

Separate Structural Engineering License

Final report from Separate SE Licensing Strategy Workshop
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Preamble

All 50 States of the Union plus the District of Columbia, Puerto Rico, and the U.S. Territories presently have laws governing the licensing and practice of engineering. In a vast majority of these jurisdictions, the same license pertains to and incorporates all of the various disciplines of engineering such as mechanical, electrical, aeronautical, and structural. In these jurisdictions, all of these differing engineering disciplines are licensed to practice as Professional Engineers. A few states, however, have a separate licensing law pertaining exclusively to the practice of Structural Engineering.

Today a graduate can become a Professional Engineer by passing an exam that has little or no structural content. The candidate can choose an area of examination such as Civil or Aeronautic and pass the exam without working any structural problems. Also, the Principles and Practice essay is only 8 hours. To examine a candidate in structural design, an exam of at least 16 hours is needed.

The Need for Separate Structural Engineering License

The history of the education and training of Structural Engineers needs to be explained. Years ago the requirement to obtain a Bachelor of Science degree in engineering was in the realm of 140 to 150 semester hours. This has been reduced so that the requirement today at many universities is as low as 124 semester hours. Obviously courses have been deleted from the curriculum. Many of these graduates have not had all of the courses required for the design of the various structural materials used in present-day structures. Meanwhile, structural engineering design and building codes have become more complicated. The engineering graduate today is not getting the academic training that his counterpart received years ago. Also, the Professional Engineering examination administered in all jurisdictions does not adequately test for the knowledge required for the design of today's structures.

Many structures have been and are presently being designed by licensed engineers who are not adequately trained in structural engineering. Many of these existing structures, though inadequately designed, have stood and been serviceable for many years without any discernable structural problems. They are therefore perceived to be safe when in fact they may not be able to withstand the maximum loads and forces spelled out in the building codes. In reality, structures such as these may be a hazard to the public. They may be prone to collapse when the rare, but realistic high forces of nature occur such as those caused by extreme earthquakes, hurricanes, or high snow loads.

Since many structures are being inadequately designed by inadequately trained licensed engineers, structures are presently being constructed which pose a potential danger to the public. To alleviate this problem and to provide safer structures, a change in the licensing of engineers will be required in most jurisdictions. The present law regulating Professional Engineers would not be eliminated, but the creation of a separate license solely for the practice of Structural Engineering is recommended. To obtain such a license would involve a more stringent

examination covering all aspects of structural engineering design. Implementing such a license will require legislative action on the part of the legislative body of the jurisdictions involved.

Seeking Legislation

In the process of seeking legislation in establishing a separate license for the practice of Structural Engineering, it must be remembered that it is likely that there will be some opposition since people basically do not want change. The general public tends to be suspicious of proposed changes. It is therefore important to arrive at good sound reasons why separate Licensing of Structural Engineers is needed in addition to the current system where all engineering disciplines are covered by one common licensing law.

Written information will need to be developed explaining the reasons for having separate licensing of Structural Engineers and its importance for the welfare and safety of the public. This information should be immediately available for use by interested parties. Good and well-informed speakers should be identified and be available to speak before interested groups.

Develop Case Study Examples

Come up with actual written examples that depict problems caused by improperly trained engineers performing inadequate structural design. Failures caused by natural disasters can be used to illustrate and emphasize the need to protect the public. Focus on structures that failed which were designed by Licensed Professional Engineers who were not fully educated and trained as Structural Engineers. These examples should be well documented and objective. Illustrate in these written examples how poor designs are a danger to the public.

State licensing boards hear complaints brought against engineers. They listen to and investigate the particulars of the case and based on the facts, they issue their verdict as to the validity of the complaint. Thus, the state boards may have records pertaining to engineers performing incompetent structural engineering design and services. Records of such incompetence may be of public record and should be obtained in order to generate data to be used to convince legislators of the need for separate Structural Engineering Licensing.

In developing written examples of actual problems caused by inadequate structural design, it may be desirable to obtain factual information from those people highly acquainted with the facts. You may have a hard time getting these people to come forward to discuss the matter. The design engineer of record may be fearful of discussing the matter due to the possibility of pending litigation. Outside engineers and others called in to independently investigate the problem may likewise be hesitant to reveal their findings and opinions. Fear of litigation is a problem and their fear needs to be overcome before the informed person may be willing to openly discuss the problem. It may be a considerable length of time after the problem has occurred before the matter can be discussed.

Honest Mistake vs. Incompetence

It needs to be pointed out that while many structural problems are caused by incompetent engineers, there are also problems which are due to human error. The competent structural engineer, like everyone else, is only human and can unknowingly create an honest mistake. The

difference between a problem caused by the incompetent as opposed to that due to a human mistake needs to be well defined and explained.

Starting the Legislative Process

To start the process identify those people and groups, both pro and con, who would be actively interested in the Separate Licensing of Structural Engineers. These could include state legislators, members of the State Licensing Board, professional organizations, and other interested parties.

Discuss with legislators the advantages and necessity of allowing only qualified Structural Engineers to design structures, especially when conditions such as blast, terrorism, earthquakes, hurricanes, or heavy snow loads are to be considered. It needs to be emphasized that when such catastrophic events do occur, the public needs to be protected from failures due to inadequately designed structures. In order to protect the welfare and safety of the public, structures need to be designed by competent Licensed Structural Engineers who have demonstrated their competency through education, experience and by written examination.

It can also be pointed out that there are additional advantages to having Licensed Structural Engineers design structures. In addition to a reduction in risk of failures in structures and improved life safety to the public, there is an economic benefit to the client/owner of the structure. A structure can be designed which may be safe and meets the requirements of the building code, but yet, is not the most cost effective structural system being used. With the many different types of building materials and structural systems in existence, the properly qualified structural engineer has the knowledge and experience to be able to select the appropriate materials and design the proper structural system that will produce the most cost effective yet safe product for the client. This knowledge is obtained through proper education, training, and experience such as that which would be expected of a Licensed Structural Engineer.

Enacting a law providing the Separate Licensing of Structural Engineers will require legislation approved by the State Legislators. To obtain such approval may require the services of a qualified lobbyist. Money to pay a lobbyist may be required to come from contributions from local structural engineering associations interested in separate licensing of S.E., and from PAC contributions.

Many engineering societies already have lobbyists representing them pertaining to issues of interest to them. In addition to working on these issues, the societies should have their lobbyists promote Separate Licensing of Structural Engineers when they are dealing with legislators with whom they are in contact. Obtaining the names of lobbyists who have proven to have been effective in dealing with legislators becomes beneficial for future collaboration.

Finally, it would be helpful if someone from the profession was elected to the state legislature. Since such a person has a better understanding of the issue, there will be a tendency to convince the legislature from within and get their consent. This will make the task of the local group a bit easier to achieve.

Be Prepared for the Opportunity

Always be ready for the unanticipated opportunity. For example, a sudden earthquake may cause severe damage to structures, resulting in injury and even death. This may be the time to express the need for Separate Licensing of Structural Engineers.

When there is a major failure, such as the Kansas City Hyatt House failure, people want to know how and why such a catastrophic event took place. They want to know what can be done to prevent (or minimize) such occurrences from happening in the future. While such a failure remains fresh in the minds of the public is the time to propose a change in the state law. This is a good time to convince politicians that Separate Licensing of Structural Engineers is in the interest of and for the protection of the public.

While it is recognized that using a natural disaster will always find a listening ear in the legislature, in some states where such disasters are not common, it is not feasible to “wait” for a natural disaster to happen. It is believed that although case studies of failures of structures located outside of the state may not have the resounding effect desired, it will still have an impact on legislation if properly presented.

Opposition

It is probably an inherent nature that people basically do not want more laws to inhibit their normal way of life. Because of this, people will need to be persuaded that the enactment of a Separate License of Structural Engineers will be to their benefit and for the life, safety and welfare of the public.

It needs to be recognized this proposed enactment may, in the eyes of some, affect their present practice. Thus, some may object to the new proposal and will probably voice their opposition to those in authority such as members of the State Board of Registration or to their State Legislator.

There presently are many civil engineers who are currently practicing some structural engineering in conjunction with their civil engineering projects. These engineers typically practice structural engineering in only one area such as bridges, culverts, transmission towers, or miscellaneous wood structures.

To get a Structural Engineering license, an engineer will need to prove he/she is qualified through education, experience and by examination in all areas of structural practice. Present engineers who are currently practicing some structural engineering will not be affected since they will need to be grandfathered in. However, future engineers who wish to perform some structural engineering tasks will need to be Structural Engineers who are licensed through education, experience and examination.

How to Get Started

In getting an effort started, it is important to recognize that moving separate structural engineering licensing forward in your state will be a long term effort most likely spanning several years. So one of the first steps in getting started is the identification of a champion (or two) who feel passionate enough about this subject to make a long term commitment to the effort – the results, increased public safety, will be worth the effort.

With a champion, or group of champions, in place the next step will be for these individuals to fully educate themselves about separate licensing. Several resources at their disposal are:

- Results from the first National SE License Workshop – contact SEI
- Report from the third Summit – the results from each of the breakout sessions are attached to this report as appendices
- Contact the SEI Professional Activities Committee and participate in one of their monthly conference calls – contact SEI for dates and phone numbers
- Obtain and study the licensing laws in your state – typically posted on your state licensing board’s website
- Review the presentations from the third Summit – attached as appendices

With the champions well educated it is important that they develop a white paper wherein the reasons, rationale and benefits of establishing a separate structural engineering license are presented. The effort of putting this in writing will help to clarify the issues for the champions so that as they proceed forward a clear and consistent case can be presented. If possible, the white paper should be augmented with the written examples (local if possible) which document and illustrate situations where the lack of sufficient structural engineering knowledge resulted in an endangerment of the public. These written examples shouldn’t be simply a recitation of a mistake, but rather a situation where someone undertook a structural engineering effort who did not possess sufficient knowledge.

With the leaders fully educated and their reasons firmly spelled out, it is important for the leadership group to reach out to the local organizations that may be affected or have an interest in this effort – this list of groups must include organizations that may support the effort and those who may be in opposition. Some of the obvious groups that need to be on this list are the local structural engineers association, the local ASCE and/or SEI chapter, the local chapter of NSPE, the state DOT or other state agencies and their unions, the local CASE and/or ACEC chapter and the local chapters of various technical groups such as ACI, AISC, TMS or PCI.

In meeting with these groups it is important to go into the meetings with an open mind with the hope of educating them on how a separate structural engineering license will serve to better protect the public. It will – but if in the meetings a perception of self interest is conveyed, even accidentally, the entire effort may be undermined. It is for this reason that time must be spent to put together your case in writing with as much supporting evidence as possible.

As the leadership of your effort proceeds through these meetings – and multiple meetings with the same group may be necessary as their leadership rotates through – various challenges or obstacles may emerge along with a sense of the possibilities for success. The leadership will need to continually and without bias examine their effort and adjust their strategy accordingly. It’s important to be fully honest with yourselves in this process – a failed effort at the legislature resulting from ignoring of obvious obstacles and signs may set the effort back years as opposed to working for a year to resolve the obstacle.

At some point in the process a determination will need to be made regarding mobilizing a grass-roots effort to contact the legislature or hiring a professional lobbyist. Both approaches have their strengths and weaknesses, advantages and disadvantages some of which are documented in the appendices of this report. Both approaches can and have worked – however it’s recommended

that an approach that encompasses both grass-roots support with guidance from a professional lobbyist is highly recommended and will result in the highest likelihood of success.

Prior to approaching individual members of the state legislature it is important to polish and re-polish your white paper. Although much does occur within a legislature through personal connections your white paper will be useful in helping your representative persuade his or her colleagues. Once you feel ready to approach the legislature you'll need to identify a representative or two who you feel will support your goal. When you first meet with the representative or their staff approach the initial meeting as an educational meeting where you can educate them and they can educate and advise you on the process. Follow their advice – your state representatives are there to serve you and their advice on how to proceed within the halls of the Capital will be invaluable.

Eventually, with a bit of luck, you'll need to provide draft legislation. Key items to include in the legislation such as grandfathering are discussed elsewhere in this report and appendices. Legislation from other states is available to use as a model. As you draft the legislation keep the affected organizations informed – regular in-person meetings are best so that you can gauge their support, neutrality or opposition. Some points for use in overcoming objections are likewise contained within the appendices.

As you work with the legislature be cognizant of opportunities which may present themselves. Disasters, natural or man-made, within your state or outside, are an opportunity where the importance of structural engineers comes to the forefront. If the preparation work has been properly done, the introduction of your legislation may be easier. If the ground work hasn't occurred, rushing into the legislature with a bill may quickly be perceived as being self-serving.

As the bill moves through the legislature you will need to follow its progress and remain in contact with the various staff. They will need to know how to quickly contact the leadership (2 or 3 people at most) to arrange testimony or meet with other staff. Stay organized and stay focused – there may come a time when you receive extremely short notice to have someone appear to testify. Again, the white paper becomes important so that whoever's available to testify can deliver the consistent message of the benefits to the public.

As several states have shown, this is not an impossible goal but it does require organization, clarity and persistence – three attributes at which structural engineers excel. At anytime throughout your efforts don't hesitate to contact any member of the Professional Activities Committee for suggestions. The individuals on this committee have dedicated years to advancing the structural engineering profession and serving the public and they are glad to share their knowledge and experience with you.

Appendices

Appendix A: Report from Breakout Session A – State with no Structural Designations

Appendix B: Report from Breakout Session B – State with a Title Act but no Practice Act

Appendix C: Report from Breakout Session C – State with a Limited Practice Act

Appendix D: Presentation by Gene Corley – Overview of Separate SE Licensing in the US

Appendix E: Case Study – Oregon by Jed Sampson

Appendix F: Case Study – Alabama by Glenn Bishop

Appendix G: Case Study – Nebraska by Michael Conzett

Appendix H: Case Study – Washington by Ed Huston

Appendix I: Presentation by Nancy Gavlin – Overview of Issues Which Need to be addressed in Strategy

Appendix J: Wrap up Presentation by Ron Hamburger