



Licensure of Structural Engineers

Thoughts from an E.I.T.

By Edward Major II, E.I.T.

I believe engineering is one of the most important professions in a civilized society. Similar to the way the public relies on medical professionals to keep us healthy and to prevent injury and illness, the public relies on the professional engineer to design safe structures and equipment. Engineers improve the lives of people across the globe. We wake up to an alarm clock (electrical engineer). We take a car, bus, train, or bike (mechanical engineer) on highways, over bridges, and through tunnels (civil engineer). We spend most of our time in houses, office buildings, or warehouses (structural engineer). Society relies on engineers to design, check, and recheck many elements, all of which are used by the public, to ensure their safety and continued serviceability.

When I buy a sweater, I am not worried whether that sweater was created by a “professional knitter.” I do not have this worry because I can easily trust that this item will pose no harm. However, most who utilize the services of an engineer do not know if that engineer’s solution to their problem will harm them or their peers. Professional licensure bridges this gap by providing proof that an individual has met the required professional standards to practice. My goal is to obtain my Professional Engineer (P.E.) and Structural Engineer (S.E.) licenses as evidence to the public that I can be trusted with their well-being.

Examination for professional engineering licensure is not a new idea. Most states began to require testing of new engineering graduates for an “Engineer-in-Training” license and further testing for the professional license beginning in the 1950s. It was not until the 1990s that every state (including the District of Columbia) required both the fundamentals exam (Engineer-in-Training) and the professional exam (P.E.) as a means to establish a minimum level of competence and to evaluate a candidate’s knowledge of basic engineering concepts and principles.

Since the 1950s, engineering has become vastly more complex. While the underlying principles of engineering have stayed the same, the processes have changed as the structures we design become taller, larger, and

more complicated. Because of this, I believe the engineering profession should examine the possibility of recognizing an additional license for the structural engineers.

The P.E. exam is meant to be the *minimum* benchmark of competence for an engineer. The key word here is minimum. Thirty years ago, a person taking the P.E. exam chose and solved eight questions from a variety of engineering topics.

Today, the P.E. Civil-Structural exam consists of a 4-hour morning session (general civil) and a 4-hour afternoon session (one of five specialist areas). The structural portion of this exam is a mere 40 questions. While that may seem to be an appropriate number, a closer look at the NCEES exam specifications reveals there are four questions on loads (such as wind, snow, and seismic loading) and their applications influencing structures. Does solving four questions covering these topics seem adequate to assess a structural engineer’s competence? I do not think it does. By contrast, the NCEES S.E. exam consists of 8 hours of lateral forces (wind/seismic) and 8 hours of gravity forces (dead, live, and snow loads). This is why, as noted previously, the P.E. exam should be considered a *minimum* level of competency and structural engineers should strive to pass the S.E. exam, a higher level of competency.

Passing the S.E. exam may not be necessary for some professional engineers already providing structural engineering services. Years of experience can yield a vast increase in one’s abilities to understand and design complex structures. Recognizing the experience of an engineer gained after he or she has become licensed is important, and should be considered when qualifications are assessed. Although some states agree with this premise, other states have refused to do so.

In 2015, the Florida Structural Engineers Association proposed legislation that would require all threshold buildings (defined in Florida as any building greater than 3 stories or 50 feet in height, with an area greater than 5,000 square feet or an occupancy load greater than 500 persons) to be sealed by a licensed Structural Engineer. All other structures can

be sealed by a P.E. practicing in their area of competence. The bill passed the House on March 27, 2015 (107 YAY to 2 NAY) and the Senate (38 YAY to 2 NAY) on April 23, 2015. However, in June of that year, Governor Rick Scott vetoed the bill. He did so because he felt that the transition clause, which allowed some structural engineers to forgo the 16-hour exam, was unfair and that everyone should be required to pass the S.E. exam. This kind of logic is unacceptable to the public and the profession.

While Florida’s attempt fell short, other states have been more successful. There are currently two states that have a full practice restriction on structural engineering. Illinois and Hawaii only allow a structural engineer who has an S.E. license to seal structural drawings for any type of structure. Other states such as California, Nevada, Utah, Oregon, Washington, Oklahoma, and Alaska have partial practice restrictions where certain types of structures must be sealed by a licensed Structural Engineer. These states passed licensure for structural engineers with legislation that acknowledged the accomplishments of those who passed the NCEES 16-hour S.E. exam, but also provided a transition clause for those practicing structural engineering who, as a result of their years of practice, were considered competent and equal.

For the protection of the public, structural engineers should acknowledge the advancement of our profession and support licensure for structural engineers who have passed the NCEES 16-hour S.E. exam *or* demonstrated their competence through years of practice. Additionally, we need to hold *new* engineers in training (EIT) aspiring to become structural engineers to a higher standard by requiring the more useful measure of competence that is the S.E. exam.▪

Edward Major II (emajor@wbcm.com) is a structural engineer in Pittsburgh, PA, for Whitney, Bailey, Cox & Magnani. He is active within several professional organizations including the NCSEA Structural Licensure Committee and the Pittsburgh Section of ASCE.

Structural Forum is intended to stimulate thoughtful dialogue and debate among structural engineers and other participants in the design and construction process. Any opinions expressed in Structural Forum are those of the author(s) and do not necessarily reflect the views of NCSEA, CASE, SEI, the Publisher, or the STRUCTURE® magazine Editorial Board.