

# The Pressing Need for Structural Licensing in Florida

*Submitted by:  
The Florida Structural Engineers Association*

The Florida Structural Engineers Association (FSEA) is proposing legislation to establish SE licensure in Florida. The goal in establishing separate licensure is to “raise the bar” so as to better protect the public and improve the quality of structural engineering work throughout Florida. The following article was adapted from the “White-Paper on Separate Licensing of Structural Engineers in Florida” prepared by the Florida Structural Engineers Association’s (FSEA) Licensing Committee and was submitted to the FBPE by the FSEA.



## ***Background***

Prior to the year 2000, the criteria for the design of buildings and structures in Florida were largely established by local ordinances and laws, and referred to generally accepted national codes that often contained very few pages dedicated to structural design. The current (2010) Florida Building Code includes over 230 pages related to structural strength, reliability and durability, with more than 4,000 pages in reference standards for loads and material design.

Each new generation of engineering methods and analysis techniques brings with it corresponding increases in complexity and sophistication. Prior to the 1960s, structural codes generally specified a safety factor selected by the judgment of the code writers. However, with more detailed understanding of how structures react to real conditions, structural codes are now based on probabilistic analysis. While this leads to more efficient use of materials and reduced construction costs, it requires a higher level of understanding, knowledge, training and experience to implement properly.

Recognizing this, the National Council of Examiners for Engineering and Surveying (NCEES) has eliminated its separate 8-hour Structural I and II examinations in favor of a single, more comprehensive 16-hour examination. The areas tested are quite extensive, going far beyond what is typically encountered by those who only occasionally practice structural engineering. Nevertheless, passing this 16-hour Structural exam is not currently required to get a Professional Engineer (PE) license and practice structural engineering in the State of Florida.

Florida licenses individuals as PEs upon successful completion of an 8-hour examination in the Principles and Practice in a field of engineering of the examinee’s choosing. For structural engineers, this currently would be the civil engineering exam with a

*(Continued on page 13)*

(Continued from page 12)

structural emphasis in the four-hour afternoon portion of the exam. Upon licensure, the engineer may practice in any area of engineering in which he or she has sufficient training and experience - as determined by the licensee. This leads to a 'reactive' environment that subjects the licensee to discipline after an event has occurred that brings his or her competence into question. For engineers practicing in the field of structures, that triggering event can lead to injury or death.

Not all structural engineering errors end in a catastrophic failure; many result simply in complaints to the Florida Board of Professional Engineers (FBPE). While all licensed PEs in Florida are subject to complaints and/or disciplinary action by the Board, the FBPE estimates that 40% to 50% of the complaints they investigate in any given year are related to structural engineering, structural design, or structural inspections. The next largest category was investigations related to unlicensed activity (30%).

The alternative to the 'reactive' disciplinary system currently in place is a 'proactive' environment that better prevents unqualified individuals from practicing structural engineering in the first place.

## ***Structural Licensing***

Discipline-specific licensing of structural engineers goes back almost 100 years in the United States. The State of Illinois was the first to enact such a measure in 1915. In November 2000, the three major national structural engineering organizations - the Council of American Structural Engineers (CASE), the National Council of Structural Engineers Associations (NCSEA), and the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) - held a National Summit on Separate Licensing of Structural Engineers. The attendees concluded that the field of structural engineering is changing rapidly, and that the structures designed by SEs are important and often critical. Therefore, those practicing structural engineering should have appropriate credentials, stay current in the field, and demonstrate sound judgment that comes only with experience. As a result, all three of these organizations have now endorsed structural licensing.

Currently, ten states and one territory have some form of SE licensing in place: California, Guam, Hawaii, Idaho, Illinois, Nebraska, Nevada, New Mexico, Oregon, Utah, and Washington. The requirements vary between states as to the amount and type of experience required beyond normal PE licensing, the examinations that must be passed to obtain licensure, and the type of licensure. At least seven other states outside of Florida are also working on SE licensing initiatives.

The type of structures required to be designed by SEs also vary from state to state ranging from "all" structures to those based upon design criteria factors such as height, area, occupancy category, span (for bridges) and number of occupants.

(Continued on page 14)

## **Harbour Cay Condominium Cocoa Beach, Florida**

The Harbour Cay Condominium, a five-story flat-plate reinforced concrete building under construction, collapsed shortly after 3:00 pm on March 27, 1981, killing 11 workers and injuring another 23. The collapse occurred during placement of the roof slab. The most probable cause of collapse was a combination of design and construction errors: the design did not even consider the possibility of punching shear failure.



## **Turner Agri-Civic Center Arcadia, Florida**

Built in 2002 and certified by the Architect of Record that it was designed for 140 mph winds, the Turner Agri-Civic Center was used as a hurricane shelter for the Hurricane Charley event of August 13, 2004. Approximately 1,400 people were housed in the facility as the storm approached. One FEMA report indicated that clips holding the roof panels to the steel supports failed resulting in portions of the roof blowing off before partially collapsing the end wall of this pre-engineered metal building.



## **Berkman Plaza II Parking Garage Jacksonville, Florida**

Jacksonville-based A.A. Pittman & Sons Concrete Co. had been pouring the top level of a six-story, post-tensioned concrete garage for about four hours when it collapsed at about 6 a.m. on December 6, 2007. Jacksonville Fire and Rescue Department responders found 60% of the structure collapsed, resulting in the death of one construction worker and injuries to 23 others. The Occupational Safety and Health Administration (OSHA) concluded that while the collapse was due to errors made by those on the design, construction, and inspection teams, the structural design had numerous deficiencies including one column that "was barely able to support the dead loads (of the structure)."

Reasons why FSEA believes that SE licensing for structural engineers should be pursued in Florida include:

1. Protecting the safety, health, and welfare of the public – an engineer’s highest obligation. The practice of structural engineering has become extremely complex, and only those fully qualified by appropriate education, experience, examination and licensure should be authorized to design structures. The new 16-hour SE exam is a more comprehensive tool for fully testing that ability, especially when it comes to complex and essential structures.
2. Reducing the number of unqualified engineers who design structures that require complicated analysis. We will never be able to stop the unscrupulous - those who knowingly and willingly practice outside their area of expertise. What we can do is help ensure that those licensed to practice structural engineering have the knowledge and understanding to translate academic theory into practice.
3. Improving the structural design of more complex, sophisticated structures. More often than ever before, SEs are being asked to span extreme distances, provide difficult load transfers, and appear to defy the laws of physics.
4. Improving structural performance under extreme load conditions. Not only are buildings and bridges to remain standing after being subjected to the extremes from hurricanes, earthquakes, and severe storms, often they are required to remain serviceable. Many must protect against disproportionate or progressive collapse and blast effects.

## ***Making the Change in Florida***

FSEA is proposing that Chapter 471 of the Florida Statutes be amended to recognize the discipline of structural engineering and provide for a corresponding license. An engineer would apply for the SE license only after being licensed as a PE, and after taking and passing the NCEES 16-hour structural examination.

Only structures over a certain threshold would require a licensed SE to design them. Structures under that threshold could still be designed by a licensed PE or architect as currently permitted by law.

So as not to adversely affect PEs currently designing structures, there would be a 12-to 18- month transition period during which any Florida licensed PE who attests that he or she is competent to design structures may apply to the FBPE to obtain the SE license without taking the 16-hour Structural

exam. After that transition period, licensing would follow the requirements of the law as administered by the FBPE.

## ***Conclusion***

FSEA has prepared legislation and plans to submit it to the State legislature in 2014. It would introduce appropriate amendments to FS 471 to establish licensing of SEs. It is the mission not only of structural engineers, but of all engineers to hold paramount the safety, health and welfare of the public in the State of Florida.

## ***Author & Acknowledgements***



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