNS OBSERVATION ISLAND - Subcontract to Raytheon under Air Force Contract

#F-19628-82-C-00990 where his duties entailed extensive ship surveys and stability analysis, engineering design, preparation of working drawings, stability analysis and cost estimates for the installation of a 100 ton phased array radar antenna upon the fourth tier of the deckhouse of an existing MARINER Class ship.

During the 1982 through 1983 period Schofield was the G&C contractor Program Manager for the David Taylor Naval Ship R&D Center topside and superstructure weight reduction studies for Destroyer and CG-47 Cruiser Class ships.

(August 1983 through 1985) Schofield was employed by Marinette Marine Corp. shipyard as the Deputy Program Manager and Project Engineer for the Minesweeper-Hunter Project (MSH-1). MMC developed the entire ship design for that class of composite ships and performed sophisticated dynamic analyses of fiberglass composite structures for hull and machinery. Schofield was responsible for all design and engineering for this project, under a $1.25 M budget.

(1985 - 1986) Schofield was the Manager of Engineering for Wausaukee, Inc. Presently, he still does consulting for them, and has engineered a large number of fiberglass and composites for marine, automotive, military truck, and industrial customers.

(1986 – Present) Schofield has operated a naval architecture and marine structural engineering office for 38 years, as an independent marine consulting and design business. In this capacity, he has designed a number of boat models, large yachts and small passenger vessels and has designed structures and systems for many shipbuilders as a consulting engineer for a large number of other vessel design and construction projects.

Schofield has provided consulting engineering and design services for the U.S. Customs & Border Patrol, U.S. Navy, and over forty of the major U.S. boat manufacturing firms, involving fiberglass and aluminum boats ranging in length from 16 to 155 feet. He personally performed structural engineering of Sea Ray's 65 foot and 63 foot models to obtain ABS Class approval, as well as a good number of smaller models. Similar work on comparable boat designs has been performed for Atlantic Yachts, Cobalt Boats, Cruisers Yachts, Grady White, Marlin Yachts, Nautica, OMC Boat Companies, ProLine, Regal Boats, Switzercraft, Tollycraft, Wellcraft and Zodiac Hurricane (16 to 66 ft). He has performed structural engineering work for the entire product line for several well-known boat manufacturers, including SeaCat, Cobalt Boats, Cruisers Yachts, Marlin Yachts, New Water Boats, and World Class Catamarans.

Regarding naval ships, Schofield was contracted under his own business for a number of projects for the U.S. Navy: MHC-51 GRP Ship Structures Repair Manual - Bill Seeman (Seeman Composites) and Schofield each provided GRP

composite structures damage assessment and repair expertise to the writing of a new fiberglass ship structures repair and inspection manual for this ship class. Each wrote sections and reviewed all drafts for the proposed manual.

MHC-51 Minehunter Lead Ship Shock Test - Schofield participated as the fiberglass damage ship survey and repair expert under contract to the U.S. Navy's NAVSEA engineering group for this series of underwater explosion shock tests of the lead ship of the class.

Carderock Contracts No. N00167-94-R-0008 Vacuum Assist Resin Transfer Molding of GRP Ship Section, and No. N00167-94-R-0071 PrePreg Fabrication of GRP Ship Section, Subcontract to SunRez Corporation, San Diego, CA. Performed structural and tooling design, materials selection, fabrication cost and tooling cost estimating, and on-site fabrication assistance for a half-scale ship section, which was built at Intermarine USA, Inc. shipyard at Savannah, GA.

DTRC Integrated Technology Deckhouse Program, Subcontract to CASDE Corp. Consulting on structural design, fabrication techniques, bonded and bolted connections design of GRP DDG deckhouse.

MHC-51 Construction, Subcontract to Intermarine U.S.A., Subtier contract to Industrial Plastics, Wisconsin Rapids, WI Structural design of fiberglass filament wound tanks, Grade "A" shock qualification by finite element analysis, and assistance during fabrication. 2 shipsets built for MHC Shipbuilding Program.

Ship Stack, U.S. Navy Contract No. N00167-88-C-0051, for David Taylor Research Center ($85K): Schofield was engineering subcontractor to Hercules Aerospace Company, Magna, UT. Project was for design and fabrication of a fiberglass skin/fiberglass honeycomb cored naval destroyer ship stack structure for simulated nuclear airblast test. A large-scale test was performed under actual FAE airblast by the Government at White Sands, NM in May 1989. Structure survived intact and functional. Schofield developed the structural configuration and assisted in fabrication.

MHC Contract Design, U.S. Navy Contract N00024-84-D-4013, T.I. No. 6.03.01.05, from NAVSEA, the Naval Sea Systems Command ($57K): Subcontract through J.J. McMullen Associates. Earl Zion, former manager of Owens Corning Fiberglas Laboratory, and Schofield developed material specifications and qualification test and fabrication procedures for the fiberglass fabrics and resins used in the construction of the MHC-51 Class minesweeping ships. These 184 ft., 800 ton fiberglass ships were being built with commercial specification Italian and French fiberglass and Dutch resins. The structural materials were being procured with only supplier stock numbers and incomplete commercial performance specifications. The technical assistance of 18 U.S. fiberglass and resin companies were enlisted by Schofield & Zion for this project,

and complete specification and qualification procedures were developed for U.S. domestic procurement of the materials.

Intermarine U.S.A. Shipyard: Hercules Aerospace retained Schofield 1985-1990 as consultant for forming the joint venture with Intermarine Spa., assisting in locating, planning, and construction of a shipbuilding facility in the U.S. (Intermarine U.S.A., Savannah, GA), writing the proposal to build the MHC-51 Class ship, and developing future markets for composite structural components for naval surface combatant ships and submarines.

Large Yacht and Commercial Passenger Vessel Design: Rob Schofield designed or collaborated in the design of numerous motoryachts and passenger vessels with lengths of up to 155 ft which were, or are, being built by Fittipaldi Yachts, Filippetti Yacht, Christensen Motoryachts, SeaForce IX, VectorWorks Marine (two large sportfishing yachts and three pleasure yachts), Westport, Westship World Yachts and Broward Marine Shipyards.

Schofield's own hull designs from scratch and overall naval architecture designs include these projects, in which Luiz DeBasto collaborated as the stylist and arrangements designer:
Fittipaldi Yachts 110 foot aluminum MotorYachts (2 built 2008-2010, Brazil)
Filippetti Yachts Daemon Series, 70, 75 and 83 foot 60 knot MotorYachts (70 & 75 ft production series manufacturing, Trieste Italy at Cantieri Adriatica, building 2010-present)
Astondoa Top Deck 43, 51, and 63 Models, Spain (2012-2013, presently manufacturing the 63 model)

The following was a recent solo design from the Schofield office:
Sea Force IX 45 foot aluminum offshore oil crewboat – (20 built, Florida 2014)

Schofield collaborated with other designing naval architects and did structural engineering and propulsion engineering, to name a few projects:
Broward Marine Shipyard – One 90 ft, two 140 foot, and one 155 foot motor yachts, the last being the BUBBA TWO (now INSPIRATION) to ABS full Class.
Westport 130 Model (with Greg Marshall, 2000)
Westship 120' and 145' hulls, the last being the BOARDWALK (2000-2004)
Destiny 108' (ALWAYS LATE) completed by Vectorworks & Westship (2008)

Small Boats: Schofield solo-designed several very successful 50-65 knot pleasure sportboats and popular commercial & naval RIBs of 18 to 31 foot length:
Regal Boats 222, 202, and 182 Models (1992)
SwitzerCraft 250SS and 310SS Models (1988 and 1992)
Celebrity Andretti 26 Sportboat (1990)
Sunsation Boats 290 Model (1991)
WorldCats 29 ft hull, 4 models based on that hull (2010)

The SwitzerCraft 250SS Model won POWERBOAT Magazine's 1991 "Performance Sterndrive of the Year" Award.

Schofield performed design and analysis for a number of military versions of rigid hull inflatable boats for Nautica International and Zodiac Hurricane, two of the best-known RIBs builders.

Marine Craft Structures: Schofield developed one of the U.S. marine industry's most commonly-used series of structural design computer program for powerboats: C-Shell and CLAM. These programs were the primary structural design tool for 47 of the best-known powerboat builders and designers in the U.S. The programs were developed through a decade's worth of at-sea instrumented testing and research. Sea Ray Boats alone documented for the ISO 12215 Standards Committee the fact that they built over one hundred twenty thousand boats, ranging in size from 17 to 65 feet, produced between January 1990 and January 1997 with laminates and framing developed with the aid of C-Shell and CLAM.

The American Bureau of Shipping contracted Schofield to develop Section 8 of the Guide for Building and Classing High Speed Craft. My input concerned structural design rules for large high-speed multihull, SES, and hydrofoil vessels and was first published November of 1997.

In 2000, the Chinese government's Shanghai FRP Research Institute and the State Administration for Building Materials (SABMI) contracted Schofield to assist in the development of the structural design for their new 33 meter (108 foot) fiberglass and wood fishing vessels, currently being series-built in Huei Hai Shipyard. He worked with the engineers of the FRP Research Institute to do the necessary drawings and specifications (in Mandarin Chinese, through a translator), pass the project through the PRC Fishing Boat Authority, and consulted with the shipyard in tooling up for the construction phase.

Structural Engineering Lectures: Since 1983, Schofield has taught intensive, 40-hour lectures in the U.S., Australia, and Europe on ship and boat designs in fiberglass, wood, and other composite materials. These seminars have been attended by many well-known naval architects, ship and boatbuilders, composite suppliers' technical staff, Navy and Coast Guard engineers. (sponsors: YDI Schools & Maine Maritime Academy, Wausaukee Inc., KRP Plastiques, Paris, American Klegecell, Texas, and the Composites Institute of Australia). Two of these were held at USCG Headquarters, Washington, DC., and Puget Sound Naval Shipyard, under government contracts to train USCG and navy engineers how to design in wood and composite structures.

Appendix B

Publications and Professional Society Lectures

Composites Institute of Australia: 1998 July/August Lecture Series, 40 hours of lecture, held in Melbourne, Adelaide, Perth, Brisbane, and Sydney/Newcastle, Australia, on "Design of Efficient Laminates for Light Weight, Highest Strength, and Least Cost".

Participated in the development of the "Structural Plastics Selection Manual", American Society of Civil Engineers Manual No.66 (1985)

Society of the Plastics Industry Technical Paper, "An Economics Study for the Engineering and Use of Fiberglass Combination Materials in Marine Construction" (October, 1987)

Composites Fabrication Association
Annual Convention and Industry Conference, October 1989, and Society publication, January, 1990: "Setting Up an In-House Testing Program for Characterizing and Evaluating Laminates", which was also republished in Professional Boatbuilder Magazine, August/September 1997.

Suppliers of Advance Composites Materials Association (SACMA) 1989 Annual Convention - "State of Advanced Composites in the U.S. Pleasure Boat Market."

Society of Naval Architects and Marine Engineers, "Structural Design of Power Boats - A Dynamic Problem", presented at the 6th Bienniel Power Boat Symposium, October, 1995

Schofield was a Contributing Editor to the Composites Fabricators Association's journal, Composites Fabrication, from 1996 through 2003. Articles written include:
Society publication, Composites Fabrication, September, 1995: "Thickness Considerations in Design of Laminates"", which was also republished in Professional Boatbuilder Magazine, February/March 1998.

Composites Fabrication, September 1996: "Create an In-House Resin Test Lab"

Composites Fabrication, October 1996: "Just How Will We Manage?" (Article on production management versus project management of manufacturing companies)

Composites Fabrication, January 1997: "The Ruggedness Factor" (Article on engineering considerations for product abuse and impact in structural design)

Composites Fabrication, February 1997: "Fire Performance of Composites"
Also reprinted in the Australian publication, Composites, July 1997
Composites Fabrication, July (September?) 1997: "FRP Toolmakers" (Article on marine mold and tool builders in the U.S.)

Composites Fabrication, October 1997: "What About Plywood?" (Article on engineering properties and advantages of plywood)

Composites Fabrication,October 1997: "Rational Design With Core Materials" (Article on engineering design of sandwich cored composite structures)

Composites Fabrication, November 1997: "Rational Selection of Core Materials" (Article on engineering approach to selection of core materials)

Composites Fabrication, July 1998: "Proper Evaluation of New Core Materials" (A second article on engineering approach to selection of core materials)

Composites Fabrication, September 1998: "Cosmetic versus Structural Performance of Laminates"

Composites Fabrication, September 1998: "High Temperature Performance of Laminates"

Composites Fabrication, October 1998: "Design of FRP Joints"

Composites Fabrication, March 1999: "FRP Joints - Part II: Structural Adhesives and Mechanical Fasteners"

Composites Fabrication, October 2001: "One-Stop Shopping – How to determine Laminate Properties for Different Resin Type, Fiber Material Type, Or Fabric Type"

Composites Fabrication, September 2002: "Is it Safe? –How to Build a Fire Resistant Laminate.", Vol. 18, Issue No. 9

Professional Boatbuilder Magazine, April/May 1996: "The Case For Plywood Structure"

Professional Boatbuilder Magazine, February/March 1998: "The Importance of Thickness in Single-Skin Laminates"

Professional Boatbuilder Magazine, October 2003: "Pseudo-Cores and Bulker Plies"

International Boat Builders Exhibition and Conference (IBEX):
1992 through 2013 - One to four 1.5 hour lectures for each symposium series, on structural design of powerboats, high speed hull design, marine design and dynamic stability of powerboats, production economics and international standards for structural design of marine craft.

Composites Fabrication Association 1994, 1995, 1996, 1997 and 2000 Annual Convention lectures on engineering design of Composite Structures.

Appendix C

List of Court Cases Latest 10 years, in which Robert A. Schofield has been retained as Expert Engineer

LITIGATION EXPERIENCE LATEST 10 YEARS OF ROBERT A. SCHOFIELD AS EXPERT

case #	Style of Case	Cognizant Court	Jurisdiction	Case No.	Date Hired	Function as Expert
67	Thomas Boney & Yacht "T-BONE" v. U.S. Navy	U.S. District Court	Southern District of Florida - Miami		2003	Determine reasonable structural repair cost for collision 55' yacht
68	David W. Lewis v. Western Marine	State of Idaho	District Court, 4th Judicial District - Ada Co.	CV OC 0401017D	2005	Determine dynamic instability of high speed boat
69	Markel Insurance Co. v. Schuberts Marine East M.Y. "MAD HATTER"	U.S. District Court	Eastern District of Louisiana	CV 04-0376	2005	Determine cause of hull bottom blistering 55' boat hull
70	Old Park Investments, Harbortown Marina vs LEDA, Bailey et al	U.S. District Court	Southern District of Florida	CV 05-14042	2006	Analyze mooring piling deterioration versus hurricane holding loads
71	Borden M. Larson v. Correct Craft, Todd & Snook	U.S. District Court	Middle District of Florida - Orlando Div.	6:050-CV-686-ORL-31-JGG	2006	Expert definition of boat design features for patent dispute
72	Johnston Family Louisville LLC v. Kentuckiana Yacht Salesinc. & Jefferson Yachts	U.S. District Court	Western District of Kentucky at Louisville	CIV 3:07CV-122-S	2006	Engineering analysis of 82' yacht stability
73	Thomas Logan v. Luhrs Yacht Group				2007	Engineering analysis 44' boat structure
74	Lincoln Adventures et al vs Alley Maese Rogers et al (Schuberth vs Queenship)	State of Florida	15th Judicial Circuit, Palm Beach County	2008-CA-002419 (AE)	2004	Expert - Engineering analysis 90' yacht structure
75	Moll's Marina, et. al. v. Kelerides v. REM Marine, Inc.	State of New Hamp	Superior Court	05-C-0383, 06-C-0383 & 0369	2005	Engineering analysis of as-built 40' boat structures versus transportation loads
76	Keylow v. JUST JS Official No.735647, Venturevale Investments Ltd	U.S. District Court	Southern District of Florida, in Admiralty	04-22310-CIV-Altonaga/Turnoff	2005	Marine Accident Reconstruction
77	Shellnutt v. Pro-Line Boats	U.S. District Court	District of South Carolina, Charleston, Admiralty	2:07-262-DCN	2007	Engineering analysis 26' failed boat structure
78	Arguesa, LDC v. United States Coast Guard	U.S. District Court	Southern District of Florida	1:06-CV 22722	2007	Accident reconstruction, allision of superyacht with aid to navigation
79	Lady Di Fishing Team Inc, v. Brunswick Corp	U.S. District Court	Middle District of Florida, Jacksonville Div	3:07-CV-402-J-33TEM	2007	Engineering analysis of seakeeping adequacy
80	Clear Marine Ventures Ltd (Michael Krieger) vs Brunswick Corp et al	U.S. District Court	Southern District of Florida, Miami Div.	08-22418-CIV-MORENO/TORRES	2008	Engineering analysis of seakeeping adequacy
81	Unlimited Holdings Inc v. Bertram Yacht, Inc. and Ferretti Group USA, Inc.	U.S. District Court	District Court of Virgin Islands, Div. St Thomas & S	CIV-ST-05CV-0046	2005	Determined cause & extent of gelcoat deterioration
82	Ralph R. Crabtree vs. Donzi Marine, LLC	U.S. District Court	Middle District of Florida, Jacksonville Div	3:07-CV-464-J-34JRK	2008	Engineering analysis 30' boat structure
83	TGB Marine, Allen Ball v. Midnight Express	U.S. District Court	Southern District of Florida	08-60940-CIV-COHN	2008	Engineering analysis 36' boat structure
84	Girard H. Rodgers, Jr. vs. Costa Cruciere S.p.A. (Costa Cruise Lines)	U.S. District Court	Southern District of Florida - Ft Lauderdale Div.	08-60233-CIV-Dimitrouleas	2009	Analysis of slip & fall on cruise liner & design of stairwell
85	Kelecaney et al vs Chevron, Exxon Mobil, BP, Conoco Phillips, et al	U.S. District Court	Southern District of Florida - Ft Lauderdale Div.	08-61294-CIV-ALTONAGA/Brown	2009	Analyze ethanol fuel deterioration of fiberglass boat tanks
86	Lavin, Red Bank Enterprises vs Markel Essex Ins. Co	U.S. District Court	Southern District of Florida	10-60130-CIV Lenard/Turnoff	2009	Expert - evaluate hurricane damages vs structural deterioration 70' yacht
87	Seaway Enterprises(Yacht AKIM) vs AIG Ins. Co	U.S. District Court	Southern District of Florida	11-23549-CV Ungaro	2009	Hurricane insurance claim versus reasonableness of work done 120' yacht
88	Eric Hippeau vs Horizon Yacht Co. Ltd, et al	U.S. District Court	Southern District of Florida - Miami Div.	10-80615-CIV-RYSKAMP/VITUNAC	2010	Expert - industry construction practice for superyacht shipyards
89	Charles F Welsh III vs Progressive Insurance - re 29' Gorbon damage	State of Florida	4th Judicial Circuit, Duvall County	16-2009-CA-013584	2010	Engineering analysis 29' boat structure
90	Sanderson vs Creative Pultrusions & FPL Plant	U.S. District Court	Middle District of Florida, Ft Myers Div	2:07-cv-629-FtM-29DNF	2010	Engineering analysis of fiberglass pultruded structural sections
91	Dhevatars Beach Seychelles v Bertram Yacht & MarineMax et al	U.S. District Court	District of South Carolina, Charleston, Admiralty	CIV 2:09-2979-RMG	2011	Expert - accident reconstruction and structural analysis of 63' yacht sinking
92	MYD Marine Distributors, Inc vs Gurit (Canada) Inc.	American Arbitration Association		50-155T-00732-12	2012	Expert re use and deficiencies in marine fairing and coating system for 80' yach
93	Applied Concepts Unleashed vs Steven Matthews	U.S. District Court	Southern District of Florida	12-14035-CV- Graham/Hopkins	2012	Expert review of intellectual property rights & proprietary yacht design features
94	Burch vs Progressive Insurance	State of Florida	5th Judicial Circuit, Citrus County	2011-CA-002345	2012	Expert - evaluate hurricane damages vs structural deterioration 26' boat
95	Porter vs Unique Marine & ProKat Boats	State of Florida	16th Judicial Circuit, Monroe County, Florida	09-CA-291-PK	2012	Engineering analysis of structural deficiencies
96	Gemini II, Ltd. Vs Mesa Underwriters	U.S. District Court	Southern District of Florida	12-61711-CIV-Zloch	2013	Expert re use and deficiencies in marine fairing and coating system for 145' ya
97	Imagine Nation Co. Inc & Copperfield vs Midnight Express Powerboats Inc	U.S. District Court	Southern District of Florida	13-CV- 60553-W.IZ	2013	Engineering analysis of structural deficiencies
98	Dowzell Sweyngim vs Parma CCS Inc & HBC Inc dba Nortech Boats	State of Ohio	Cuyahoga County, Court of Common Pleas	CV-12-779938 AMBROSE	2013	Engineering analysis of fuel explosion
99	Cigarette Racing Team LLC vs Engineered Metals & Composites Inc	State of Florida	11th Judicial Circuit, Miami-Dade, Florida	12-31089-CA-15	2013	Engineering analysis of structure of hardtop
100	Charles F Welsh III vs Marina San Pablo Condominium Association et al	State of Florida	4th Judicial Circuit, Duval County, Florida	16-2012-CA-008870, Div. CV-A	2014	Engineering analysis of shallow water maneuvering & wake
101	Alessa Leigh LLC vs Marine Exhaust Systems	U.S. District Court	Southern District of Florida, West Palm Beach Div.	12-80011-CV- MARRA	2014	Engineering analysis of defective underwater exhaust installation
102	KAKAWI Yachting, Inc vs Marlow Marine Sales, et al	U.S. District Court	Middle District of Florida, Tampa Div.	8:13-CV-01406	2014	Engineering analysis of stability & Classification

CATEGORY COUNT TALLY:				
depo	court report	Defendant	Plaintiff	
51	33	102	69	33

Wendy Anderson

From: Jack Beamish <jbeamish@FBPE.org>
Sent: Monday, February 04, 2008 4:08 PM
To: dhains@murrayna.com
Subject: Robert Schofield Complaint
Attachments: Complainant-Hains-Schofield- C&D issued.docx

Mr. Hains:

Please see attached letter.

Jack Beamish, Investigator
Florida Board of Professional Engineers
2507 Callaway Road, Suite 200
Tallahassee, FL 32303
850-521-0500
www.fbpe.org

FLORIDA BOARD OF PROFESSIONAL ENGINEERS

February 4, 2008

Drew B. Hains, PE
Murray and Associates, LLC
4101 Ravenswood Rd., #210
Fort Lauderdale, FL 33312

VIA Email: dhains@murrayna.com

Re: Complaint against Robert A. Schofield

Case No. 2008002965

Dear Mr. Hains:

As we discussed earlier today on the telephone, please be advised that on January 25, 2008 we sent via certified mail to Robert A. Schofield a Notice to Cease & Desist from identifying himself as a "marine structural engineer." We have not yet received the certified mail return receipt and the case remains open.

I understand that you will be sending me additional information in which the Florida Board of Professional Engineers previously issued a Notice to Cease & Desist to another engineer who was performing a scope of work similar to the work you allege is being performed by Mr. Schofield. We appreciate it that you are sending the documents so that our prosecutors can review them. After the prosecutors review this information, we will contact you and inform you of any changes in the status of the case.

Thank you for bringing this matter to our attention.

Sincerely,

Jack Beamish
Investigator
Florida Board of Professional Engineers

cc: John Rimes

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

2639 North Monroe Street
Suite B-112
Tallahassee, Florida 32303
Phone: (850) 521-0500
Fax: (850) 521-0521
www.fbpe.org

November 5, 2014

Drew B. Hains, P.E.
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC
4101 Ravenswood Road, Suite 210
Ft. Lauderdale, Florida 33312

Re: Complaint filed against:
Robert Schofield; Case #2014031544

Dear Mr. Hains:

This letter is to inform you that the investigation regarding your complaint is complete. Robert Schofield has been issued a Notice to Cease & Desist from offering engineering services while not licensed to provide engineering services as required by Chapter 471, Florida Statutes.

Thank you for bringing this matter to our attention and thank you for your patience. Please call me if you have any questions.

Sincerely,

Wendy Anderson
Investigator

/wsa

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FLORIDA BOARD OF PROFESSIONAL ENGINEERS

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

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July 30, 2014

Drew B. Hains, P.E.
Vice President, Engineering
Naval Architect/Marine Engineer
Murray and Associates, LLC
4101 Ravenswood Road, Suite 210
Ft. Lauderdale, Florida 33312

Re: Complaint filed against:
Robert Schofield; Case #2014031544

Dear Mr. Hains:

This letter is to acknowledge receipt of the complaint you filed against Robert Schofield. The complaint has been assigned the number referenced above. The matter will be analyzed by the undersigned for a determination of legal sufficiency. As complaints vary in complexity, no definite time frame can be given as to when the analysis will be completed. You will be advised in writing of the outcome of this analysis.

Please note that the Florida Board of Professional Engineers' jurisdiction is statutorily restricted to the investigation of matters involving possible violations by licensees or allegations of unlicensed practice of professions regulated by the Board. For a complaint to be deemed legally sufficient for investigation, the allegation must constitute a possible violation of a licensee's practice act or governing rules and must contain adequate documentation to support the allegation. Complaints involving services fees or monetary recovery are not covered by statute or rules and therefore should be addressed in civil court.

Sincerely,

Wendy Anderson
Investigator

/wsa

System Messages

- Complaint created. New Complaint # 2014031544.

Lic Type **0901 - Professional Engineer** Status **10 Initial Review** Status Date **07/30/2014**

Complaint # **2014031544** Case Type **CMP - Complaint** Disposition Disposition Date

Docket# Respondent **SCHOFIELD, ROBERT** Responsible **wgregory - GREGORY, WENDY** **Private Case**

Complaint | Respondent | Complainant | Addt'l Info

Source **LIC - Licensee** Security Level **1**

Form **EMAL - Email** Priority

Class'n **UNLC - Unlicensed Activity** Complexity **R - Regular**

Security **STND - Standard** Incident

Region Received **07/28/2014**

Reference

Entered **07/30/2014** Entered By **wgregory**

Summary **Allegations that subject is utilizing the protected title of naval structural engineer and does not hold a Florida Professional Engineer license.**

Updated **07/30/2014 07:16:28** By **wgregory**

Parties | Activities | Allegations | Discipline | Violations | Compliance | Related | Disposition | Inspection | Costs | Time Tracking | Auto Assign | Attachments | History | Work Notes | Print Report

Change | Save | OK | Cancel | Back

MURRAY & ASSOCIATES, LLC

NAVAL ARCHITECTS • MARINE ENGINEERS

4101 Ravenswood Road Suite 210
Ft. Lauderdale, FL 33312

Telephone (954) 527-5505
Fax (954) 527-5504
e-mail: *mweyenberg@murrayna.com*

July 30th, 2015

William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee FL 32303-5268

Via Email: board@fbpe.org

Re: Proposed Rule Making Amendment Regarding the Definition of Marine Engineering

References: (A) Minutes for the Florida Board of Professional Engineers April 8, 2015

Dear Mr. Bracken:

I am writing regarding the Minutes for The Florida Board of Professional Engineers that occurred on April 8th and 9th 2015, specifically the proposed rule amendment to Rule 61G15-18.011, reference (A).

I am currently a licensed professional engineer in the state of Florida, license number 77744. I am unable to attend the workshop on August 12th, but I would like to have my comments considered.

According to the above reference minutes, the term marine engineer is to be defined as follows:

> (7) The term "marine engineer" as used in Section 471.031(b), F.S. shall mean a person who uses engineering principles and methodologies in the design of piers, docks, sea walls, or other marine structures governed by the Florida Building Code. Marine engineering shall not encompass the design of marine vessels, except for floating residential units as defined in Section 202 of the Florida Building Code.

The proposed definition is ambiguous, and the intention of the proposed rule change in unclear. I see two possible intents for the rule change:

1. The intent is to allow a person that is not licensed by the state of Florida (or a person that is not exempt from licensure) who designs marine vessels to use the title "marine engineer"
2. The intent is to prevent a person licensed by the state of Florida (or a person that is exempt from licensure) who designs marine vessels to use the title "marine engineer"

Regarding the first point, my understanding is as follows. The proposed definition of the term marine engineer does not change the wording of 471.031(b)1 of the Florida Statutes which lists the protected titles. The title "marine engineer" is still a protected title. Additionally, the proposed definition of the term "marine engineer" does not change the wording of 471.003(2) of the Florida statutes, which provides for exemptions from licensure. So considering the above, "marine engineer" in still a protected title, and there is no exemption for the practice of marine engineering. It appears to me that a person may still only use the title "marine engineer" if they are licensed, or exempt from licensure. Even with the proposed definition, it does not appear that the Florida Statutes would allow an unlicensed person to use the title "marine engineer" even if they are designing marine vessels.

The possible intent has a direct impact on me. I have a master's of science degree in Naval Architecture & Marine Engineering from the University of Michigan. I have taken and passed the Naval Architecture & Marine Engineering PE exam offered by the NCESS. I am currently a licensed professional engineer in the state of Florida, license number 77744. My license lists Naval Architecture & Marine Engineering as a special qualification. Am I allowed to use the title "marine engineer" if I use engineering principles and methodologies in the design of marine vessel?

I appreciate your time and the opportunity to have my comments considered.

Sincerely,

Matthew Weyenberg, PE

CC: Zana Raybon (zraybon@fbpe.org)

MURRAY & ASSOCIATES, LLC

NAVAL ARCHITECTS • MARINE ENGINEERS

4101 Ravenswood Road Suite 210
Ft. Lauderdale, FL 33312

Telephone (954) 527-5505
Fax (954) 527-5504
e-mail: *jbenoit@murrayna.com*

July 31, 2015

William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee FL 32303-5268

Via Email: board@fbpe.org

Mr. Bracken:

It is understood by means of the *Florida Board of Professional Engineers* April Meeting minutes a motion has been put forth to add the definition of the protected title of Marine Engineer. The new definition not only introduces the person engaged in the design of piers, docks, sea walls or other marine structures but also explicitly excludes those engaged in the design of marine vessels.

As a contributing member of the Florida maritime industry engaged in the design of ships, vessels and their associated workings – the proposed motion could not be more off base; divergent from a century plus old international term and occupation; and of further financial, safety and commercial detriment to a coastal state which dwells economic commerce from both international and domestic shipping, recreation and national border enforcement.

It is duly recognized persons engaged in the design of piers, docks and sea walls are contributing members of our economy and great State on a similar basis of coastal frontage, however it would be far more suited to provide these individuals with a unique title far more reflective of their design sector without explicitly and intentionally depriving those engaged in the design of marine vessels of a protected title.

I am a graduate of the four year college Webb Institute in Glen Cove, NY and in possession of a Bachelor of Science in both Naval Architecture and Marine Engineering. I have also successfully passed the NCEES Professional Engineer exam in the discipline of Naval Architecture and Marine Engineering. I have further made the State of Florida my state of residence and occupation based on the field of Marine Engineering.

I respectfully ask this motion be repealed and the protected term of Marine Engineer be reconsidered. Absent further recourse, the safety of the public, vessel's crew and maritime commerce shall be at stake in the hands of potentially unqualified personnel in an industry which inherently is predicated on safety, education and continued training.

Please do not hesitate to contact the undersigned should you have any questions.

With best regards,

James Benoit, PE
Naval Architect / Marine Engineer
Florida PE #64654
Alabama PE #33809

Cc: Zana Raybon, FBPE Executive Director & FEMC President, via email: zraybon@fbpe.org

Miguel Angel Tovar, EI

1865 Brickell Ave, #A1413
Miami FL 33129
Telephone (954) 397-2019

August 3, 2015

Via e-mail (board@fbpe.org)
William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee FL 32303-5268

Dear Mr. Bracken,

Re: Concern Regarding Proposed Rulemaking for Marine Engineer Title

I, a naval architecture and marine engineering intern (EI) on track to become a Professional Engineer (PE), have reviewed the Notice of Development of Rulemaking issued June 19, 2015 pertaining to FBPE Rule 61G15-18.011 whereby the Board approved a rule amendment to add a new definition for "Marine Engineer" as used in Chapter 471, F.S. where the proposed definition is as follows:

> (7) The term "marine engineer" as used in Section 471.031(b), F.S. shall mean a person who uses engineering principles and methodologies in the design of piers, docks, sea walls, or other marine structures governed by the Florida Building Code. Marine engineering shall not encompass the design of marine vessels, except for floating residential units as defined in Section 202 of the Florida Building Code.

However, I would like to address a few issues with the new ruling that will prejudice current Naval Architects and Marine Engineers.

As defined by The Society of Naval Architects & Marine Engineers (SNAME) —an organization founded in 1893— Naval Architects, Marine Engineers, and Ocean Engineers design, build, operate, and maintain ships and other waterborne vehicles and ocean structures as diverse as aircraft carriers, submarines, sailboats, tankers, tugboats, yachts, underwater robots, and oil rigs. These interrelated professions address our use of the seas and involve a variety of engineering and physical science skills, spanning disciplines that include hydrodynamics, material science, and mechanical, civil, electrical, and ocean engineering.

More specific, **Marine Engineers "are responsible for selecting ships' machinery, which may include diesel engines, steam turbines, gas turbines, or nuclear reactors, and for the design of mechanical, electrical, fluid, and control systems throughout the vessel. Some marine engineers serve aboard ships to operate and maintain these systems."** [1]

[1] As published by the Society of Naval Architects & Marine Engineers (SNAME) [http://legacy.sname.org/careers.htm]

This definition is in accordance to what current Naval Architects/ Marine Engineers perform in their careers. This is a definition that can be supported by current curricula from universities that offers a double major in Naval Architecture and Marine Engineering such as: Webb Institute, University of Michigan, and University of New Orleans.

These ABET accredited programs offer some Marine Engineering specific courses such as: Marine Engines, Propulsion and Auxiliary Systems, Marine Electro-mechanical engines, Marine Power Systems, to just mention a few. However, none of the courses taught throughout these programs are related to piers, docks or sea walls as can be seen on the attached curricula of the before mentioned universities. Keeping the new definition would be incorrect and will affect all professionals that have graduated with a degree in Naval Architecture and Marine Engineer.

Some Universities and Colleges have been offering Marine Engineering for over 100 years. Keeping the new definition prevents Marine Engineer graduates from working with what they have been taught, but rather relates their title to another discipline.

Based on the proposed new definition, graduates with this double major (Naval Architecture and Marine Engineer) could no longer use the Marine Engineer title — even though our Diploma depicts the "Marine Engineer" title.

I request the possibility of considering the SNAME definition to describe a Marine Engineer, which I consider to be more in accordance to the actual meaning. The design of piers, docks, sea walls, or other marine structures could fall under terms such as coastal engineering, waterfront engineering, or marine civil engineering to list a few possible options.

Yours Sincerely,

Miguel Angel Tovar, EI

cc via e-mail:

Zana Raybon
FBPE Executive Director & FEMC President
(zraybon@fbpe.org)

Enclosure (3)

Webb Institute Undergraduate Curriculum Matrix

FRESHMEN		SOPHOMORE***		JUNIOR		SENIOR	
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
Math I Calculus I 4-0-4	Math II Calculus II 4-0-4	Math III Differential Equations 3-0-3	Math IV Adv Engnrg Math 4-0-4	Probability/ Statistics 4-0-4	Thesis 0-1-½	Thesis 0-5-2½	Thesis 0-6-3
Technical Communication 2-0-2	Political Philosophy 3-0-3	Western Culture I 3-0-3	Western Culture II 2-0-2	Humanities/ Social Science Elective 3-0-3	Development of American Government 2-0-2	Ethics and the Profession 3-0-3	Professional Presentations 2-0-2
Chemistry 3-1-3½	Materials Science 3-0-3	Strength of Materials 3-0-3	Dynamics 3-0-3	Vibrations 3-0-3	Hydrodynamics 3-0-3		Special Topics 3-0-3
Physics I 3-0-3	Physics II 2-0-2	CAD 0-2-1	Physics III 2-2-3	Electrical Engineering I 2-2-3	Electrical Engineering II 2-2-3	Engineering Economics 1-0-1	Senior Seminar 2-0-0
Programming & Applications 2-1-2½	Statics 3-0-3	Thermo-dynamics 3-0-3	Fluid Mechanics 3-0-3		Ship Design I 1-4-3	Ship Design II 2-4-4	Ship Design III 1-4-3
Introduction to Naval Architecture 2-2-3 (NA I)	Science Lab 0-2-1	Ship Statics 2-2-3 (NA II)		Ship Resistance & Propulsion 2-2-3 (NA III)	Ship Structures 2-2-3 (NA IV)	Ship Dynamics 3-0-3 (NA V)	Propulsor Design and CFD 3-0-3 (NA VI)
	Intro to Mar Engineering Systems 1-2-2 (ME I)	Mar Eng System Components 2-2-3 (ME II)	Mar Eng Machinery Design 3-0-3 (ME III)	Mar Eng Applied Thermo 3-0-3 (ME IV)	Ship Auxiliary Systems 4-0-4 (ME V)	Ship Propulsion Systems 4-2-5 (ME VI)	Marine Transportation 3-0-3 (NA VII)
20/18	19/18	23/19	19/18	21/19	24/18½	24/18½	24/17

↑ Ship/Boat Yard Trades Internship

↑ Cadet/Observer Aboard Ship Internship

↑ Marine Industry Internship (Juniors)

↑ Marine Industry Internship (Seniors)

NA&ME Curriculum Effective Fall 2015

A typical study plan for a Naval Architecture and Marine Engineering student at the University of Michigan.

Year 1

1	Math115 4	Chem 125/126 and 130 or Chem 210/211 5	Eng 100 Intro. to Engineering 4	Intellectual Breadth or free electives 4	17
2	Math116 4	Physics 140/141 5	Eng101 Intro. To Computers & Programming 4	Intellectual Breadth or free electives 4	17

Year 2

3	Math 215 4	ME 235 Thermodynamics I 3	Physics 240/241 5	NA 270 Marine Design I 4		16
4	Math 216 4	ME 211 Intro to Solid Mechanics 4	ME 240 Dynamics and Vibrations 4	NA 260 Marine Systems Manufacturing 2	NA 280 Probability for Marine Engineers 2	16

Year 3

5	NA320 Marine Hydrodynamics I 4	NA310 Marine Structures I 4	NA331 Marine Engineering I 3	Intellectual Breadth or free electives 5		16
6	NA321 Marine Hydrodynamics II 4	NA340 Marine Dynamics I 4	NA332 Marine Electrical Engr. 3	NA391 Marine Engr. Lab I 3	Intellectual Breadth or free electives 2	16

Year 4

7	NA470 Foundation of Ship Design 4	Technical Elective I 4	Select from NA410 NA420, NA431*, NA440	NA492 Marine Engr. Lab II 2	Intellectual Breadth or free electives 5	15
8	NA475 Marine Design Team Project 4	Technical Elective II 3	Select from NA401, 403, 410, 416*, 420, 423, 431*, 440, 483*, 525*, 562; Math 450, 454*, 471*	NA 461 Marine Structures Construction 3	Intellectual Breadth or free electives 5	15

*- 3 credit Tech Elective

BSE Requirements = 128 credits
Intellectual/Breadth = 16 credits
Free Electives = 8-10 credits

Naval Architecture and Marine Engineering 2015

→ Prerequisite - - - - - - - - → Credit or Registration

Freshman	Sophomore	Junior	Senior
Introduction to Naval Architecture NAME 1170 (3)	Naval Arch. Laboratory NAME 1175 (2)	Hydrostatics and Stability NAME 2160 (3)	Intro to Marine Engineering NAME 2130 (3)	Ship Hull Strength NAME 3120 (3)	Marine Engines NAME 3131 (3)	Marine Electro-mechanical Eng. NAME 3135 (3)
	Statics ENCE 2350 (3)		Mechanics of Materials Lab ENCE 2311 (1)	Ship Resistance and Propulsion NAME 3150 (3)	Marine Hydro-dynamics Lab NAME 3155 (1)	NAME Elective NAME 4 _ _ _ (3)	NAME Elective NAME 4 _ _ _ (3)
		Dynamics ENME 2750 (3)	Mechanics of Materials ENCE 2351 (3)	Engineer. Analysis ENME 3020 or MATH 3221 (3)	Offshore Structure and Ship Dynamics NAME 3160 (3)	Marine Design NAME 4170 (3)	Marine Design Project NAME 4175 (3)
		Differential Equations MATH 2221 (3)	Fluid Mechanics ENME 3720 (3)		Marine Design Methods NAME 3171 (3)	NAME Elective NAME 4 _ _ _ (3)	NAME Elective NAME 4 _ _ _ (3)
Calculus I MATH 2114 (4)	Calculus II MATH 2124 (4)	Calculus III MATH 2134 (4)	Fluid Mechanics Laboratory ENME 3716 (1)			Senior Seminar ENGR 3090 (1)	
Physics for Science and Engineering I PHYS 1061 (3)	Physics for Science and Engineering II PHYS 1062 (3)		Thermodynamics ENME 2770 (3)	Material Properties ENME 2740 (3)	Basic Electrical Circuits ENEE 2500 (3)		
Physics Laboratory PHYS 1063 (1)	Physics Laboratory PHYS 1065 (1)		General Chemistry I CHEM 1017 (3)	Engineering Economics ECON 2000 (3)	Technical Writing ENGL 2152 (3)		Biology Elective BIOS _ _ _ _ (3)
English Composition 1 ENGL 1157 (3)	English Composition 2 ENGL 1158 (3)	Literature Elective _ _ _ _ _ _ _ _ (3)		Art Elective _ _ _ _ _ _ _ _ (3)		Ethics PHIL 2201 (3)	Social Science Elective _ _ _ _ _ _ _ _ (3)
14 credit hours per term	**16**	**16**	**17**	**18**	**16**	**16**	**15**
Fall	**Spring**	**Fall**	**Spring**	**Fall**	**Spring**	**Fall**	**Spring**

Use boxes underneath courses to assign terms.

First-time, full-time Freshmen also have to take UNIV 1000

Some course names are abbreviated! Use course numbers to enroll.

Underscores in course numbers indicate student choices. Observe graduation requirements.

The numbers in parenthesis are the course credit hours.

Jul 15, 2015, lb

Student Name: _____

Student ID: _____

Date: ___/___/___

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Mr. William C. Bracken, P.E.
Chairman, Florida Board of Professional Engineers
2639 N. Monroe Street, Suite B-112
Tallahassee, FL 32303

August 3, 2015

Mr. Bracken;

I write to you today regarding the Board's proposed redefinition of the term Marine Engineer, as used in Section 471.031, F.S. This rule change redefines Marine Engineer as an engineer specializing in pier, dock, seawall, and marine structure design. It further specifies that the discipline of Marine Engineering will no longer encompass marine vessel design. As a currently practicing licensed engineer working in the field of marine vessel design (formerly known as Marine Engineering), this change of title definition has negative effects my current and future career trajectory. As such, I am asking for the Board to reconsider their actions and reverse their decision.

Redefinition of the title of Marine Engineer provides a great deal of confusion to the general public, and anyone who requires design and engineering services for their marine vessel. If a search for "Marine Engineer" yields only results of firms specializing in seawall construction, clients needing vessel design will be unable to find suitable firms. Additionally, my current employer will suffer the financial consequences of potential new clients being unable to discover our firm and its range of capabilities.

While this change is only written in the books in the state of Florida, its effects extend well beyond the state lines. I ask you to please keep in mind that in order to provide services to a greater range of clients, many engineers in my line of work hold licenses in multiple jurisdictions. I personally hold an active license in the state of Louisiana, in addition to the state of Florida. Several colleagues of mine hold licenses in Alabama as well. We are known in these states, and nationwide, as Marine Engineers. The rule change proposed by the FBPE will greatly confuse that fact. I will be classified as a Marine Engineer in 49 states (in fact, even internationally), yet in Florida I risk disciplinary action for associating with that title. To comply with the FBPE rules, I must advertise my services as something else. If clients outside the state of Florida cannot find my company when searching for licensed Marine Engineering firms, it does us a great disservice, and limits our earning potential. All those jobs which could have landed in our hands will now end up in other design firms, and in other states. Obviously, this is bad for the company since it lowers the amount of money coming in. It's also bad for the state of Florida, to see this potential source of revenue eliminated due to an unnecessary discrepancy in job title verbiage.

In addition to the negative effects on my company's practices, this action by the Board is grossly inconsistent with the entire definition of a worldwide industry, in both an educational and professional sense.

I am a 2008 graduate of Webb Institute. Webb Institute is a fully accredited college, widely considered the premier higher education institution for the field of Naval Architecture and Marine Engineering. During my four years as a student, I studied extensively, following a rigorous course load. This education provided me with all the knowledge needed to begin my career designing marine vessels of all sizes: tug boats, yachts, commercial fishing vessels, container ships, barges, etc. Not once during my course of study was the design of docks, seawalls, or fixed structures discussed. It was understood that a degree in Naval Architecture and Marine Engineering would enable me to design boats. During networking events where I interacted with students from other schools, there was a consistency in our discussions: we were all pursuing an education to become Marine Engineers -- to design marine vessels and ships, not docks and seawalls. My course load was heavily influenced by our industry's governing professional association, the Society of Naval Architects and Marine Engineers (SNAME). SNAME is a professional organization which was founded in 1893 and provides publications, conventions, and educational services for persons in the fields of Naval Architecture, Marine Engineering, and Ship Design. The Society has numerous publications dedicated to various aspects of ship design – yet not one dealing with the design of fixed, land-based structures. Why then, is the FBPE attempting to redefine the term Marine Engineer to something vastly inconsistent with the educational and professional precedent that has been in existence for well over a century?

In 2013, I sat for the professional licensing exam. I submitted the application to the FBPE, where I outlined my work experiences – all relating to the design of ships. This was good enough for the Board, which approved my application. I sat for the NCEES exam in the discipline of Naval Architecture and Marine Engineering, and answered questions entirely relating to the design of marine vessels and vessel systems. There was not one question on the exam relating to the design of a dock, seawall, pier, or fixed structure. The FBPE was happy to take my money when I applied to sit for the PE licensure examination. They are happy to have me spend my valuable time and money completing continuing education courses in order to maintain an active license. Yet now, they are also all too happy to take away the title I have worked so hard for and tell me that I may no longer use the title of Marine Engineer, because it is reserved for someone in a completely different field. I challenge the Board to explain how it makes sense that someone lacking the educational background and knowledge base to pass the Naval Architecture and Marine Engineering discipline of the PE examination be given the official title of Marine Engineer.

In summary, it is my strong opinion that the FBPE rethink its decision to redefine the definition of Marine Engineer. It is harmful to all the individual engineers and businesses in the state of Florida who have been providing ship design and engineering services for years. It is also contradictory to the educational and professional standard known around the world.

I believe that I, and all the other practicing Naval Architects and Marine Engineers in the state of Florida, deserve the respect of your consideration of this matter.

Regards,

Johanna L. Exner, P.E.

Cc: Zana Raybon

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August 3, 2015

William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee FL 32303-5268

Via: Email (*board@fbpe.org*)

Re: 61G15-18.011 Definitions – Marine Engineer

Reference: (a) Minutes for The Florida Board of Professional Engineers April 8, 2015

Dear Mr. Bracken:

I have been made aware, thorough the April meeting minutes, about the motion to set forth the definition of a “Marine Engineer” under the FBPE rules as a protected title. As a licensed professional engineer, I am a firm supporter of protected titles and the enforcement of them by the Florida Board. However, I feel the exclusion of those engaged in the design of marine vessels in the proposed definition of a “Marine Engineer” poses a risk to public safety and personal property by allowing unqualified persons to provide engineering services in the design of marine vessels in the state of Florida.

The US department of labor defines a Marine Engineer as follows: Marine engineers and naval architects design, build, and maintain ships from aircraft carriers to submarines, from sailboats to tankers. Marine engineers work on the mechanical systems, such as propulsion and steering. Naval architects work on the basic design, including the form and stability of hulls. Nowhere in this definition is there a discussion in regard to the design of piers, docks, sea walls or other marine structures, but instead this definition is specific to vessels. Similar definitions can be found throughout many industry resources.

I obtained a Bachelor of Science degree from Webb Institute in Naval Architecture and Marine Engineering. Webb Institute has been a leading college in these fields since its foundation in 1889. Its curriculum follows a thorough set of coursework in the Marine Engineering field that includes courses pertaining directly to maritime vessel machinery. The curriculum begins with an introductory course of propulsion and auxiliary systems and moves further into more detailed studies of machinery and systems, including the design aspects of steam generators, steam and gas turbines, diesel engines, heat exchangers, power transmission systems, main engine support systems, piping systems, HVAC systems, and control systems. These are all aspects of the industry-accepted Marine Engineering field that, under the new definition, would fall outside the realm of a Marine Engineer.

I am unsure why the FBPE feels it does not have jurisdiction over the engineering of vessels in the state of Florida. Regardless of whether the engineering is being performed on a land based structure, a vehicle, vessel, etc., if the engineering is being performed by an individual/firm in the state of Florida, then the FBPE should require the engineer be licensed. I feel it is the duty of the Florida Board of

Professional Engineers to oversee all aspects of engineering undertaken in the state of Florida regardless of whether it is contained in the Florida Building Code or not.

Furthermore, it should be noted that the FBPE currently offers the NCEES examination for Naval Architecture and Marine Engineering to qualified individuals. However, the aspects of Marine Engineering in this exam fit the traditional definition of Marine Engineering, and do not include the design of docks and structures under the Florida Building Code. One would think that if an individual took an exam that was involving Marine Engineering, that person would be qualified to practice as a Marine Engineer. Under the updated definition, this individual would in fact not be qualified to do so. If the board lacks jurisdiction over the engineering of vessels, then why does the Board offer an examination concentrated on vessel design and license these individuals as such?

The primary purpose of licensure is to protect the public health, safety, and welfare. By specifically excluding the engineering of vessels under the definition of Marine Engineering, the Board is turning a blind eye to the protection of an industry that is intertwined throughout the livelihoods of many Floridians. I request this motion be repealed and the protected title of Marine Engineer be reconsidered to include the engineering of vessels and offshore structures.

Should you have any questions, please do not hesitate to contact me.

Yours Sincerely,

Dennis J Tarantino
2015.08.03 14:53:11 -04'00'

Dennis Tarantino, PE
FL PE License # 68303
AL PE License # 33836

CC: Zana Raybon
FBPE Executive Director & FEMC President
Via: Email (zraybon@fbpe.org)

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August 3, 2015

William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee FL 32303-5268

Via: Email

Re: FBPE's Proposed Definition of "Marine Engineer"

Dear Chairman Bracken:

My name is Mark D'Angelo and I am a practicing Naval Architect and Marine Engineer with Murray and Associates LLC. in Fort Lauderdale, FL. I received my undergraduate degree from Webb Institute with a dual major of Naval Architecture and Marine Engineering. Upon graduation, I came to work for Murray and Associates LLC and endeavored to obtain my Florida Professional Engineer's license. For years, I practiced my field under the tutelage of other capable PE's in our office until I achieved the Board's perquisite requirements to sit for the PE exam. As I hope you are aware, the expenditure in obtaining my own license, both in time associated with the necessary paperwork and time preparing for the exam as well as financial costs for exam registration and appropriate study materials, was very significant. I sat for and successfully passed the Naval Architecture and Marine Engineering discipline exam in 2012 and was proud to become a licensed Professional Engineer in the state of Florida.

It has recently come to my attention that the FPBE has provided a proposed rule amendment to define the title "Marine Engineer." Upon review of the details surrounding this definition, I am unpleasantly shocked that a board of professionals could be so clearly inaccurate while defining a specific discipline of engineering. Further exacerbating my concern is the fact that not a single qualified Marine Engineer was present during this April 2015 meeting to provide clear and accurate description of the definition. I liken this to sending an untrained soldier onto the front lines of a battle. Without proper training and instruction, this "soldier" will stand minimal chance in achieving victory, let alone surviving combat.

As a practicing Marine Engineer, I implore you to consider my qualified opinion regarding the definition of what I endeavor to do each day of my career. Your proposed definition of Marine Engineering is WRONG. It is inaccurate. According to the proposed definition, marine engineering does NOT encompass the design of marine vessels. How can this be true when I have spent eight years of my career designing MARINE VESSELS? How can this be accurate when my undergraduate education, from arguably the most prestigious Marine Engineering Institute in the world, was geared towards the design of marine vessels? For arguments sake, I would conservatively opine that greater than 90% of the curriculum taught there is geared towards MARINE VESSELS. Where is the disconnect? Why would the board take it upon itself to unilaterally propose a definition for an engineering discipline that is in conflict with reality? I implore you to reconsider this stance, and advise that the board seek the advice of the industry professionals that can accurately define our field.

As noted above, I paid dearly for my PE license. I sacrificed to augment my career and ensure my practices were sound and in accordance with engineering practices recognized by the Board. Should you choose to move forward with this unfounded proposed definition, all of that would have been a waste, in both my efforts and financial commitments. I would be practicing in a field that is not protected by the licensure requirements that I worked so hard to obtain. By doing this, the board will allow unqualified engineers to practice the true definition of Marine Engineering, exposing the general public that enjoy boating, or working on marine vessels, in the sunshine state to great risks. These are true travesties.

Should you have any questions regarding the comments above, please do not hesitate to contact the undersigned professional engineer proudly specializing in Naval Architecture *AND MARINE ENGINEERING – including the design of marine vessels*.

Yours Sincerely,

Mark D'Angelo, PE
FL PE License # 74697

CC: Zana Raybon
FBPE Executive Director & FEMC President
Via Email: zraybon@fbpe.org

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August 3, 2015

William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee, FL 32303

Via Email: board@fbpe.org

Mr. Bracken:

I was shocked to learn that the Florida Board of Professional Engineers has put forth a motion to define the title of "Marine Engineer" as a person engaged in the design of piers, docks, sea walls or other marine structures, and specifically **not** those engaged in the design of marine vessels. This is quite the opposite of the commonly held definitions of these terms, which would suggest that "Marine Engineering" is the design of marine vessels, and the design of piers, docks and sea walls fall under terms such as "Coastal Engineering" or "Marine Civil Engineering". A simple Google search will yield the conventional definitions of these terms.

I hold a Bachelor of Science degree in Naval Architecture and Marine Engineering from the Webb Institute in Glen Cove, NY. Beyond that, I have 7 years of career experience in what I and my colleagues call "Marine Engineering". Last year I took the NCEES Professional Engineer License exam in the discipline of "Naval Architecture and Marine Engineering". My career has been comprised of designing, engineering and maintaining marine vessels. I have a shelf on my desk full of Marine Engineering textbooks. Never once have I designed or studied the design of a pier, dock or sea wall.

Changing the commonly held definition, particularly if it only applies to the State of Florida, will cause significant confusion for clients trying to determine which firms and individuals are qualified for these various types of engineering work. It would give some engineers license to practice in fields for which they are not qualified, while stripping others, such as myself, of the title of our profession.

I respectfully request that the Board repeal this motion. Please consider protecting the title of "Marine Engineer" by maintaining the conventional definition of this specific engineering discipline.

Best Regards,

Emily Whitman, PE
Naval Architect / Marine Engineer
Florida PE # 77669

Cc: Zana Raybon, BFPE Executive Director & FEMC President, via email: zraybon@fbpe.org

Steven Guglielmoni
Naval Architect and Marine Engineer
1515 E Broward Blvd. Apt. 316
Fort Lauderdale, FL 33301

August 3rd, 2015

William C. Bracken, PE
Chairman, Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee FL 32303-5268

Mr. Bracken,

I'm writing to express my concern regarding a recent change to the FBPE rules committee to rule 61G15-18.011 ("Definitions") regarding the definition of a "Marine Engineer." In the April 8th meeting of the FBPE, an amendment was proposed and approved which stated the following:

> *(7) The term "marine engineer" as used in Section 471.031(b), F.S. shall mean a person who uses engineering principles and methodologies in the design of piers, docks, sea walls, or other marine structures governed by the Florida Building Code. Marine engineering shall not encompass the design of marine vessels, except for floating residential units as defined in Section 202 of the Florida Building Code.*

As a practicing engineer with a Bachelor's of Science in the field of "Naval Architecture and Marine Engineering" from Webb Institute, as well as a master's of science in Ocean Engineering from Stevens Institute, I believe that this amendment provides an incorrect definition of what generally constitutes a "marine engineer."

Per the Oxford English Dictionary, marine engineering is defined as "the branch of engineering that deals with the construction, operation, and maintenance of machinery and equipment used in ships, offshore installations, or elsewhere at sea." Similar definitions are also held by a number of American professional societies, regulatory societies, and educational institutions, including – but not limited to:

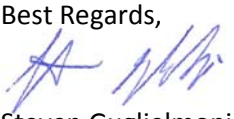
The Society of Naval Architects and Marine Engineers
The American Society of Naval Engineers
The American Bureau of Shipping
The United States Code of Federal Regulations
The New York Board of Professional Engineers and Land Surveyors
The United States Naval Academy (USNA)
The United States Coast Guard Academy (USCGA)
The United States Merchant Marine Academy (USMMA)
The California, Great Lakes, Massachusetts, Maine, New York, and Texas Maritime Academies.
Webb Institute of Naval Architecture and Marine Engineering
The University of Michigan (UM)
The University of New Orleans (UNO)
Stevens Institute of Technology (SIT)

Given such a widespread definition across such a large number of sources with direct ties and influence over the United States marine industry, it seems ill-advised that the FBPE alone should choose to define the term differently, and patently unprofessional that it should do so without the counsel of a single practicing marine engineer.

Additionally, I believe some consideration should be made regarding the impact of this change upon those of us in the state of Florida who hold nationally accredited degrees in the field of marine engineering, but have never studied "the design of piers, docks, sea walls, or other marine structures." As someone who is working towards a professional engineer's license in the state of Florida, I would feel uncomfortable describing myself as a "marine engineer" under this amendment, but would have no other title which would accurately convey my engineering background to the rest of the marine industry. It is with this in mind that I ask the Rules Committee to revisit this amendment and consider updating it to define a "marine engineer" in a way which does not conflict with those definitions of the rest of the maritime community.

Thank you for taking to time to read this, and I hope the board can offer further consideration on the matters I've addressed.

Best Regards,



Steven Guglielmoni
Naval Architect and Marine Engineer

cc: Zana Raybon
FBPE Executive Director & FEMC President