

## **FICE Structural Committee Position Paper**

**Topic:** Structural Engineering (SE) Licensure

### **Position:**

The FICE Structural Committee supports a Structural Engineering (SE) license in Florida for engineers practicing structural engineering for structures above a certain threshold. This designation will establish minimum competency standards for structural engineers going forward and will increase the stature of the practice of structural engineering. Owners and Building Code Officials will gain assurance that SE's designing significant structures have demonstrated a higher level of knowledge and competency in structural engineering. This committee encourages SE Licensure as a post-PE credential, and to include in any new legislation a transitioning clause for engineers currently designing structures.

### **Background:**

In the 20<sup>th</sup> century, the criteria for the design of buildings and structures in Florida were largely established by local ordinances and laws. These criteria referred to generally accepted national codes which did not contain a lot of emphasis on structural design provisions. Catastrophic events in recent years have led to the current (2010) Florida Building Code swelling to over 230 pages related to structural strength, reliability and durability, with more than 4,000 pages in reference standards for loads and material design. To meet the need for increased structural reliability, new engineering methods and analysis techniques are necessary, along with corresponding increases in complexity and sophistication. While this detailed understanding of how structures behave 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 and replaced them with a single, more comprehensive 16-hour examination. Although the Florida Board of Professional Engineers (FBPE) has recommended this more rigorous 16-hour exam for structural engineers, it is not required to obtain a PE license in Florida. Florida does not have separate SE Licensure requiring passage of the 16-hour exam.

The Council of American Structural Engineers (CASE), the National Council of Structural Engineers (NCSEA), and the Structural Engineering Institute of the American Society of Civil Engineers (ASCE-SEI) all support the 16-hour NCEES exam and SE Licensure for engineers designing significant structures. As of 2013, ten states, as well as the territory of Guam, have some form of SE licensing in place. At least seven other states outside of Florida are working on SE licensing initiatives.

Florida currently licenses individuals as PEs upon successful completion of the 8-hour examination in the Principles and Practice of a field of engineering of the examinee's choosing. For structural engineers, this would be the civil engineering exam with a structural emphasis. Only the four-hour afternoon portion of this exam focuses specifically on structures.

### **Concerns with current Licensure requirements:**

The current 8-hour Civil/Structural PE Exam (4-hour afternoon Structural Depth portion) is not adequate to test the ability for a professional engineer to design advanced structures. Advances in technology and software have rendered structural engineering more accessible to engineers lacking thorough knowledge and experience in advanced structural design.

The oversight procedure to evaluate an engineer's competence based on their design ability occurs only after an engineer's judgment is called into question. The event which triggers such a review of a structural design could have already resulted in injury or death. The state's reactive review is appropriate only when proper procedures are in place to assure competency is proven before designs are completed.

The overall concern of this Committee is that the PE Exam is unable to fully assess a professional engineer's competence for advanced structures, and there is no threshold established between routine and advanced design knowledge. Without separate structural licensure, there is no way to identify professional engineers capable of advanced designs. An additional competency requirement of obtaining a structural license should be established by passing the NCEES 16-hour SE Exam, and enacted for structures as determined by the FBPE as warranting advanced design knowledge.

### **Benefits of SE licensure:**

- Enhance protection of the safety, health, and welfare of the public.
  - The practice of structural engineering has become extremely complex, and only those fully qualified by appropriate education, experience and licensure should be authorized to design advanced structures.
- Improve design quality recognized by owners and building officials.
  - This will benefit all parties including the designers by improving their comfort level knowing they are working with structural design professionals.
- Reduce the number of unqualified engineers (or architects) designing structures which require complicated analysis.
- Improve the structural design of more complex, sophisticated structures.
  - More often than ever before, SE's are using advanced analysis techniques to span larger distances, resist larger wind forces and incorporate complex geometry and advanced materials into structural designs not thought possible a few years ago.
- Improve structural performance.
  - With today's emphasis on sustainability, not only are buildings and bridges to remain standing after being subjected to extreme forces such as hurricanes, earthquakes, and severe storms; often they are required to remain serviceable.
  - Advances in structural materials have led to taller buildings and larger spans that require careful evaluation of vibration, deflection and stability.

### **Implementation Considerations:**

- Grandfather in current professional engineers designing structures.
  - Current PE's will need to be able to certify that they are currently qualified to design advanced structures and may continue their current practice.
- Establish an additional competency requirement for design of advanced structures by means of passing the NCEES 16-hour SE Exam to obtain a structural license after obtaining their PE license.
  - Applicable to engineers without their PE License at the time of the legislation being enacted.
- Define structure types where an SE would be required.
  - This threshold should be determined by the FBPE. It should be possible for routine structures to still be designed by a licensed PE or architect as currently permitted by law.
- Amend both the Florida Laws and Engineering Rules.
  - The FBPE has indicated they are willing to revise Florida Administrative Code chapter 61G15 to incorporate appropriate language. As of 2013, any changes to the State Statutes have yet to be discussed in the legislature.

### **Conclusion:**

By supporting SE Licensure in Florida, FICE joins CASE, NCSEA, and ASCE-SEI in advocating the adoption of a Structural Engineering License which recognizes those structural engineers able to pass the 16-Hour SE Exam, and ensures that all significant structures will be designed by SE licensed engineers. The 8-hour PE exam is no longer sufficient to fully test the professional engineer's education and experience to the extent of which reactive disciplinary action can safely evaluate an engineer's competency. Advanced materials and analysis techniques required for today's significant structures also requires an advanced level of demonstrated structural competency. In order to promote public safety and sustainable infrastructure in a time when complicated structural designs are more accessible through computer programs, a structural engineer's competency without computers must be determined proactively. A Structural License should be adopted in Florida to differentiate those that have demonstrated additional structural competency through passage of the 16 hour SE Exam. The FBPE would be relied upon to determine the threshold for structure types which would require design and seal by a Florida-licensed SE.