Department of Regulatory Agencies

2013 Review: Proposal for Mandatory Continuing Education for Professional Engineers

May 17, 2013

Consumer Protection

Department of Regulatory Agencies

Executive Director's Office
Barbara J. Kelley
Executive Director

John W. Hickenlooper
Governor

May 17, 2013

Members of the Colorado General Assembly
c/o the Office of Legislative Legal Services
State Capitol Building
Denver, Colorado 80203

Dear Members of the General Assembly:

As a part of the Executive Director's Office within DORA, the Office of Policy, Research and Regulatory Reform seeks to fulfill its statutorily mandated responsibility to conduct reviews of proposals to require mandatory continuing education with a focus on protecting the health, safety and welfare of all Coloradans.

DORA has completed its evaluation of the proposal to impose continuing education requirements on professional engineers and is pleased to submit this written report. The report is submitted pursuant to section 24-34-901, Colorado Revised Statutes, which provides that DORA shall conduct an analysis and evaluation of the proposal to determine whether mandatory continuing education would likely protect the public served by the practitioners.

Sincerely,

Barbara J. Kelley
Executive Director

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Table of Contents

Background

Prior to introduction of legislation designed to impose a mandatory continuing education requirement on a regulated occupation or profession, the proponents of the legislation must submit information concerning the need for such a requirement to the office of the Executive Director of the Department of Regulatory Agencies. The Executive Director is required to review, analyze, and evaluate the proposal and report in writing to the General Assembly whether mandatory continuing education would likely protect the public. Section 24-34-901, Colorado Revised Statutes, states:

> *Proposed continuing education requirements for regulated occupations and professions - review by office of executive director.*
>
> (1) Before any bill is introduced in the general assembly that contains, or any bill is amended to contain, a mandatory continuing education requirement for any occupation or profession, the practice of which requires a state of Colorado license, certificate, or registration, the group or association proposing such mandatory continuing education requirement shall first submit information concerning the need for such a requirement to the office of the executive director of the department of regulatory agencies. The executive director shall impartially review such evidence, analyze and evaluate the proposal, and report in writing to the general assembly whether mandatory continuing education would likely protect the public served by the practitioners. Proposals may include, but need not be limited to: Information that shows that the knowledge base for the profession or occupation is changing; that mandatory continuing education of this profession or occupation is required in other states; if applicable, that any independent studies have shown that mandatory continuing education is effective in assuring the competency of practitioners. The proposal may also include any assessment tool that shows the effectiveness of mandatory continuing education and recommendations about sanctions that should be included for noncompliance with the requirement of mandatory continuing education. The provisions of this section shall not be applicable to:
>
> (a) Any profession or occupation that, as of July 1, 1991, has mandatory continuing education requirements in place;
>
> (b) Any bill that is introduced as a result of a legislative interim committee and that as introduced in the general assembly includes a mandatory continuing education requirement.

Before beginning the review, the Executive Director evaluated the application to determine if the review was necessary under the requirements of the statute. The evaluation revealed that a mandatory continuing education program for professional engineers did not meet any of the exemptions from the statute and, therefore, was subject to review by the Executive Director.

Proposal for Continuing Education

The Colorado Section of the American Society of Civil Engineers (Applicant) submitted information on February 19, 2013 to the Department of Regulatory Agencies, proposing mandatory continuing education for professional engineers. The requirement would apply to all engineers licensed through the State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors (Board).

The Applicant proposes that professional engineers self-certify their completion of 24 hours of continuing education for their biennial license renewal. The continuing education proposal would require the Board to determine the best type of sanction for failure to certify completion of the required hours.

In response to a statutory directive that it provide information that shows the knowledge base for the profession or occupation is changing, the Applicant provided the following statement:

> *The occupation of engineering is continually making advances in knowledge through research and application. The building codes routinely change with each new edition to reflect new data, engineering progress, or new safety standards. Engineers must be well aware of changes in their profession regarding the knowledge base. A simple look at AASHTO* [American Association of State Highway and Transportation Officials] *requirements and IBCO/ICC* [International Building Code/International Code Council][1] *codes that have changed over the last ten years is in itself proof that the knowledge base of the profession is continually changing, being refined, and advancements being made.*
>
> *Each engineering specialty has seen continuing expansion of its knowledge base:*
>
> - *Environmental – advanced wastewater treatment technologies*
> - *Geotechnical – knowledge of seismic hazards, earthquakes, probability and potential damage, knowledge of soil behavior and modeling such as finite element analysis, computer based modeling of soil and rock slopes, modeling and behavior for dams for safety*
> - *Structural – computer-based analysis of structures*
> - *Transportation – new approaches to transportation modeling*

[1] The original application only contained acronyms. The defined acronyms are provided by DORA.

The Applicant also provided a 1985 publication entitled, *Continuing Education of Engineers; Engineering Education and Practice in the United States,* by the National Research Council as an independent study to illustrate that mandatory continuing education is effective in assuring the competency of practitioners of this profession or occupation.

The applicant provided no assessment tools that show the effectiveness of mandatory continuing education.

According to other information supplied by the Applicant, 39 states require some level of mandatory continuing education. Of those, Florida has the lightest requirement at 8 hours every two years and New York's 36 hours every two years is the heaviest.

Profile of Professional Engineers

Engineers provide a link between scientific discoveries and commercial applications. They design and develop, test, produce, and maintain systems and products. Most engineers specialize in a discipline. All 50 states and the District of Columbia require licensure for engineers who offer their services directly to the public.[2]

Licensure generally requires a degree from an Accreditation Board for Engineering and Technology (ABET)-accredited engineering program, four years of relevant work experience, and completion of an examination. Colorado has 12 institutions that offer ABET-accredited programs.[3]

- Colorado School of Mines;
- Colorado State University;
- Colorado State University – Pueblo;
- Colorado Technical University;
- Fort Lewis College;
- Metropolitan State University of Denver;
- Regis University;
- United States Air Force Academy;
- University of Colorado at Boulder;
- University of Colorado at Colorado Springs;
- University of Colorado Denver; and
- University of Denver.

A Colorado professional engineer license is dependent, in part, on passing professional engineering examinations developed and proctored by the National Council of Examiners for Engineering and Surveying (NCEES).

The licensing process involves a two-stage examination. The initial Fundamentals of Engineering examination may be taken after graduation or while in the senior year of an ABET-accredited engineering degree program. Those who pass become engineers in training (EITs) or engineer interns (EIs). Colorado uses the term "EI". After completing the requisite experience, EITs and EIs can take the second examination, called the Principles and Practice of Engineering examination.[4]

[2] U.S. Bureau of Labor and Statistics: *Occupational Outlook Handbook 2010-11 Edition*. *Engineers.* Retrieved November 28, 2011, from http://www.bls.gov/oco/ocos027.htm
[3] ABET. *Find Accredited Programs*, Retrieved March 4, 2013, from http://main.abet.org/aps/Accreditedprogramsearch.aspx
[4] U.S. Bureau of Labor and Statistics: *Occupational Outlook Handbook 2010-11 Edition*. *Engineers.* Retrieved November 28, 2011, from http://www.bls.gov/oco/ocos027.htm

Engineers typically obtain a bachelor's degree in a specialty. While the NCEES examines engineers in 25 specialties, Colorado licenses only one category, "Professional Engineer." The specialties that the NCEES offers examinations for are:[5]

- Agricultural;
- Architectural;
- Chemical;
- Civil: Construction;
- Civil: Geotechnical;
- Civil: Structural;
- Civil: Transportation;
- Civil: Water Resources and Environmental;
- Control Systems;
- Electrical and Computer: Computer Engineering;
- Electrical and Computer: Electrical and Electronics;
- Electrical and Computer: Power;
- Environmental;
- Fire Protection;
- Industrial;
- Mechanical: Heating, Ventilation, and Air Conditioning and Refrigeration;
- Mechanical: Mechanical Systems and Materials;
- Mechanical: Thermal and Fluids Systems;
- Metallurgical and Materials;
- Mining and Mineral Processing;
- Naval Architecture and Marine;
- Nuclear;
- Petroleum;
- Software; and
- Structural

The Engineer Practice Act is located at section 12-25-101, *et seq*., Colorado Revised Statutes. It is a mandatory practice act and any person who practices, offers, or attempts to practice professional engineering without an active license commits a misdemeanor.[6]

[5] NCEES. *PE Exam.* Retrieved from http://ncees.org/exams/pe-exam/ on February 25, 2013.
[6] § 12-25-105(7), C.R.S.

The Act contains several exemptions for:[7]

- Individuals who normally operate and maintain machinery or equipment;
- Individuals who perform engineering services for themselves;
- Partnerships, professional associations, joint stock companies, limited liability companies, or corporations, or the employees of any such organizations, who perform engineering services for themselves or their affiliates;
- Individuals who perform engineering services under the responsible charge of a professional engineer;
- Individuals who perform work of a strictly agricultural nature which is not required to be of public record;
- Professional land surveying;
- Individuals who practice architecture;
- Individuals who are employed by and perform engineering services solely for a county, city and county, or municipality;
- Individuals who are employed by and perform engineering services solely for the federal government; and
- Utilities, their employees, or contractors when performing services for another utility during times of natural disasters or emergency situations.

Using National Society of Professional Engineer figures, a conservative estimate is that 65 percent of people making a living as an engineer work under an exemption.[8] During fiscal year 10-11, the State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors licensed 22,829 professional engineers.

[7] § 12-25-103(1), C.R.S.
[8] National Society of Professional Engineers. *PE Licensing; The 80% Myth in the Engineering Profession.* Retrieved from http://community.nspe.org/blogs/licensing/archive/2010/09/13/the-80-myth-in-the-engineering-profession.aspx on February 25, 2013.

Analysis

The Colorado Revised Statutes (C.R.S.) section that governs the consideration of mandatory continuing education requirements posits that,

> the group or association proposing such mandatory continuing education requirement shall first submit information concerning the need for such a requirement.[9]

The information submitted by the Colorado Section of the American Society of Civil Engineers (Applicant), is listed in the "Proposal for Continuing Education" section of this review. It bases the argument for mandatory continuing education on three premises: a statement concerning changes to the profession, a 1985 paper published by the National Academy of Engineers, and a listing of states which currently have a mandatory continuing education requirement.

Statute directs that the Executive Director of the Department of Regulatory Agencies (DORA) determine "whether mandatory continuing education would likely protect the public served by the practitioners",[10] which directive establishes the principal criteria for review and analysis.

The first premise for mandatory continuing education, the Applicant's statement concerning changes to the profession, advances the argument that, "engineering is continually making advances in knowledge through research and application." The substantiation provided to verify this conclusion is the assertion that building codes routinely change. The fact of code changes alone is not a sufficient driving rationale for imposing a mandatory continuing education requirement. The Applicant does not indicate the impact of such changes in the context of the Colorado licensure scheme. There is no assertion that the changes affect the basic, foundational knowledge, training or course content associated with the degree programs or the national examinations which are the principal tools for determining competency under the Colorado regulatory scheme.

Under the Colorado scheme, assuring a minimum, yet appropriate, level of competency is the means by which the public's interests and safety are protected. While it may be desirable for engineers across the spectrum of the profession to keep current with changes in the practice, such "desirability" does not equate to a sufficient basis for government to mandate additional regulatory requirements. There must be shown a reasonable nexus to the competencies required under the Colorado licensure regime.

[9] § 24-34-901, C.R.S.
[10] § 24-34-901, C.R.S.

The proposal further asserts that there are advances in engineering knowledge and engineers should be required by the state to remain current with those changes. Again, the Applicant does not establish any rational connection or relationship between the "advances" in engineering knowledge and the competency requirements under the Colorado regulatory program. Also, the Applicant does not address the appropriateness or impact of mandatory continuing education in the case of the groups of engineers which are presently exempt from the Colorado licensure requirements. As previously noted, it is estimated that almost two thirds of practicing engineers are exempt from licensure.

The Applicant for state mandated continuing education is the Colorado Section of the American Society of Civil Engineers. Further, the itemized examples of changing professional knowledge are associated solely with civil engineering specialties. Because Colorado does not license by discipline, any imposition of mandatory continuing education on professional engineers will affect all engineers, in all disciplines. Petroleum engineers, metallurgical engineers, software engineers, nuclear engineers, and agricultural engineers are not affected by changes in construction codes but mandatory continuing education will have an effect on their licenses, their ability to practice, and ultimately their ability to earn a livelihood.

In support of its proposal, the Applicant submitted to DORA a paper published in 1985 by the National Research Council.[11] While this paper concludes that there may be value to continuing education for engineers, it acknowledges that additional information, research and study is recommended to determine the efficacy and effectiveness of continuing education. It should be noted that the paper does not include any recommendation that mandatory continuing education should be imposed through government regulations.

Finally, the Applicant provided information showing that 39 states currently carry a mandatory continuing education requirement. Of those states, 28 require 30 continuing education hours every two years. A majority of the states with a requirement stipulate, at least in part, what subject areas must be covered or are acceptable. However, there is no indication of the basis for any comparability of the underlying licensure schemes with that prevailing in Colorado to determine and evaluate the appropriateness, basis and outcome of the continuing education requirements in those other states.

[11] Panel on Continuing Education Committee on the Education and Utilization of the Engineer Commission on Engineering and Technical Systems National Research Council, *Continuing Education of Engineers; Engineering Education and Practice in the United States*, National Academy Press Washington, D.C.1985, p. 3.

Conclusion

The Executive Director of the Department of Regulatory Agencies (DORA) is statutorily charged with determining whether mandatory continuing education would likely protect the public served by licensed professional engineers. With respect to the application submitted by the Colorado Section of the American Society of Civil Engineers (Applicant), an affirmative conclusion is not warranted based upon the information provided in the application, and DORA's review and analysis of that information. The Applicant did not establish that the public consuming the services in question would likely be protected through the imposition of mandatory continuing education.

DORA made the following determinations, among others:

- The overwhelming majority of practicing engineers are not subject to state licensure requirements, and presumably would also be exempt from any mandatory continuing education requirement;
- The overwhelming majority of the thousands of professional engineers currently licensed perform their jobs without incident;
- The Applicant failed to demonstrate that the knowledge base for the professions across the board is changing such that mandatory continuing education is necessary to maintain the required minimum, yet appropriate, level of competency contemplated under the Colorado regulatory scheme; and
- The Applicant failed to demonstrate the efficacy of mandatory continuing education with respect to maintaining or assuring competency of practitioners.

For these reasons, the Executive Director of DORA concludes that increasing the regulatory burden on licensees as proposed under the subject application is unjustified. The General Assembly should not impose a mandatory continuing education requirement on professional engineers.