



**FBPE**  
FLORIDA BOARD OF  
PROFESSIONAL ENGINEERS

# Connection

*Linking You With the Florida Board's Latest Engineering News and Information*

October 2021

## From the Executive Director: Disciplinary Process 101

By **Zana Raybon**, FBPE Executive Director & FEMC President

As you might expect, the Florida Board of Professional Engineers' office receives a lot of inquiries whenever a catastrophic event happens.

If a building or structure collapses, we can count on a flurry of questions, and understandably so. Engineers recognize the importance of protecting the public's health and safety, and are, therefore, concerned when such events cause injury or loss of life.

What a lot of engineers and the public don't realize is the process the Board and its staff must go through when a complaint is filed against an engineer. One of the best places to start to understand our procedures is [Section 471.038\(3\), Florida Statutes](#), which states:

*The Florida Engineers Management Corporation is created to provide administrative, investigative, and prosecutorial services to the board in accordance with the provisions of chapter 455 and this chapter.*

This means the Legislature, when it established the [Florida Engineers Management Corporation](#) in 1998, gave Board staff the authority to investigate and prosecute any complaints received against licensed engineers.

Anyone can file a complaint against an engineer. We receive complaints from homeowners, business owners, building officials, and even other engineers. All one must do is go to [our website](#) and download the complaint form.

Once a complaint is filed with the Board, our investigator will open the complaint in our licensing system and begin to gather information to determine if the complaint is legally sufficient. In other words, is the accusation a violation of the *Engineering Practice Act*?

If the complaint is legally insufficient, it is closed.

If the complaint is legally sufficient, a full investigation is launched, which may include obtaining additional documentation and witness statements. This is where it may be important to know who the complainant is. While you can file a complaint anonymously, if the investigation requires additional information and we have no contact information for the complainant, we may have to close the file.

Once an Investigative Report is complete, the file will go to the Board's Probable Cause Panel (PCP), which meets every other month. The PCP's three-member panel comprises one or two current Board members



and one or two past Board members. The PCP will deliberate and determine whether to simply close the case with no further action, close the case with a Letter of Guidance, or issue an Administrative Complaint. The PCP meetings are closed to the public.

If an Administrative Complaint is authorized by the PCP, the respondent may opt to agree to a Settlement Stipulation, elect to convene an Informal Hearing (before the FBPE Board), or have the case go to the Division of Administrative Hearings to be heard before an administrative law judge.

Once the case has been finalized, it is considered inactive. Some of the inquiries we receive have to do with trying to obtain information about complaints that have been filed against a particular engineer. It is important to realize that FEMC has a slightly different requirement than some other regulatory boards. [Section 471.038\(7\), F.S.](#), addresses how active complaints are handled, stating:

*For the purposes of this subsection, an investigation is considered active so long as the management corporation or any law enforcement or administrative agency is proceeding with reasonable dispatch and has a reasonable, good faith belief that it may lead to the filing of administrative, civil, or criminal proceedings. An investigation ceases to be active when the case is dismissed prior to a finding of probable cause and the board has not exercised its option to pursue the case or 10 days after the board makes a determination regarding probable cause. **All information, records, and transcriptions regarding a complaint that has been determined to be legally sufficient to state a claim within the jurisdiction of the board become available to the public when the investigation ceases to be active.** (Emphasis added)*

So, when we receive inquiries from the public, media, or other engineers, we are not able to provide any information on an active investigation pursuant to Florida law. Once the case is dismissed or 10 days after probable cause is found, we can then make the investigation public.

It is also important to note that our website contains [the latest disciplinary actions](#) by the Board, for those that are interested.

Remember, we are always available to answer any questions you may have about the Boards' disciplinary process or how to file a complaint. Just don't ask for information about an ongoing investigation.

## Chair's Corner: PE Licensure: The Good, the Bad, the Ugly

By C. Kevin Fleming, PE

I am a Clint Eastwood fan from way back, and some of my favorite Clint movies are the spaghetti westerns of the 1960s and '70s that got his career rolling. One film, *The Good, the Bad, and the Ugly*, is a classic character play between moral and immoral — albeit very loosely — as well as the persona that is both good and bad, but mostly neither: the ugly.

Your Board will review thousands of applications every year, for both the achievement of Engineering Intern and for Professional Engineer. Just like characters in a dusty western, there are those applications that can be approved (the “good”), those that do not comply with the statutes (the “bad”), and then there are those applications that are



vague, incomplete, or contain conflicts, such that the application cannot be deemed to demonstrate the requirements of licensure.

There are four basic requirements for licensure in engineering in Florida. Let's consider each.

## **Education**

The first is education. Chapter 471.013(1)(a), Florida Statutes, states:

*A person shall be entitled to take an examination for the purpose of determining whether she or 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 science curriculum of 4 years or more in a school, college, or university which has been approved by the board; or*
- 2. Is a graduate of an approved engineering technology curriculum of 4 years or more in a school, college, or university which has been approved by the board.*

The statute then directs and authorizes the Board to determine what an approved curriculum consists of. That determination is made as part of the definitions within in Rule 61G15-20.001, Florida Administrative Code — as well as sections 61G15-20.007 or 61G15-20.008 — and Chapter 455.11(2), F.S.

For most applicants, this is achieved by obtaining an engineering science or engineering technology degree from an EAC/ABET- or ETAC/ABET-accredited curriculum.

Applicants whose degree is not from an ABET-accredited school or university must demonstrate that they meet the requirements of Rules 61G15-20.007 or 61G15-20.008 by other means. This is not uncommon, especially for applicants with degrees from other countries where engineering programs are not surveyed or accredited by ABET. This involves having the education program's curriculum evaluated by comparing it to the standards of Rules 61G15-20.007 or -20.008, F.A.C., as appropriate.

Applicants whose degree curriculum is found lacking have several options, including completing additional college-level courses, obtaining an advanced degree from a college or university whose undergraduate program is accredited, or showing equivalence through examination of the missing non-engineering core subject matter via the College-Level Examination Program, or CLEP, for short. "Clepping" courses is an efficient and affordable way to fulfill the general education and basic math and science requirements that foreign degrees often may be missing.

## **Experience**

Engineering experience is the next component of licensure and must be demonstrated as part of the application process.

*Chapter 471.015, F.S., Licensure*

*(1) The management corporation shall issue a license to any applicant who the board certifies is qualified to practice engineering and who has passed the fundamentals examination and the principles and practice examination.*

*(2)(a) The board shall certify for licensure any applicant who has submitted proof satisfactory to the board that he or she is at least 18 years of age and who:*

*1. Satisfies the requirements of s. 471.013(1)(a)1. and has a record of at least 4 years of active engineering experience of a character indicating competence to be in responsible charge of engineering; or*

*2. Satisfies the requirements of s. 471.013(1)(a)2. and has a record of at least 6 years of active engineering experience of a character indicating competence to be in responsible charge of engineering.*

Experience, to be acceptable, must be in accordance with Chapter 471.013(1)(a)1 and 2, F.S., and Rule 61G15-20.002, F.A.C.

Applicants should accurately and succinctly describe work that produce engineering design as defined in Rule 61G15-18.011, F.A.C. Applicants must demonstrate a relevant and increasing level of responsibility and the application of engineering knowledge.

Work must be supervised by someone with appropriate seniority, training, and education, and who is responsible for the applicant's activities. In general, that supervision should come from a licensed Professional Engineer, however, that is not always the case — see Rule 61G15-20.002, F.A.C.

Appropriate experience may consist of work that demonstrates:

- Engineering concepts and learning (engineering sciences, mathematics, and sciences)
- Decision-making as part of a process
- Analysis
- Original thought
- Investigation, research, and drawing conclusions
- Development of standards, processes, details or methods, based upon theory, research, and application
- Contributing directly to engineering work that is deemed by the statutes to require a licensed engineer in responsible charge
- Demonstration of experience that clearly demonstrates the applicant's ability to be placed "in responsible charge" of engineering.

The following activities do not require the application of engineering principles and are generally not considered engineering:

- Monitoring or reporting, except as a required component of engineering oversight and performed as part of an engineering service
- Scheduling or logistical activities
- Negotiation or review of proposals, quotes, etc.
- Field labor or supervision of field labor
- Any work the results of which do not exceed the obvious
- Any work for which the applicant is not competent or qualified to perform.

Applications that clearly describe the applicant's role, performance of appropriate experience, level of responsibility, and supervision by a senior team member in responsible charge are important elements of the application to convey to the Board. By statute, experience must demonstrate, to the Board's satisfaction, the applicant's fitness to be placed in responsible charge. Anything less may be found to be unacceptable upon review.

## *Examination*

Thirdly, every engineer licensed to practice in our state has successfully taken and passed two examinations, each approximately eight hours in length. There are some exceptions, granted by rule, for substantial experience or education by which the Fundamentals of Engineering (FE) or the Principals and Practice of Engineer (PE) exam is waived, but these circumstances are rare.

### *Chapter 471.015, F.S., Licensure*

*(1) The management corporation shall issue a license to any applicant who the board certifies is qualified to practice engineering and who has passed the fundamentals examination and the principles and practice examination.*

The requisite exams are adopted under authority of Chapters 455 and 471, and Rule 61G15-21.001, F.A.C., and administered by the National Council of Examiners for Engineers and Surveyors (NCEES). Simply put, in almost every consideration, passing the FE and PE exams are required for licensure.

The Board reviews many applications for licensure by comity, persons licensed in another state or multiple states who were issued a license to practice without successfully passing one or both of the required examinations. These applications are uniformly denied.

## *Good Moral Character*

Chapter 471, F.S., is clear that applicants for licensure should be of good moral character. What does that mean, exactly?

Do past transgressions prevent one from entering the profession? Probably not. We are all human and have flaws. All of us have made poor decisions and probably acted in ways that were not in our or someone else's best interest.

However, engineers licensed in Florida are charged with protecting the health, safety, and welfare of the public.

Our statutes and rules do not require us to become wealthy or to work for free. There is no rule language that suggests how each of us is to go about our work. Short of some administrative directives, our charge is only to stay faithful to that public trust.

This is a complicated matter, and the Board looks at each situation individually. In the end, applicants must always be forthright. Anything less may imply a character not befitting an engineer.

I encourage our applicants to be "The Good," with the required examinations passed and all requisite education and material experience reported.

After more than six years as a Board member, I can say the Board is eager to review every application. It is rewarding to me personally as a licensee to see a complete education file, a strong accounting of qualifying experience, and all required credentials clearly showing an applicant is qualified to practice engineering in Florida and is suitable to be in responsible charge.

## FBPE Office Has New Address, Hours

The office of the [Florida Board of Professional Engineers](#) has moved to a new location in Tallahassee, and changed its office hours.

FBPE's new address is [2400 Mahan Dr., Tallahassee, FL 32308-5302](#). Please use that address when mailing applications, fees, and other correspondence to FBPE or the [Florida Engineers Management Corporation](#).

Mail sent to the old Monroe Street address may be delayed or may not be delivered after October 2021. Please make sure that you are using the new address going forward.

In addition to the move, the office hours are now 7:30 a.m. to 4:30 p.m. Monday through Friday. Someone will be available to respond to your email or take your call between those hours.

The office is the workplace of the [Board's staff](#), who are employees of the [FEMC](#). The staff handles functions for the Board including licensure, investigations, and outreach.

## 2021 FEMC Annual Report Highlights

The [Florida Engineers Management Corporation](#) produces an annual report as required by [Section 471.038, Florida Statutes](#).

The report is submitted to the Secretary of the Department of Business and Professional Regulation, the Florida Board of Professional Engineers, and the Florida Legislature by Oct. 1 each year. It reports on the status of the corporation, including information concerning FEMC programs and funding, as well as information regarding licenses and complaints handled by FEMC.

Below are some highlights from the Annual Report for Fiscal Year 2020-21 (July 1, 2020-June 30, 2021):

**32** – Number of meetings administered for the FBPE Board and committees

**42,372** – Average number of licensees and others receiving FBPE's [Connection newsletter](#) each quarter

**256,900** – Approximate number of users of the FBPE website, a 145-percent increase from FY19-20 and a 126-percent increase from FY18-19 (the previous license renewal period)

**1,250** – Approximate number of engineering students, interns, and professionals reached by **6** virtual and **1** in-person outreach presentations to discuss engineering exams and licensure at universities and companies/organizations (with travel limited by the COVID-19 pandemic)

### LICENSURE STATISTICS

**38,057** – Professional Engineer licenses renewed

**4,120** – Applications received for PE licensure

**2,741** – Applications for PE licensure approved

**204** – Applications for PE licensure denied

**655** – Certifications issued for Special Inspectors of threshold-type buildings



**59.52** – Days on average to issue a license

**789** – Examinees passed the October 2020 NCEES Principles & Practice of Engineering exam (paper/pencil & CBT); **496** failed the exam; and **43** did not show to take the exam

**463** – Examinees passed the April 2021 NCEES Principles & Practice of Engineering exam (paper/pencil & CBT); **467** failed the exam; and **20** did not show to take the exam

**13,669** – Examinees passed the NCEES Fundamentals of Engineering exam (CBT) in FY20-21; and **1,100** failed the exam

### **LEGAL STATISTICS**

**231** – Complaints regarding engineering practice processed, of which **137** were found to be legally sufficient

**\$103,265.23** – Fines and Costs imposed

**68** – Administrative Complaints filed in cases where the Probable Cause Panel found reason to believe a violation of the *Florida Engineering Practice Act* had occurred

**88** – Final Orders issued against Professional Engineers

**1** – Case tried before an administrative judge at the Division of Administrative Hearings

**43** – Cases dismissed with a finding of no probable cause

**25** – Cases dismissed with a letter of guidance

**0** – Licenses revoked

**3** – Voluntary Licensure Relinquishments

**3** – Licenses suspended

**3** – Licenses restricted

**16** – Reprimands issued

**4** – Probations issued

**3** – Project reviews

**48** – Engineers ordered to successfully complete course in Engineering Professionalism and Ethics

**76** – Engineers ordered to successfully complete the Board's *Study Guide on Laws and Rules*

In addition to [FEMC Annual Reports](#), copies of [FEMC's Quarterly Reports](#) are also available online.

## **Mentoring Is More Than Teaching Engineering Fundamentals**

By Scott Drury, PE

Last weekend, I attended a memorial service for a good friend of mine whose life was tragically cut short. While losing a friend is always a difficult circumstance, this particular one hit closer to home than others, with multiple similarities between our lives: married to a teacher, father of two daughters, and a Professional Engineer by trade.

But, unlike other memorial services that I have attended, this included a eulogy from one of his team members about his life as a Professional Engineer. First, let me briefly introduce you to my friend.

David (Dave) Conrad, PE, was a structural engineer who primarily worked in port engineering. I had the privilege of working with him on one project in my career, a pro bono for the church we both attended.



During that project, I interacted with a few members of his team, one of whom gave this eulogy at his memorial service.

While I could tell you a lot of stories about Dave, I would like to share with you a few things mentioned by his team member during the eulogy, and how these can apply to each of us as Professional Engineers.

Dave was a mentor, a leader, and a loyal friend. He invested a lot of time in his team, not just with the technical engineering aspects, but also in other aspects of life. He taught his team first and foremost about our responsibility as engineers to protect the public. Dave was known for telling people about John R. Wooden's *Pyramid of Success*.

Dave was concerned about the success of others as much as his own. He was patient as he listened to others, helping them not only to solve problems but also to understand the path to the solution. He found satisfaction and joy in helping people be the best engineers they could be. In addition to all of this, he was a devoted family man and leader at his church.

This got me thinking more about the whole concept of mentoring young engineers, and why this is an important aspect of our roles as Professional Engineers.

The engineering profession is different from many others. Many professions do not require an applicant to have 48 months of full-time experience (post-graduation) under the supervision of a licensed professional before being eligible for a license.

Just wondering, from whose perspective do you see that requirement — from the applicant's or from the licensed professional's?

The applicant is required to gain this experience to be eligible, but nothing requires a licensed professional to mentor a young engineer. Training and mentoring someone for four years takes a lot of time and effort. So, why would anyone want to spend their time and energy doing that?

Maybe it's like being a parent. People do not typically become parents because they think it will make their life easier. In fact, they know that it will be a long commitment full of challenges, frustrations, and impacts on their time and personal finances.

But, as a parent, you get to experience life again from a different perspective, enjoy the successes of your child as they learn new things, mold eager minds and lives, and so much more. You can even carry-on traditions and start new ones.

Training and mentoring a young engineer can be just like that. Think about it... There are engineering traditions and fundamentals that have been passed on for generations, while new technologies and applications are continuously being made. Many people can learn engineering fundamentals from books. But, in addition to the technical application of engineering fundamentals, there are also a lot of intangibles — such as character, responsibility, teamwork, integrity, etc. — that we learn from our mentors.

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*“Success is peace of mind attained only through self-satisfaction in knowing you made the effort to do the best of which you’re capable.”*

*- John R. Wooden*

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Investing in the next generation of engineers is a way to pass on what you have learned as another way to continue our responsibility of “protecting the public health, safety, and welfare.”



As you read this next example, understand that I am aware that not all of you hold the same faith as me. However, hopefully you may appreciate the analogy.

There is a proverb in the Bible (Proverbs 22:6) that says, “Train up a child in the way he should go; even when he is old, he will not depart from it.”

The idea here is for us to teach our children the values we hold dear, not only in our words, but also by our deeds. If we apply that same logic to mentoring young engineers, we can help instill our engineering values into the next generation of engineers. We can teach them not only the correct way to apply engineering fundamentals, but also how to do so with integrity, how to take our responsibility to protect the public seriously, how to be a loyal team member, how to have mutual respect with the competition, and how to pass what they learn to the generation after them.

My friend Dave Conrad was a great example of this. I aspire to be more like him in many ways. I hope you will be inspired by this simple tribute and be that kind of mentor to the engineers you interact with every day.

## **A Look at Building Recertification in South Florida**

By JOHN C. PISTORINO, PE, SI

On June 24, 2021, a portion of a 12-story, concrete-frame condominium in Surfside, Fla., crashed to the ground, killing 98 people.

It was thought that collapses such as Champlain Towers South weren't supposed to happen. Miami-Dade County, and neighboring Broward County, had a 40/50-year building recertification program in place. No other jurisdiction in the country had such a program.

### ***A Brief History***

The only other poured-in-place concrete building to have collapsed in the United States — a federal building housing the Drug Enforcement Administration Miami Field Office — happened in downtown Miami on Aug. 5, 1974, killing seven.

At the time, my evaluation of the cause of the federal building collapse revealed that corrosion of embedded reinforcing steel had compromised the ability of concrete members to support the gravity loads.

The on-going corrosion of the steel had not been addressed, and the cracks in the concrete members (spalling) had been filled with caulking and aesthetically painted over on a continual basis. The building was originally constructed in 1925 and underwent renovations from time to time, so we considered the building was equivalent to a 40-year-old structure. An engineer had inspected and deemed the building safe six years before, in 1968.

We (Herbert M. Schwartz and Associates), as consultants to the Dade County Board of Rules and Appeals, were asked for a recommendation to prevent such an occurrence from happening again. We recommended that any building in Dade County older than 25 years be inspected by a competent structural engineer and be certified to be safe for occupancy. Many buildings were in this category, and ultimately the 40-year criteria were decided upon, with a follow-up every 10 years thereafter.



The South Florida Building Code (SFBC), a uniform building code for all of Dade County and its cities, incorporated Subsection 104.9, *Recertification* (1979 Edition).

Subsection 104.6, SFBC, *Structural Determination*, defined structural as “any part, material or assembly of a building or structure which affects the safety of such building or structure and/or which supports any dead or designed live load and the removal of which part, material or assembly could cause, or to be expected to cause, all or any portion to collapse or to fail.”

The building officials were required to send a “Notice of Required Inspection” to owners of buildings 40 years or older regarding recertification. The owner had to provide a written report, prepared by a Professional Engineer or architect registered in Florida, certifying that a building was structurally safe for the specified use or continued occupancy in accordance with the Recommended Minimum Procedural Guidelines for Building Recertification issued by the Building Official.

This applied to all buildings except single-family residences, duplexes, and minor structures. Minor structures have an occupant load of 10 or fewer and a gross area of 2,000 square feet or less.

“The report shall only be made by an engineer or architect qualified by training and experience. The report must indicate the manner and type of inspection forming the basis for the report,” as stated in the building code.

The recertification program was incorporated into the Miami-Dade County Ordinance, Subsection 8-11(f), *Existing Buildings*, because it was not carried through in the new Florida Building Code that replaced the SFBC in 2002. The last edition of the SFBC was 1994, and electrical recertification was added as a result of observations made in damaged buildings after Hurricane Andrew in 1992.

Recertification was also added to the Broward County Code Subsection 110.15.

Needless to say, the recertification program was intended to prevent a reoccurrence of the 1974 collapse.

### ***Enforcement of Recertification Program***

At this writing, it is unknown why Champlain Tower South collapsed. However, the incident revealed that many buildings in Miami-Dade and Broward counties, including Champlain Tower South, had not been recertified as required for one reason or another.

Irrespective of the recertification program, the SFBC required that buildings be maintained in a safe condition from the time they were constructed (SFBC Section 105, *Maintenance of Buildings and Property*). Building owners weren’t intended to wait for 40 years before inspecting and maintaining their buildings. In fact, the 40-year recertification was envisioned to confirm that the building had been maintained and was safe for occupancy.

It would be a relatively easy task to prepare a Recertification Report if the building was properly maintained over its life. Unfortunately, this was not the case in many buildings where sufficient funds and reserves were not available, and therefore critical maintenance was deferred.

Because of the unique mandatory and legal requirements of the 40-year Recertification Program, owners of buildings are required to produce the engineering reports or face fines and possible eviction. The Building Official has the authority to withdraw occupancy permits and declare a building unsafe in the absence of a Recertification Report.

## *Current Status*

Deferred maintenance has placed a major responsibility on structural engineers and architects to evaluate buildings that have been neglected and to make judgements as to the significance of the deterioration observed in such buildings. Therefore, the structural inspections have become more difficult as the significance and degree of spalling concrete in key structural elements — such as columns, beams, or slabs that are carrying significant and critical loading — must be made by the engineer.

Concrete buildings exposed directly to salt-laden air and rain and that may have workmanship deficiencies are candidates for concrete spalling deterioration long before the 40-year period has been reached. Deferred maintenance, such as painting and waterproofing, add to the potential for early significant deterioration of the building's structural elements.

The conclusion that an engineer or architect makes after conducting a 40-year structural inspection must be documented with a written opinion as to the continued safe occupancy of a building, even if the building requires significant repairs. Such judgement will be relied upon by the occupants and the Building Official, and with limitations as to when the repairs will be undertaken and completed. In fact, the common denominator is the judgement of the engineer/architect.

This is also true of the electrical engineer who is providing that phase of the recertification. Deficiencies in the maintenance of the electrical system may also lead to a potentially unsafe building.

## *Qualifications of Recertification Engineering/Architect Experts*

The recertification program requires that the report be made only by a Professional Engineer or architect qualified by training and experience. The FBPE licensing program relies upon an engineer to provide services only in areas for which he or she is competent, as well as qualified. Therefore, the mere designation of “PE” after ones’ name does not qualify an engineer to perform recertification inspections on buildings. As stated above, the occupants and building official must rely upon the *judgment of an engineer* as to whether a building should continue to be occupied.

Such judgments are life-safety decisions, and therefore, a Building Official may review the qualifications of an engineer and decide to accept a Recertification Report from the engineer or advise a building owner to obtain the services of another engineer/architect who, in the opinion of the Building Official, is qualified.

For purposes of this article, only the structural aspects will be discussed at this time.

The construction of a building and the significance of the load-carrying members must be well known by an inspecting engineer. Generally, this author is of the opinion that the engineer must be familiar with the design of buildings, as well as the activity during the construction phase. Such qualifications are similar to requirements for Special Inspectors (SI) of Threshold buildings, wherein minimum two years of design and three years of construction inspection are required by the Florida Board of Professional Engineers.

The SI is expected to observe all aspects of construction in new buildings and the repair of significant damage in existing buildings in accordance with the permitted plans. The permitted plans are used and not the shop drawings. The SI must measure the concrete cover that will be provided and observe the placement of concrete ensuring that required concrete sampling is taken. This experience during

construction provides firsthand knowledge as to the original condition of concrete members as constructed. The concrete quality and workability are also observed, including curing methods used.

The significance of a damaged structural member must be recognized and identified by the engineer who understands what loads and what capacities members are carrying, as well as their connection details. This requires design experience wherein load paths are developed and reinforced concrete structural capacities are established for shear, moment, and flexure in accordance with American Concrete Institute (ACI) Standards and building frame load path distribution. Therefore, engineers/architects must assure and demonstrate to the end users (building occupants and the Building Official) their relative experience and capability regardless of how many years of work in the field. Simply being part of a design and construction team does not qualify an engineer/architect. However, prior responsibility, including the signing and sealing of structural documents during design and the construction phase, will help demonstrate the required knowledge.

The engineer who is inspecting a building may use full-time employees who are also engineers to assist in the actual inspections. Employees who assist the engineer (*duly authorized representatives*) are under the engineer's supervision and therefore can facilitate such inspections in a more timely and economical manner. A Building Official may require the employees to be identified by the engineer prior to conducting inspections.

### *Regarding Shoring*

Familiarity with shoring techniques and capabilities is also a requirement when critical conditions are observed.

When cantilevered balconies are determined to be in imminent failure, shoring must be provided quickly. Most structural engineers are not qualified to specify shoring systems, as this is a specialty that revolves around shoring contractors and shoring-system manufacturers. Therefore, shoring engineers must be engaged who are familiar with a specific shoring system and its capabilities.

However, the inspecting engineer must recognize how the shoring will transfer loads and whether loads must be transferred all the way to the ground or distributed to other supporting members. In such cases, a decision must be made as to the reliability of the shoring so that a building can remain occupied while corrective work is underway. The Special Inspector must confirm that shoring plans and calculations have been provided to the Building Official and that the specialty-shoring engineer has inspected the shoring system in place and approved it. The shoring must be maintained and reinspected frequently by the shoring engineer. An SI does have the experience of observing shoring installed and certified by a shoring engineer during original construction and can rely on that experience when observing an older building that will require shoring.

Shoring for the main load-bearing concrete-frame components (columns, girders, transfer beams, etc.) can be a major undertaking in a multistory building. Such shoring often requires the removal of all loading on the member being repaired. Complex shoring systems that transfer vertical loads down to the foundations can require intrusion into occupied spaces and apartments. A determination must be made whether to temporarily vacate a building that requires such shoring until the repairs have been made and the shoring removed.

In no case should substantial structural damage in which “there exists a significant risk of collapse, detachment, or dislodgement of any portion, member appurtenance or ornamental of the building or structure under service loads” [FBC-E] be allowed in an occupied building.

### *Reinforced Concrete*

Cracks in concrete increase its permeability. The corrosion of embedded reinforcing steel affects the durability and load-carrying ability of structural elements especially in harsh environments where chlorides are present in the air and water.

The embedded steel is protected by the alkalinity of the concrete and therefore is resistant to corrosion. However, when chlorides reach the steel, an electrochemical reaction takes place in the presence of oxygen that causes the steel to corrode and expand, creating a force larger than the tensile strength of the concrete resulting in cracking, delamination, and ultimately spalling.

It is known that concrete that is underwater may not have significant corrosion due to the absence of higher levels of oxygen.

Information on the mechanism of corrosion of steel in concrete may be read in ACI 222R.

Other types of cracks may be the result of settlement, volume change, temperature changes, redistribution of loading, vibration, impact, overloading, excessive long-term deflection, and the effects of aging and other events during the life of a building, including the wind force of hurricanes. The recertification inspector is expected to recognize the type of cracks, delamination, and spalling, and their significance and cause.

### *40-year Inspection Procedure*

Engineers who inspect a building for the purpose of recertification should observe, as a minimum, the following procedures. (These are recommended procedures, and under no circumstances are these minimum recommendations intended to supplant proper professional engineering judgement.)

1. Undertake an initial, cursory inspection for the purpose of becoming familiar with the general condition of the structure. Photographs may be taken at this time.
2. Obtain the permit plans (original design) for the building if they are available.
3. Research the permit history of the building, and become familiar with the previous work undertaken on the building, including concrete repairs, additions, modification to the main structure, reroofing, window and door replacement, painting, guard-rail repair or replacement, waterproofing, expansion joints, and all items that could affect the structural frame of the building.
4. Obtain a list of observations or reports previously made by the management company or residents.
5. Identify persons most familiar with the condition of the building, such as building maintenance engineers who may have extended experience with many aspects of the building.
6. Obtain information on previous claims made to insurance companies, such as for hurricane damage, pool leaks, and water intrusion.
7. Obtain documentation on all service contracts, such as roofing.
8. Become familiar with the structural system and the main load-transfer components.
9. Create a check list of adjacent improvements that will be inspected, such as pool deck, seawall, retaining wall, rooftop equipment, etc.

10. Create a plan identifying and locating each structural component inspected, such as columns, soffit beams, and transfer beams. This will provide a documented history for each item to be included in follow-up inspections, including future 10-year recertifications.
11. Begin inspecting and evaluating at locations where the initial inspection documented deterioration and determined the failure mechanism.
12. Starting with the lower foundation or garage area, focus on the main supporting-load-bearing systems of the building (columns, pile caps, structural slabs, cast in place transfer beams and framing beams and joists. Observe and make note of each element observed.
13. For reinforced concrete, begin by using the traditional sounding technique of a tapping hammer. This method will provide a strong ping for solid concrete and a dull sound for hollow concrete that may have internal spalling, delamination of concrete cover, and void areas. The use of simple equipment, such as tape measures, depth gauges, keel markers, and caliper gauges, is recommended. Information is noted together with sketches, photographs, and even video. This is referred to as nondestructive testing (NDT) and allows for a quick determination of the overall condition. Soundings, as they are called, are the first of the NDT methods.
14. Observe all cracks, and denote their configuration with sketches. Pay particular attention to those that are subject or exposed to water intrusion. Determine the cause of such cracks if possible. Strain gauges may be installed on cracks that are not caused by corroding steel but may be the result of settlement, overstressing, or movement. Such strain gauges can be electrically monitored if desired. In addition, elevations of critical members may be established to monitor movement using benchmarks from a licensed land surveyor. The use of feeler gauges and crack-width meters will document the size of the cracks at the time of inspection.
15. Observe and note any corrosion stains and their sources.
16. If spalling is evident at the surface of concrete members, it may be removed with a handheld non-mechanical chipping hammer to expose the steel. A photograph of the condition should be made first. Such spalled concrete is no longer providing strength or support to the member and may be removed. Ensure that a maintenance person or assistant is available to collect and preserve the removed pieces. Spalled, damaged concrete is usually removed to expose sound concrete. The removed concrete may be tested for chloride ion, strength, sulfates, and carbonation.
17. Observe the condition of the embedded steel behind the removed spalled concrete, and measure its diameter. Compare the existing diameter with the original size as constructed.
18. Observe the bond of concrete behind the exposed embedded steel.
19. Evaluate the surrounding concrete for strength and consistency by observing and probing with a handheld tool. If the evaluation indicates low or significantly reduced characteristics, a core sampling location must be determined so that a laboratory can test the in-place concrete for strength, carbonation, sulfates, PH, and chloride ion content. Refer to ACI PRC-214.4-21 as a guide to obtain cores and interpret compressive strength results in accordance with ACI 301. The inspector can assess the issue of poor consolidation in the concrete by using nondestructive techniques of ACI 228.2R-13, *Report on Nondestructive Test Methods for the Evaluation of Concrete in Structures*.
20. In-place strength values including sample size and locations can be selected using ASTM E122-17 and ASTM C823/C823M. Obviously as sample size increases, accuracy improves, but do not risk weakening the structure.
21. Other methods for NDT testing include the use of Ferroskan magnetic equipment and Profometer to locate embedded steel. Such equipment will establish the presence of steel and

the concrete cover if the size of the steel is known. Ground penetrating radar (GPR) is another useful method to be used with a consultant that offers those services.

22. Review and become familiar with the *ACI SP-2 Manual of Concrete Inspection* by ACI Committee 311. In particular, Chapter 11 has detailed recommendations about using NDT methods and destructive sampling testing (DST) methods in Tables 11.1 and 11.2 of that Standard. Methods include Windsor Probe, pulse-echo, impact-echo testing, short-pulse radar, infrared wave, x-ray, and petrographic testing.

### *The Report*

The engineer must decide on what concrete restoration is required based upon the potential hazard of a defect and the continued deterioration that can take place. Defects that affect the structural integrity and durability must be repaired. If the defect is a hazard that threatens safety, immediate remedies must be taken, such as emergency shoring or evacuation of the building, and the Chief Building Official must be notified.

While the report is not a document to be used to implement repairs, it can refer to ACI 546 R, wherein an engineer must be retained to specify the repairs to be made by a qualified contractor with building department permits in place. In general, the report must document surface imperfections, such as cracks, distortion, sagging, excessive deflections, significant misalignment, signs of leakage, and peeling of finishes, which are all indications of possible structural deficiencies in load-carrying capacity.

The fundamental purpose of the report is to confirm, in a reasonable fashion, that the building is safe for continued use under present occupancy, even if repairs are necessary.

It will most likely not be possible to visually examine all concealed construction, nor should it be generally necessary. However, a sufficient number of typical structural members should be examined to permit reasonable conclusions that are representative of the total structure.

Structural deterioration that is observed will always require repair.

Written reports attesting to each inspection must be required. The report must note the location of the structure, description of the type of construction, and general magnitude of the structure, the existence of drawings and location thereof, history of the structure to the extent reasonably known, a description of the type and manner of the inspection, and problem areas and recommended repairs.

Each report must include a statement to the effect that the building is structurally safe, unsafe, safe with qualifications, or has been made safe. The following is a paragraph that this author created in 1974 to be included in such reports:

“As a routine matter, in order to avoid possible misunderstanding, nothing in this report should be a guarantee for any portion of the structure. To the best of my knowledge and ability, this report represents an accurate appraisal of the present condition of the building based upon careful evaluation of observed conditions, to the extent reasonably possible.”

### *Who Gets the Report?*

The client is the owner or association that retains the engineer and therefore the report is provided to that entity. Eventually, the report must be furnished to the Building Official by the client as part of the 40-year recertification process. However, and always, if critical deficiencies are identified, the Building Official must also be informed immediately about the condition and status.

We recommend that upon engagement, and as part of the contract, the client agrees that the engineer will also furnish the Building Official with the report by a specific time. The client usually wants enough time to evaluate the report, especially if repairs are necessary and financial considerations are made.

The client will then be able to advise the Building Official as to a schedule to complete any repairs and as to what safeguards may be put in place if necessary to maintain occupancy. Often the initial report is modified as repairs are made, and the Building Official is kept informed.

### *Report Categories*

When drafting the report, consider these categories:

- Foundations
- Roofs, roofing
- Bearing walls
- Floor systems
- Concrete framing systems
- Steel framing systems
- Windows, wall openings
- Wood framing
- Railing

### *Report Outline*

Reports should follow an outline similar to this:

- 1) Description of structure
  - a) General description, type of construction, size, number of stories, and special features.
- 2) Present condition of structure
  - a) Good, fair, poor – with explanation
  - b) Describe and show areas of distress (beams, columns, walls, floors, roof, slabs)
- 3) Inspection
  - a) Date of notice of required inspection
  - b) Date(s) of actual inspection
  - c) Name and qualification of individual submitting report
  - d) Description on laboratory or other formal testing.
  - e) Description of shoring as determined to be required
  - f) Structural repair required (describe scope and condition)
- 4) Supporting data
  - a) Field notes
  - b) Photographs
  - c) Drawings and sketches showing location and condition

Each jurisdiction may have its own reporting format. The engineer may need to submit additional documents that clearly identify the findings in a format that is appropriate for the actual description.

### *Summary*

This article is a summary of the existing 40/50-year recertification program unique to Miami-Dade and Broward counties. It is probable that other jurisdictions throughout Florida may adopt similar



recertification requirements for older buildings. This author has experienced deficiencies in structures far from coastal areas so that each jurisdiction may implement requirements based upon its own experience.

### *About the Author*

*John Pistorino, PE, was appointed to the Florida Board of Professional Engineers in June 2021. He has over 50 years of experience as a Professional Engineer and over 35 years as a Special Inspector of Threshold Buildings. In 1975, he wrote the 40-year building recertification program requirements for Miami-Dade County.*

## **Special Recognition: Congratulations, Examinees**

FBPE applauds all of the candidates that successfully passed engineering exams in the past quarter. We wish them much success as they move towards the next step in their engineering careers. [See the complete list online.](#)

## **Legal Department: Latest Engineer Discipline**

Pursuant to Rule 61G15-37.001(11), Florida Administrative Code, the Florida Engineers Management Corporation is required to post all Final Orders involving active disciplinary cases to the website until the terms of the final order are completed, or until the licensee becomes inactive, retires, relinquishes the license or permits the license to become null and void. Included in this section are the most recent cases in which final action has been taken by the Board, a brief description of the licensee's violation and discipline as well as a link to the final order. [View actions.](#)

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