

Compelling Reasons for Separate Licensing of Structural Engineers

By Susan Jorgensen, P.E.

Whenever the topic of separate licensing for structural engineers is brought up, the first question usually raised is, "Why?" Why should licensing requirements for structural engineers change? Why should the practice of structural engineering be legislated? Why make changes when there does not appear to be a problem?

The reason, above all others, is to protect the health, safety, and welfare of the public. While other professionals are also responsible for public safety, they do not deal with potentially catastrophic design issues on a daily basis like a structural engineer does. It is certainly understood that all engineering systems, if incorrectly designed, also have the potential to cause harm. However, structural components pose significantly more risk of life loss or injury due to poor or improper design, as evidenced by the 1981 Hyatt Regency skywalk collapse in Kansas City.

How will changing licensing rules and statutes help protect the public? It will help reduce the number of unqualified engineers who are designing structures requiring 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, and that they do so on a regular basis. We are attempting to guard against those professionals who, though knowledgeable, have not kept up with ever-changing codes, specifications, and guidelines that govern the practice of structural engineering. Above all else, we are attempting to minimize costly failures and risk of injury.

Key to this effort will be educating the public as well as the engineering profession about the importance of this issue. It is doubtful that many people would allow a general practice physician to perform open heart surgery on them, as opposed to a board-certified cardiologist. In fact, it is unlikely that the general practitioner would even venture to perform such a procedure; yet, there are examples of civil engineers designing complex structures who do not possess the required expertise.

As all engineers can attest, the practice of structural engineering has become much more complex. Buildings and bridges are no longer simple structures with regular grids or straightforward spans. More often than not, we are asked to bridge

extreme distances, provide complex load transfers, and appear to defy the laws of physics. The materials that we utilize in our designs are no longer simple either. The days of 36-ksi steel and 3,000-psi concrete are long gone. Designs of today regularly incorporate high-strength materials, plastics, metals other than steel, and composites, further complicating the design. In addition, building codes and design guidelines have become more complex. A review of the Specifications for Structural Steel Buildings in the 13th Edition of the AISCE *Steel Construction Manual* should be enough to convince anyone that it takes diligence and regular use of these documents to keep up with changes in structural engineering.

We are faced with the challenges of "less" as well: less time, less budget, and less training. In this day and age of instant connections, fast downloads, and interconnectivity, we are expected to provide results far more rapidly than ever before. In order to meet schedules and save the owner money, project delivery methods have changed from the old standard of design-bid-build to the more time-saving methods of design-build, phased construction, fast-track, and integrated design. Budgets are often tight, and our advanced technology requires that we be ever more diligent in sizing the structural elements and connections. Changes and advances in computer software have allowed structural engineers to go farther than ever before, but we are often faced with the need to "get up to speed" on the latest and greatest systems in a hurry, so that we can include them in our designs.

Structural engineers are also faced with the added challenge of designing structures with increased expectations of performance. Not only are buildings and bridges supposed to remain standing after being subjected to extreme forces such as hurricanes, earthquakes, and severe storms; often they are required to remain serviceable. Many must protect against disproportionate or progressive collapse and blast effects. Still others must meet extreme limitations on vibration, deflection, and sway. All of this, in addition to meeting the tight budget, aggressive schedule, and high standards of quality for the project.

By raising the bar in licensing structural engineers, we are trying to ensure that those who are licensed are only those who are truly qualified to design bridges and buildings. Licensing is not the only answer, but it is a first step. As with other professions, this must be combined with other measures to ensure that those practicing remain up to date and in tune.

Revising the licensing laws and regulations for structural engineers in various jurisdictions will bring some added benefits. If requirements for licensing are similar from state to state, it will be easier for engineers to obtain licenses in numerous states so that they can adequately serve their clients. It is not uncommon for engineers to have clients in multiple states, or single clients who have projects across the country. Regulating the practice of structural engineering in all jurisdictions helps reduce confusion for building officials and the public about who is qualified to design structures. It also helps guard against professionals practicing outside their area of expertise, and could aid in reducing discipline cases by state licensing boards.

Above all else, changing the requirements for the licensing and practice of structural engineering will help protect the health, safety, and welfare of the public. The practice of structural engineering has become an extremely complex profession, and only those fully qualified by appropriate education, experience, and examinations should be authorized to design bridges and buildings.▪

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