

Texas Board of Professional Engineers
Engineering For A Better Texas



Texas Board of Professional Engineers Professional Licensure

Licensing Webinar
March, 2014

Engineering for a better Texas

Welcome

- Lance Kinney, P.E.
 - Executive Director
 - Lance.Kinney@engineers.texas.gov
- David Howell, P.E.
 - Deputy Executive Director
 - Acting Director of Licensing
 - David.Howell@engineers.texas.gov

Webinar Info

- Webinar audio can be through your computer speakers or through the phone.
- All attendees will be in Listen-only mode.
- Questions will be handled in writing through the webinar software and answered by the presenter.
- If there are questions, not addressed, please email the presenter.
- During the presentation, use the Question feature in the webinar software, not the chat feature or the hand raising feature.

Welcome



- Lance Kinney, P.E.
 - Executive Director
 - Lance.Kinney@engineers.texas.gov

Professionalism and Ethics



- David Howell, P.E.
- Deputy Executive Director
- Acting Director of Licensing
- David.Howell@engineers.texas.gov

Agenda

- Overview of Engineering Practice Act
- Benefits of Licensure
- Exams / CBT
- Application Process

Poll

- Audience perspective

History of TBPE

- Created by Texas Legislature (45R) in 1937
- New London School Explosion
 - 300 students and teachers killed
 - Result of improperly designed mechanical and electrical devices
- Established a Board to regulate the practice of engineering through licensing and rules of practice



1937

Engineering for a better Texas



Engineering for a better Texas

Protect the Public

- Licensing Engineers
- Enforcement of Engineering Practice Act
- Continuing Education
- Public Outreach

Expectations of a Licensed Engineer

- Technical Competence
- Professionalism
- Ethical Responsibility
- Understanding of Laws and Rules

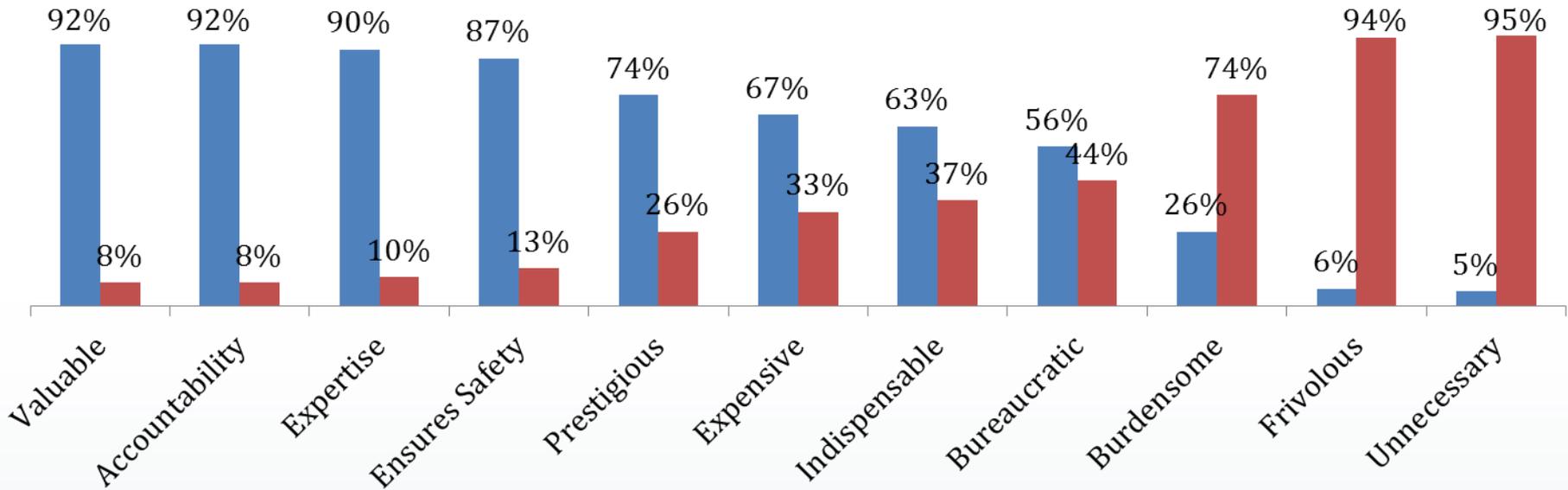
Engineering Competence

- Protection of health, safety, welfare
- Professional Engineers must not practice outside of their competence
- Competence is determined by experience, education and examination
- Competence is an expectation of the public

Public Perception of Engineers

- Honesty (Gallup Poll Nov. 2012)
 - Nurses
 - Pharmacists
 - Doctors
 - **Engineers**
 - Dentists
 - Police Officers
 - College Professors
 - Clergy

Public Perception - Licensure



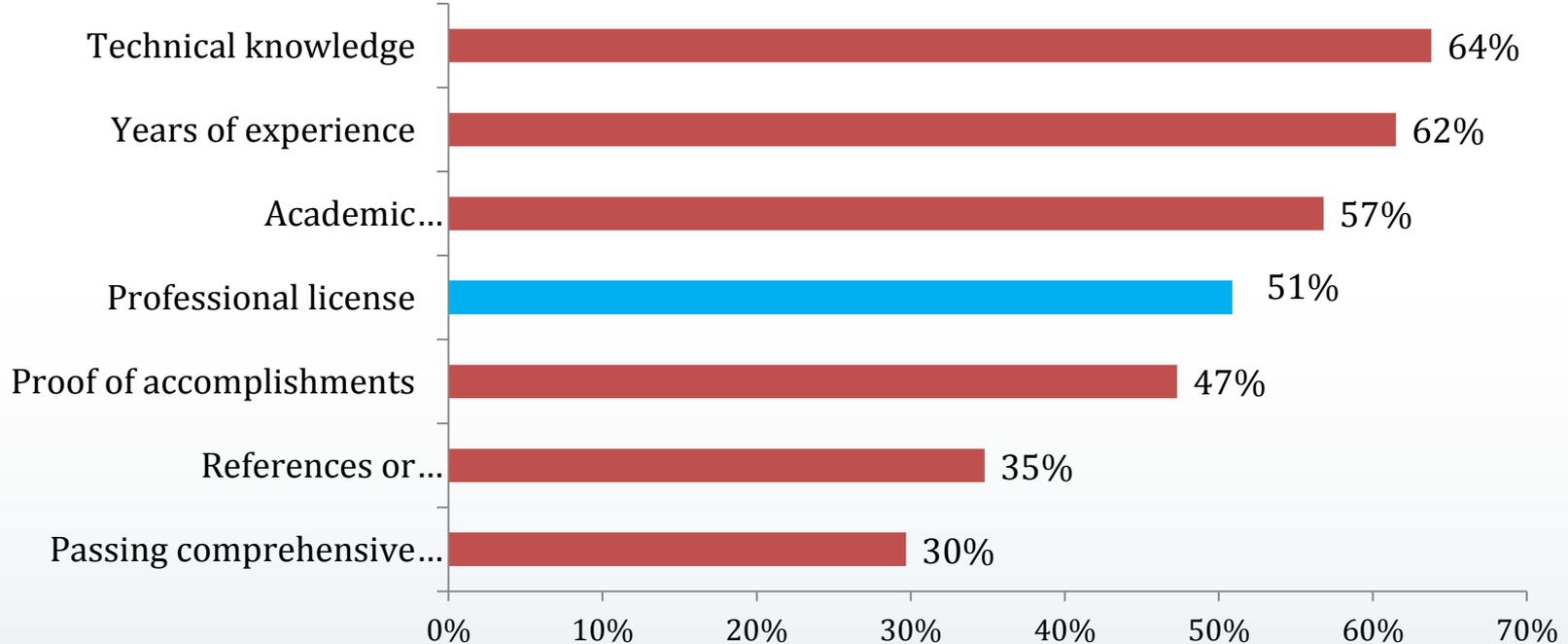
Please "click on" and "drag" each of these terms...based on whether you feel it describes professional licensure or not. (N=874)

■ Describes ■ Doesn't Describe

Survey by McKinley Advisors

Public Perception - Licensure

**Importance in ensuring a professional's expertise
(Rated "Extremely Important")**



"Please rate each of the following in terms of their importance in ensuring a professional's skills and expertise in their job/occupation" (N=998)

Survey by McKinley Advisors



Engineering for a better Texas



Benefits of Licensure

- Serves as a protection of public health, safety, and welfare.
- It shows you have accomplished a recognized standard.
- Makes you equal with other professionals. Many other professions require that you are licensed to practice.

Benefits of Licensure

- Sets you apart from others in your profession.
(Marketability)
- “Portable” credential you can keep throughout your career.
- Law - Only Licensed Engineers Can Offer Services to the General Public
- Required for Some Positions

Benefits of Licensure

- Much More than Just Passing an Exam!
- Increased Responsibility and Authority.
- You Will be in Responsible Charge of Your Engineering Projects.
- You Will be Held Accountable for Your Actions as an Engineer.

Law and Rules

- Board is authorized by the Texas Engineering Practice Act
- Board interprets and implement the statute to create Rules
- All Texas Professional Engineers must know both

Ethics and Code of Conduct

- Board Rules: Subchapter C
 - Protect the Public
 - Objective and Truthful
 - Competent
 - Confidentiality of Clients
 - Responsibility to Profession

Professionalism – TBPE Board

“It is one of the primary obligations of the Texas Board of Professional Engineers to assure that Texas engineers are held to the highest standards of competency, integrity, and honesty. Public safety depends upon that standard and consistently achieving in our profession requires faithful and unwavering practice of honesty and integrity in all aspects of our lives not only when we sit at our desk. ”

Standard Licensure Process Flow

- 4 Year Degree
- FE Exam
- Work Experience
- Apply for licensure and permission to take PE Exam
- PE Exam
- PE License

Requirements for Licensure

- **Education**
- **Experience**
- **Examinations**

Education

- EAC/ABET Accredited Engineering Programs
- Non-Accredited Programs Including Non-ABET Engineering Degrees and Related Science degrees (Math, Sciences, Engineering Technology)
- Information concerning ABET accreditation available at www.abet.org.

Experience

- 4 Years of creditable engineering work with ABET Accredited engineering Degree
- 8 Years with Non-Accredited Degree or qualifying Related Science degree
- Experience credit for Advanced Engineering Degrees from ABET accredited programs

Examinations

- Fundamentals of Engineering (FE)
- Principles & Practices of Engineering (PE)

Poll

- Audience perspective

FE Exam Content

- 7 free-standing, discipline-specific exams
 - Chemical, Civil, Electrical and Computer, Environmental, Industrial, Mechanical, Other Disciplines
 - No separate morning or breadth module
 - Each exam covers material commonly found in that discipline's curriculum.
 - FE exam uses both the International System of Units (SI) and the US Customary System (USCS).

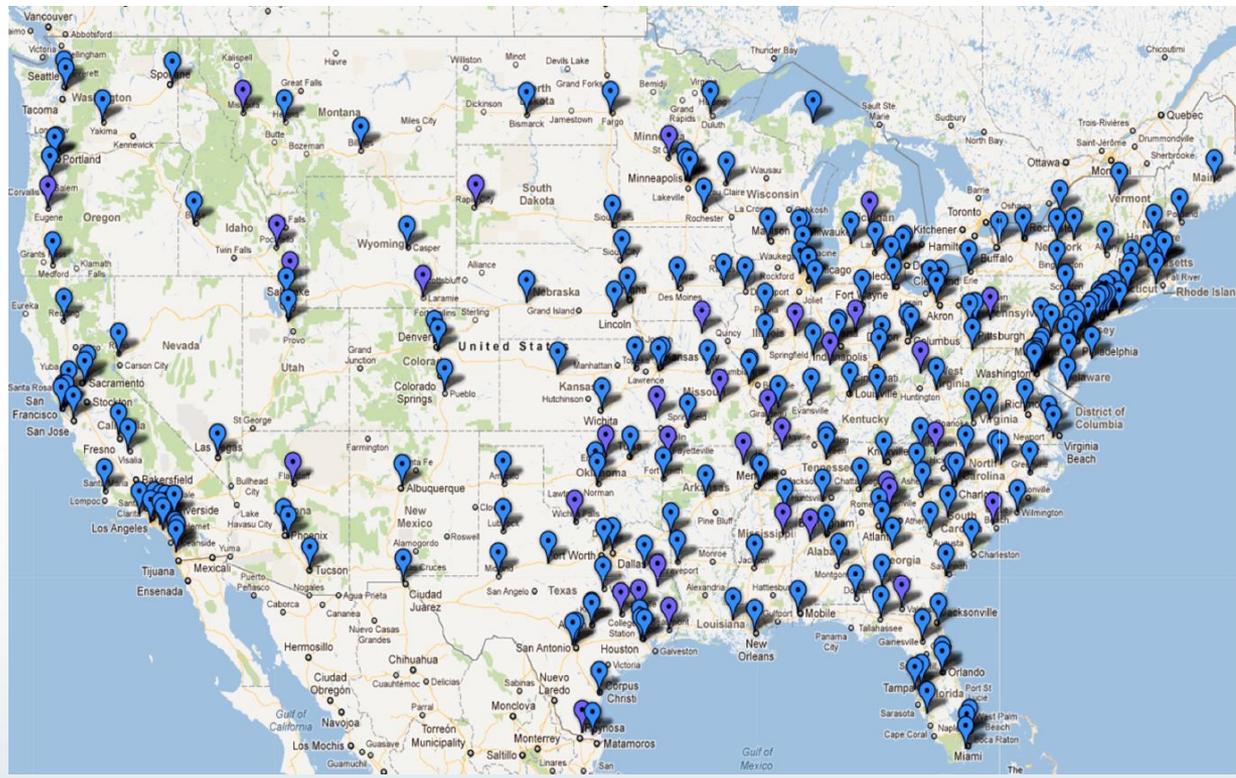
FE Civil exam

- Mathematics
- Probability and Statistics
- Computational Tools
- Ethics and Professional Practice
- Engineering Economics
- Statics
- Dynamics
- Mechanics of Materials
- Materials
- Fluid Mechanics
- Hydraulics and Hydrologic Systems
- Structural Analysis
- Structural Design
- Geotechnical Engineering
- Transportation Engineering
- Environmental Engineering
- Construction
- Surveying

Computer Based Testing

- All FE exams starting January 1, 2014
- Price \$225
 - includes test center seat, examination, and results release
- Testing windows
 - January–February, April–May, July–August, October–November
- Pearson VUE testing centers
- NCEES will release results directly to examinees within 7–10 days.

Pearson VUE



CBT

- Continuous Registration
- Register online through NCEES.org
- Pay all exam-related fees directly to NCEES via credit card
- On exam day, attest to abide by rules and policies found in the NCEES Examinee Guide

CBT

- Exam and references on computer
- Split screen
- 24-inch monitor
- FE references
 - Searchable
 - Available on NCEES website
- Specific Approved Calculators
- Security – No Other Books or References, phones, iPads, etc.

CBT FE Exam - Format

- 110 questions
- 6-hour test center appointment
 - Tutorial–8 minutes
- Exam time–5 hours, 20 minutes
 - Scheduled break–25 minutes

CBT FE Exam - Format

Candidate Name _____ Time Remaining 05:19:49
 1 of 110

Calculator _____ Flag for Review

UNIFIED DESIGN PROVISIONS

Internal Forces and Strains

Net tensile strain: ϵ_s

Strain Conditions

$\epsilon_s \geq 0.005$ Tension-controlled section $\epsilon_c \leq 0.002$
 $0.002 < \epsilon_s < 0.005$ Transition section
 $\epsilon_s > 0.002$ Compression-controlled section $\epsilon_c \geq 0.002$

RESISTANCE FACTORS, ϕ

Tension-controlled sections ($\epsilon_s \geq 0.005$): $\phi = 0.9$
 Compression-controlled sections ($\epsilon_s \leq 0.002$): $\phi = 0.65$
 Members with tied reinforcement: $\phi = 0.65$
 Transition sections ($0.002 < \epsilon_s < 0.005$): $\phi = 0.48 + 83\epsilon_s$
 Members with tied reinforcement: $\phi = 0.48 + 83\epsilon_s$
 Shear and torsion: $\phi = 0.75$
 Bearing on concrete: $\phi = 0.65$

BEAMS - FLEXURE

$\phi M_n \geq M_u$

For All Beams
 Net tensile strain: $a = \beta_1 c$

$$\epsilon_s = \frac{0.003(d-c)}{c} = \frac{0.003(\beta_1 d - a)}{a}$$
 Design moment strength: ϕM_n
 where: $\phi = 0.9$ [$\epsilon_s \geq 0.005$]
 $\phi = 0.48 + 83\epsilon_s$ [$0.004 \leq \epsilon_s < 0.005$]

Singly-Reinforced Beams

$a = \frac{A_s f_y}{0.85 f'_c b}$
 $M_n = 0.85 f'_c b \left(d - \frac{a}{2}\right) = A_s f_y \left(d - \frac{a}{2}\right)$

The nominal flexural strength M_n of the rectangular section shown is 400 ft-kips. The following data apply:

$d = 21.5$ in.
 $f_y = 50,000$ psi
 $f'_c = 4,000$ psi
 $A_s = 5$ in²
 $\phi = 0.90$

If the depth of the compressive stress block, a , needed to develop this nominal strength is 4.6 in., the minimum width b (in.) of the section is most nearly:

A. 14
 B. 15
 C. 16
 D. 17

NCEES Resources

- CBT exam-day experience video release
- Short “how to” videos
 - How to search the FE Reference Handbook
 - Hotkeys
 - Onscreen calculator
 - Reusable booklet for scratch work
 - How to flag items for review

Engineer in Training Certification

- Some Employers Want EIT Certification. Demonstrate Applicant is on the Path to Licensure
- Optional – Not Required for PE exam.
- Procedure:
 - Application form and \$15 fee
 - Official Transcripts (degree evaluation, if foreign)
 - Exam Verification if taken outside of Texas

PE Exam - Format

- Multiple Choice
- 80-100 Questions Total
- Breadth Section ~ 40 questions in morning session (same for all examinees in discipline)
- Depth Section ~40 questions in afternoon session (depend on module selected)
- Select Discipline when registering
- OPEN BOOK!

Exams

- PE Exams are offered twice per year (April / October)
- Register through NCEES – link on TBPE page
- Registration open ~6 months before exam
- Be aware of registration and application deadlines!

Exams

- FE Exam – no application. Just sign up. Must be within 2 semesters of graduating.
- FE Exam – may take as many times as necessary.
- PE Exam – must apply to board first.
- PE Exam – may take 4 times.

Application

- Form - online
- Transcripts
 - Originals Directly from Institution
 - Official Copies of Undergraduate Degrees when with Accredited Degree
 - Foreign Degree Evaluation

Application

- Supplementary Experience Records
- References
 - Regular Application 3 PE's
 - Waiver Request 5 PE's
- Ethics Evaluation
- Fee (\$80 and \$200) -online

Application

- Other
 - Documentation of English Proficiency
 - Criminal History Records Check
 - Verification of Examinations (if taken in another state)

Supplementary Experience Record (SER)

- Detailed description of engineering work
- Distinguish work personally performed from group efforts
- Project record or diary
- Form is available on TBPE Website

Supplementary Experience Record (SER)

- Experience can be obtained in Texas, other States, or Overseas
- Internships, Co-ops may be creditable if More than Three Months in Duration
- No credit for Teaching Assistant work

PE References

- 3 PE References Required for your Work Experience
 - 5 for a waiver of the FE
- Minimum 1 PE Reference for each engagement
 - All claimed engineering experience
- Fill out form / Sign SER pages
 - Must address Personal Character, Readiness for Licensure and vouch for the Engineering Experience
- Can be licensed in any state / May be inactive

PE References

- All references are confidential
- References can be directly sent to the board or collected and sent with the application
- Keep track of names, contact info for possible PE references
- It is possible to get a reference in advance (from a job you have left, etc.)
- You can have a PE review prior work if no current PE is available

Update on NCEES

- CBT Implementation
- PE Exam changes
 - Software Engineering
 - Exam restructuring
- Industry Exemption discussions
- BS+30/Masters Or Equivalent is a part of NCEES model law to be effective 2020

We want to hear from you

- How did we do today?
- How are we doing in general?

<http://engineers.texas.gov/outreachsurvey>

<http://engineers.texas.gov/feedback>

Contact TBPE

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