NHJES 7th Annual Joint Engineering Societies Conference

Issues in Engineering Licensure - 2013

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National Society of Professional Engineers®

2013 NSPE Licensure Topics

On-Going Initiatives

1. Computer Based Testing – FE Exam First
2. Early Taking of the PE Exam
3. Licensure Flexibility for Returning Veterans
4. Continuing Professional Competency Comity
5. Industrial Exemptions
6. Professional Practice Outcomes – Accreditation Criteria
7. Raise the Bar – Engineering Education
8. Licensure of Structural Engineers
9. Faculty Licensure – Licensure of R&D PI's
10. Licensure of Federal Engineers
11. L&QP Blog – NSPE Website
12. NSPE Engineering Body of Knowledge

Computer Based Testing – FE Examination

Computer Based Testing (CBT) Beginning January, 2014 – FE EXAM

At Testing Centers throughout the US, one in Concord

Available most of the year, with appointment

No more twice annual Saturday examinations

New FE Exam Format – Study Materials Available Soon – NCEES

PE Exams by CBT to follow in subsequent years

1. Early Taking of the PE Exam

- About 52,000 take the FE exam annually
- About 27,000 take the PE exam annually
- Allowing Early Taking of the PE Exam would be a convenience for EI's and may increase no. of PE's
- Requisite years of engineering experience still required for licensure

1. Early Taking of the PE Exam

Early Taking Allowed in IL, NV, NM, AZ

- Data show highest pass rates at 4 years experience, but: somewhat lower but similar pass rates with less or more experience and varies by discipline
- CPA's have done this for decades
- Particularly Fits with PE Exams by CBT in Future
- Early Taking Flexibility
  - Optional
  - Will increase licensure of engineers

1. Early Taking of the PE Exam

- What is Next?
  - NSPE Pos. Statement – NSPE BOD, July, 2013
  - NCEES Model Law Change – August, 2013
  - State by State Consideration
    - State Society Decision to Advocate?
    - NSPE Resources Available
      - Supporting Position Statement with Background Data
      - Guidelines for Changing State Engineering Statutes

2. Licensure Flexibility for Returning Veterans

- Current Topic in Some State Legislatures
- NSPE Position Statement, July, 2013

Provide Flexibility:

- Waive CPC while overseas
- Delay renewal requirements until 6 months after return
- Facilitate licensure of military spouses
- References per industry practices

BUT, Maintain Rigorous Licensure Requirements:

- Education: ABET EAC or otherwise per state law
- FE and PE Exam
- Engineering Experience – same level as civilian experience

2. Licensure Flexibility for Returning Veterans

- What is Next for State Societies?
  - Monitor State Legislation
  - Consider Advocating for Flexibility

3. Continuing Professional Competency Comity

- **Issues**
  - Unique Requirements in Individual States
  - Varying Record-Keeping/Reporting Requirements
  - Compliance Complicated for PE's Licensed in Many States

- **NSPE Actions**
  - Resolution Calling for CPC Comity
  - Correspondence to NCEES Calling for Common Record-Keeping/Reporting Requirements

- **State Actions?** Consider Advocating for CPC Comity

- NCEES Note – NCEES Education Committee beginning consideration of more rigorous CPC requirements, with provider approval and learning assessment.

4. Industrial Exemptions

- NSPE Policy No. 173

  It is the policy of the National Society of Professional Engineers (NSPE) that **all engineers** who are in **responsible charge** of the practice of engineering as defined in the NCEES Model Law and Rules in a manner that **potentially impacts the public health, safety, and welfare** should be required by all state statutes to be **licensed professional engineers**. NSPE recommends the phasing out of existing industrial exemptions in state licensing laws.

- NSPE L&QP Frequently Asked Questions – e-mail Art Schwartz for copy

States with Exemptions for Both Manufacturing and Utilities (29):

Alaska	Arizona	California	Colorado
Connecticut	Delaware	Georgia	Illinois
Iowa	Kentucky	Louisiana	Maine*
Mississippi	Montana	Nebraska	New Jersey*
New Mexico	North Carolina	North Dakota*	Ohio
Oregon	Rhode Island	South Dakota	Texas
Utah	Virginia	Washington*	West Virginia
Wyoming			

*Interesting Twists:

Maine and Washington – A P.E. must be in responsible charge of organization's engineering.

New Jersey – Exemption does not apply if engineering affects public health and safety.

North Dakota – services of "unique type" may require licensure.

States with Exemptions for Manufacturing Businesses Only (13):

Florida	Idaho	Indiana	Kansas
Maryland	Massachusetts	Michigan	Minnesota
Missouri	New York	Pennsylvania	Vermont
Wisconsin			

Jurisdictions with Exemptions for Utilities Only (5):

Alabama	District of Columbia	Nevada
South Carolina	Tennessee	

States without Current Licensure Exemptions (apparently) (4):

Arkansas

New Hampshire

Hawaii

Oklahoma

4. Industrial Exemptions

What is Next for State Societies?

Not Applicable in New Hampshire – we're good.

5. Professional Practice Outcomes – Accreditation Criteria

- NSPE Position: In Engineering Education, Include:
  - Leadership
  - Risk and Uncertainty
  - Project Management
  - Public Policy
  - Business Practices
  - Sustainability

➢ Status: Under Consideration by ABET EAC Criteria Committee

6. Raise the Bar – Engineering Education

- NSPE Policy No. 168
- NCEES Model Law 2020 Provisions – Master's or Equivalent after 2020 adopted in 2006.

- Status
  - State by State Consideration
  - Public discussions in the past year in Idaho, Nebraska and Vermont
  - No State Legislation Filed at this time, to our knowledge

7. Licensure of Structural Engineers

- Issues
  - Coalition of Structural Engineering Organizations Advocating Separate Licensure of Structural Engineers in All States
  - NSPE Policy Advocates P.E. as the only License Required for Practice
  - State Legislative Initiatives are not Resolving

7. Licensure of Structural Engineers

- NSPE Policies and Positions – Unchanged
- NSPE L&QP Committee Actions
  - Engage in Discussions with Structural Engineering Coalition
  - Monitor Legislative Initiatives and Apprise State Societies
  - Formulate Alternatives that Accomplish Objectives without Separate Licensure
  - Google – “Licensure of Structural Engineers, a workable solution”

7. Licensure of Structural Engineers

- What is Next for State Societies?
  - Monitor Legislation
  - Engage in the legislative process
  - Consider Alternatives in the Future

8. Faculty Licensure

- **Licensure of R&D Principal Investigators**
- **NSPE Position Statement 1754**
  - The National Society of Professional Engineers (NSPE) recommends and advocates the inclusion of a **principal investigator(s) (PI) or a co-principal investigator(s) (co-PI)** who is a licensed professional engineer **(P.E.) on all** Federal and State (or other jurisdiction) **research and development (R&D) contract/grants** that involve the practice of engineering, including applied research and development **associated with public health, safety, and welfare**. **Execution of basic research is not within the scope** of this position statement as basic research is generally intended to enhance the knowledge in science, not engineering.

- **Could be interpreted now under some existing statutes and rules?**

9. Licensure of Federal Engineers

NSPE Position Statement 1767

For Engineers in Responsible Charge of

Projects Potentially Impacting Public, Health, Safety and Welfare

NSPE Advocates Agency Policy:

Licensure in at least one Jurisdiction

10. PE Licensing Blog Articles

- PE Licensing Blog – NSPE Website
  - **Peer Reviewed**
  - >50,000 Hits per Year, currently

Typical Recent Topics

- **Early Taking of the PE Exam**
- **Women in Engineering - What is Going On?**
- **Engineering Licensure Accommodations for Returning Veterans**
- **Licensure of Structural Engineers: A Workable Solution**
- **Licensure of Engineering Technologists – Current Status**
- **The Washington Accord – Current Accreditation Issues**

11. NSPE Engineering Body of Knowledge

- **Knowledge, skills and attitudes** required for the practice of engineering as a professional engineer.
- Applicable across **all engineering disciplines.**
- **Guiding Principles** that will shape the future of engineering, **Key Attributes** of the P.E., **Capabilities and Abilities** of the P.E.
- Input from within NSPE and from partner societies: ASABE, IEEE, AIChE, ASCE, JSPE, others
- 2014 Scheduled Availability

11. NSPE Engineering Body of Knowledge

- Intended Audiences
  - Prospective and Current Engineering Students
  - Engineer Interns
  - Engineering Mentors
  - Employers
  - Engineering Faculty
  - Licensing Boards
  - Certification Boards

11. BOK EXCERPTS – Key Attributes of a P.E.

- **Analytical** and practical
- Thorough and **detail-oriented** in design
- **Creative** and innovative
- **Communicative**
- Knowledgeable about the application of **sciences and mathematics**
- Thoroughly **knowledgeable in a selected field** of engineering and conversant in related technical fields
- Knowledgeable about and skillful in **business and management**
- **Leader** —effects changes in strategies, tactics, policies, and procedures in project and other roles
- **Professional** and positive in attitude
- Aware of societal and historical considerations in the **global context**
- Aware of and compliant with relevant **laws, regulations, standards, and codes**
- Licensed as a Professional Engineer and knowledgeable about **engineering ethics** and applicable codes of professional conduct
- **Lifelong learner**

11. NSPE BOK Excerpts – Capabilities of a P.E.

Mathematics	Natural Sciences	Humanities/Social Sciences
Manufacturing/Construction	Design	**Engineering Economics**
Engineering Science	Engineering Tools	Experiments
Problem Recognition/Solving	Quality Control and Assurance	Risk/Reliability/Uncertainty
Safety	Societal Impact	Systems Engineering
Sustainability	Technical Breadth	Technical Depth
Business Aspects	Communication	Ethical Responsibility
Global Knowledge /Awareness	Leadership	Legal Aspects
Lifelong Learning	Professional Attitudes	Project Management
Public Policy	Teamwork	Operations and Maintenance

11. NSPE BOK Excerpts – Capability Description Example: Engineering Economics

Capability Description – Engineering Economics

The use of economic analysis is fundamental to the engineering design process and to changes in systems, processes or operations. In evaluating and comparing design alternatives, engineers need to assess initial capital costs; annual operation, maintenance, and repair costs; and periodic replacement of equipment or other components costs and determine the remaining economic value at the end of the evaluation period. Design alternatives typically have different capital and operating costs , with some alternatives having higher capital costs and lower operation, maintenance, and repair costs while other alternatives offer lower capital costs, but higher operating costs. Engineering economic analysis is used in the design process to compare alternatives on an equivalent (present worth or equivalent annual cost) basis, using assumptions for interest rates. This analysis helps assure a least cost, optimized design taking into account the estimated expenditures required and the time value of money.

Once design alternatives are selected, engineers are typically involved in further defining project economics through estimating total project costs, incorporating the cost of designing and manufacturing or constructing a solution as well as other implementation costs such as management requirements, bonds and insurances, contingencies for as yet undefined project requirements, and financing. An essential element of this process is the identification and economic quantification of the risks associated with the project or product. This entire process is often iterative wherein cost estimates are refined as projects proceed from planning to design to manufacturing or construction. Engineers often interact with managers and other professionals in providing project economic information and opinions of project costs in financial analysis and financing processes.

On some projects, engineers help evaluate life-cycle costs, taking into account annual loan payments as well as annual operation, maintenance, and other recurring costs in the process of setting rates or prices to assure that revenues to be received are adequate to offset costs. This also often involves interaction with management, finance, and other professionals.

11. NSPE BOK Excerpts – Capability Description Example: Engineering Economics

Example Abilities

As examples of engineering economics capability, an engineer entering practice at the professional level should be able to:

Prepare detailed cost estimates of initial capital and annual operation, maintenance, repair, and replacement costs for a project or component of a project

Calculate the return on investment, present worth and/or annual cost and benefit of a project having initial capital and annual operation, maintenance, repair and replacement costs using appropriate interest, discount and projected inflation rates

Identify and quantify the economic risks associated with a project or product

Compare design alternatives having varying cost profiles on a present worth or annual cost basis

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Questions?

Comments?

Thank You!

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