# SEAU

**Seismic Committee** 10/30/2008

## Professional Structural Engineering Licensing In the State of Utah

### Introduction

The practice of structural engineering in Utah is defined in *the Professional Engineers and Professional Land Surveyors Act* as the design and analysis of complex buildings and structures and includes the definition of professional engineering. While it can be presumed that there is intent to distinguish the Professional Structural Engineering license from that of Professional Engineer, in reality the definition of *complex* is that only distinction.

The SEAU Seismic committee has been regularly involved in the review and study of earthquake building code requirements for a number of years. During this time, the regulations for seismic design have matured and indeed become increasingly complex. With each new edition of the building code, more experience and judgment is required to correctly apply these requirements and maintaining a working knowledge of the various changes necessitates an almost constant continuing education. While not all structures will require a specialized degree of attention, there are certain classes of buildings which should be relegated to extra-ordinary care and concern. It is this consideration which this white paper will begin to address in the interest of exploring the present licensing regulations and the potential need for updating their scope and definition.

### History of Licensing

Civil engineering is perhaps the oldest professional occupation. Creating structures and buildings has long been necessary and licensing individuals to provide safe designs is generally considered necessary for the protection of public interests.

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### Need for Licensing

Utah shares its history of the licensing of professional engineers with many other states as a necessary step as opposed to one born from catastrophe.

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### Structural Licensing

The Licensing Act in Utah currently distinguishes professional structural engineering from professional engineering by the modifier word *complex*. While this implies a need for a distinct class of professionals, the understanding of the word complex is left to the interpreter. It is this gap in perception that the seismic committee of the Structural Engineers Association of Utah would choose to address in this paper.

Traditionally, the use of the term S*tructural Engineer* has meant a person engaged in the design of structures requiring an increased measure of care and concern. This may be due to either their complexity

or the need for greater public safety. The additional educational and experience requirements for licensing Structural Engineers serve to distinguish this title and assure competency to address both of these needs.

The issue of complexity in designing structures can take place on several levels. All engineering design originates in planning and certain projects require a greater depth of knowledge and judgment. This can include balancing structural solutions with acceptable risks or introducing non-conventional proposals. Additionally, the analysis of a building or structure may be complicated by irregular framing systems or site constraints which make simple solutions difficult or impossible. The determination of a viable structural scheme is often influenced by the economics of building and environmental conditions and these factors can require creative, balanced solutions.

While complexity is obviously a defining criterion, greater public safety can also be cause for distinction in licensing requirements. Schools, hospitals, emergency response buildings including police and fire departments and existing structures, are a few of the kinds of buildings potentially relegated to a class of structures requiring special care and concern. The following discusses each of these building types and suggests why they are appropriate candidates for requiring designs by licensed Structural Engineers.

**Schools**

Public schools are state owned and operated buildings for the education of the states' citizens. Requirements for education place students in buildings over 180 days each year. The need to assure protection is evident if weighed against the number of hours of operation and the occupants' exposure to a potentially damaging seismic event. Additionally, schools need to potentially remain operational to house students during the critical hours after an earthquake as damages are assessed and families are re-united.

The design and construction of public schools is currently administered under the State Office of Education and its *School Building Construction and Inspection Resource Manual*. This document describes procedures for design, construction and inspection of school buildings and places significant importance upon the design professionals judgments and qualifications. Special considerations regarding the seismic design of school structures are contained in requirements for a mandatory peer review at the 90% completion stage. With these considerations it is appropriate to delegate the design requirements for these buildings to the purview of Structural Engineers due to the need for increased care and responsibilities.

**Hospitals**

Critical care facilities are treated as important structures in the building codes by a design factor which serves to ensure an additional level of safety. Hospitals not only house occupants unable to potentially evacuate during an earthquake, they also serve as a necessary component in emergency response. These structures are required to remain operational after an earthquake and significant effort is needed to assure both structural and non-structural compliance with building codes.

Several (?) states already classify these types of structures as requiring design by Structural Engineers. This class of buildings necessitates not only specialized knowledge and experience; it also represents the need for critical engineering judgment in design and construction. Hospitals in Utah should also receive this added measure of protection and care.

**Emergency Response Buildings**

Just as hospitals are necessary in post-disaster response, police and fire departments play an important role in maintaining public safety. Often referred to as *Essential Facilities*, these buildings need to remain operational after an earthquake. While treated as important structures in building design codes, special considerations for assuring compliance should be delegated to the experience and judgment of Structural Engineers.

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**Existing Buildings**

This special class of buildings is perhaps the least uniformly regulated group. Existing buildings include structures designed under previous codes both with and without seismic regulations. The evolving nature of earthquake design knowledge suggests that older buildings will generally contain elements which have been improved upon or even disallowed in newer building codes. This makes recognition of these changes and incorporation of seismic improvements in buildings rehabilitated for new uses extremely important. No where else is the experience and judgment of Structural Engineers called into action or more necessary than in the upgrading of existing buildings.

## Recommendations

The Seismic Committee of the Structural Engineers Association therefore recommends the definition of *Professional Structural Engineer* in the Licensing Act of the State of Utah be amended to include the design responsibility requirements for schools, hospitals, essential facilities and the rehabilitation of existing buildings.

# References

1. *Professional Engineers and Professional Land Surveyors Licensing Act*, Title 58, Chapter 22, Utah Code Annotated 1953 As Amended by Session Laws of Utah 2002, Issued July 1, 2002...

2. *Professional Engineers and Professional Land Surveyors Licensing Act Rules*, R156-22 Utah Administrative Code, Issued April 3, 2003.

3. *The Engineering Title Act Study: The Practice/Title Act Distinction and Protection of Public Health, Safety and Welfare.* Submitted to: The California Department of Consumer Affairs, California Legislature and the Joint Legislative Sunset Review Committee, November 2002 by Institute for Social Research, California State University, Sacramento, CA.

4. *An Introduction to Professional Licensing in California and Other States*, White Paper, California Society of Professional Engineers, November 5, 2001.