

Dispelling the Myths in Becoming a Professional Engineer!

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Your Presenters

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Education:

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Experience:

Senior Research Scientist, Knowledge Based Systems, College Station, Texas 1989-Present

Licensed Professional Engineer in State of:

Texas

- Joe Michels

Education:

BS, Weber State University
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PhD, Texas A&M University
MPA, University of Oklahoma
MA, Naval War College

Experience:

United States Air Force, Retired Colonel (O-6)
College Dean- Twice
Solomon Bruce Consulting, 2007- Present

Licensed Professional Engineer in States of:

Texas, Montana

To whom it may concern...

- Practitioners
- Academics
- Students



Myths Answered

- Practitioners

- Myth--My industry requires certification in 6-sigma, TQM, CPI, RIE, factory physics, black belt, lean, PMP, etc – no one recognizes the PE – what does it cover?
- **FACT– PE covers all of these areas! A PE LICENSE is a LICENSE, not a certificate. The difference– One has to have specific qualifications for a license, i.e., education and experience approved by a governmental jurisdiction. A certificate can be awarded by anyone.**
- Myth--I have not worked for any PEs – I cannot get my experience certified
- **FACT– Not true! Your work can be certified by other PE's!**



Myths Answered

- Practitioners

- Myth--It's been too many years and I haven't taken the FE
- **FACT– YOU can DO THIS!** In some cases, you may waive FE with experience, depending upon the jurisdiction. Additionally, the FE is discipline specific – the ISE FE covers primarily ISE topics. The specification is posted at NCEES.ORG.

- Myth--Not necessary – nobody has one – not needed in my industry
- **FACT– Makes no difference– PE increases salary and prestige in industry.**



Myths Answered

- Practitioners
 - Myth-- Too risky at this stage of my career – I can't pass the test
 - **FACT– YES you can! Positive Mental Attitude and study are the keys. YOU can do this!**
 - Myth--Too risky – insurance, etc. – why expose myself or employer to the risk?
 - **FACT– Your employer has insurance to cover liability for errors**
 - Myth– My B.S. was in Mechanical (Civil, Aero, ...) Engineering, but I now work almost exclusively in production systems, this test is only for those who have a B.S. in ISE
 - **FACT– No, in fact, one of us works at a firm that has 5-licensed PE's all in the domain of ISE but 4 of the 5 have their B.S. degrees in a major other than ISE**



Myths Answered

- Practitioners

- Myth-- What for – I don't need to seal anything
- **FACT– You never know when you may be in “responsible charge” of the engineering project that you are working on.**

- Myth--Do I have to live in state where I practice?
- **FACT– NO, you do NOT have to live in the state in which you practice. You have to be licensed in the state in which you practice.**

- Myth--My practice is primarily international – this has little to no bearing
- **FACT– PE License is HIGHLY PRESTIGIOUS internationally! PE License increases your value and image of capability and competence.**



Myths Answered

- Academics

- Myth--What for – no bearing on tenure and promotion?
- **FACT– Some institutions require faculty members to be licensed to join engineering faculty, teach design courses**

- MYTH--It is not my job, takes too much airspeed and altitude
- **FACT– Faculty are ROLE MODELS for young engineers**

- MYTH--ABET not asking for it, so why the concern?
- **FACT– One never knows when new requirements may dictate professional licensure.**



Myths Answered

- Students
 - Myth--No time; schedule too constrained to coordinate with exam dates
 - **FACT**– FE exam is computer based, take it at any time!
 - Myth--Too many topics and I blew *Thermo*
 - **FACT**– FE test is IE specific, no Thermo problems on test!



Myths Answered

- Students
 - Myth--No body asking for it, employers asking for specific certifications not PE
 - **FACT– Take FE exam, gain experience for PE exam, earn certificates as needed**
 - Myth--It's really for civil and mechanical
 - **FACT– The PE License is for ALL ENGINEEERS, irrespective of discipline.**



Professional Engineering Licensure

- Why Licensure?
- Why is it Important?
- State Requirements?
- What is required to become licensed?
- How Do I become licensed?



The Future

- Do you know what you will do when you graduate?
- What are you doing next year?
 - Future Uncertain—Why take a chance on the unknown?
- 5-10-20 Years from Now?
- Career Professionalism-- you know what you'll do when you graduate?
- Where do you see yourself in five years?
- What about 10 years? 20? 30?



Current situation

- Only a very small fraction of BSIE holders become PEs
 - Starts with few seniors taking the FE
- Fewer faculty teaching the next generation of IEs have a PE
- A common **notion** is that IEs don't need to be registered because state law doesn't force it like Civil Engineering
- It is **thought** that the registration process is biased towards civils and mechanicals – IEs have a hard time passing



It's About Showing What You Can Do

- Career and resume discriminator
- What do hiring firms look for?
- Degrees, work references, technical skills
- What if there was a universal standard that was recognized throughout the profession?
- International recognition— foreign countries



Why Professional Engineering Licensure?

- Protects public health, safety and welfare



Industrial Engineers– Protect Public Health, Safety and Welfare

- IE– Only discipline to explicitly include humans in systems design!
 - Human Factors/Ergonomics
 - Health Care
 - Financial Systems
 - Warehousing/Logistics
 - Manufacturing/Service Sectors



It's Industrial *Engineering*

- Shouldn't we want to be professional engineers?
- The PE is a key reason we are a recognized engineering discipline
 - Sets IEs apart from Math, Mgt, and Psych majors
 - ***Differentiates*** our graduates in the workplace and commands more salary in most cases (IEs with a PE license make more than math majors doing essentially the same job [NSPE 2013 Salary survey])
- Professional licensure is a “No Brainer!”



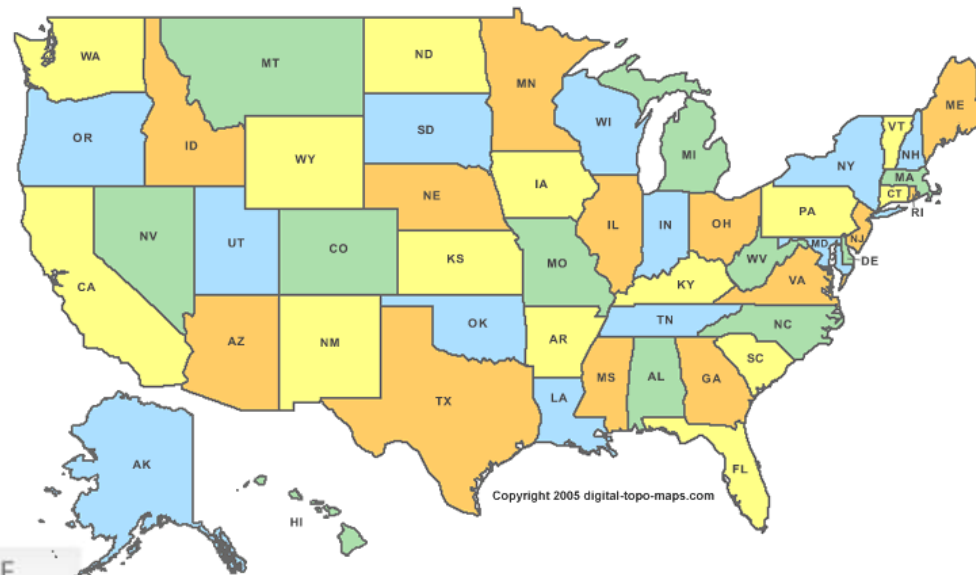
Professional Engineering License For Industrial Engineers

- Consulting
- Own an engineering firm
- Perform Government Work
- Be Identified as a Professional Engineer
- Cost/Benefit Analysis



State Role in Licensure

- Professional Engineering Licensure in the USA is Controlled by Each State



On Line Engineering Licensure Web sites

- Engineerintrainingexam.com
- Prepineer.com
- Engineerboards.com



Fundamentals of Engineering Examination

- The FE is focused by discipline; IE has their own test – covering IE material
- Computer Based Test completed at Pearson VUE testing center
- On demand, Schedule it, Take it
- 110 Questions
- 6 hour length
- Given throughout the year
- Fees
 - Paid to testing center
 - Paid to State, varies by state



FE for IE Exam Content

Topic	# of Questions
Mathematics	6-9
Engineering Sciences	5-8
Ethics and Professional Practice	5-8
Engineering Economics	10-15
Probability and Statistics	10-15
Modeling and Computations	8-12
Industrial Management	8-12
Manufacturing, Production and Service Systems	8-12
Facilities and Logistics	8-12
Human Factors, Ergonomics and Safety	8-12
Work Design	8-12
Quality	8-12
Systems Engineering	8-12

Full specification published online at NCEES.org

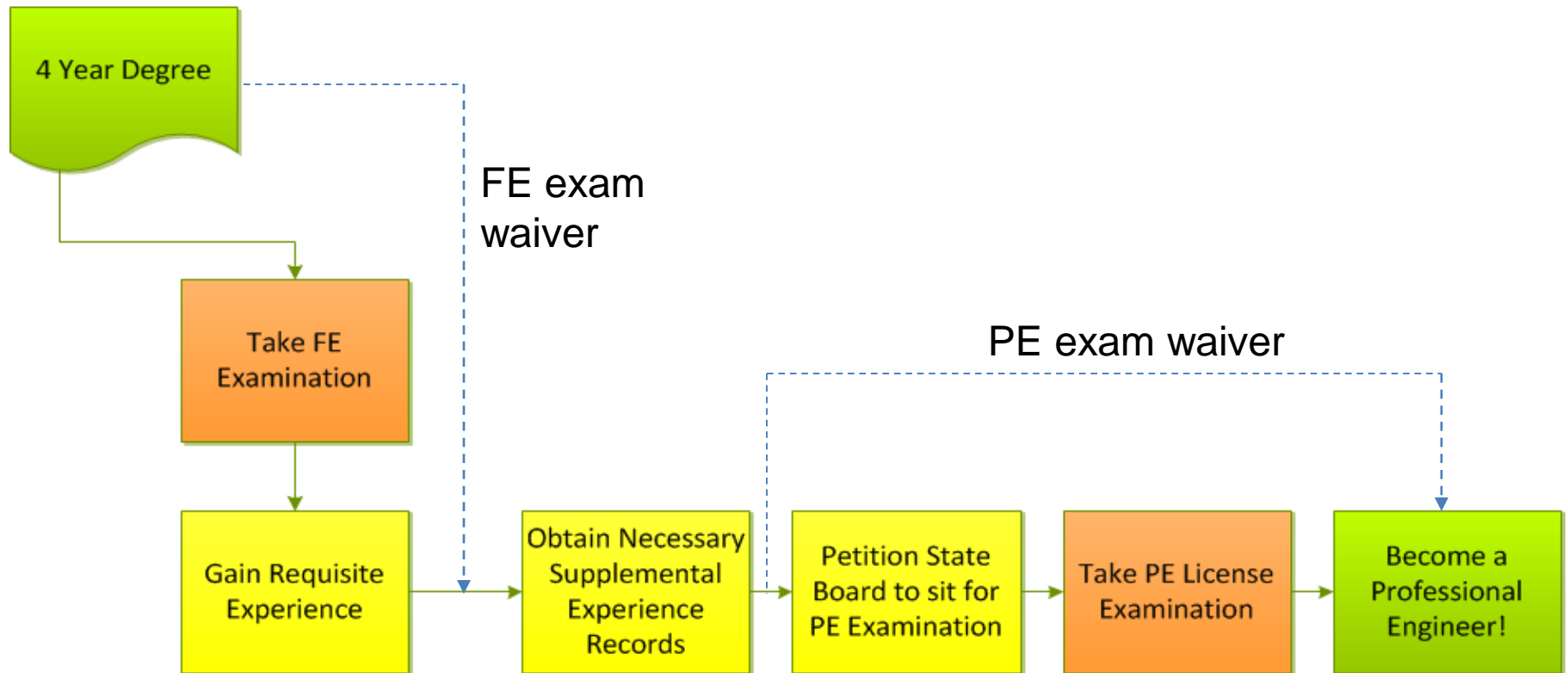


PE Licensing Process

- Take FE exam, receive certificate; or receive FE exam waiver
- Gain ~4 years of experience
 - Experience documented in record format
- Must have 3-5 licensed Engineers* verify experience
- Take PE exam; or receive PE exam waiver
- **Some** states make allowances for Engineering Educators, i.e, no testing to become a PE
- Industrial PE exam given in April each year
 - 80 questions, about 6 minutes per question



PE License Process



Note: The number of years of acceptable experience depends on the academic career and highest earned degree.

Experience

- **Normally**, 4 years of practical experience required between award of FE and taking PE examination
- **Experience** requirement changes if you have a graduate, i.e., Masters or PhD Degree
 - State Dependent– all are different
- Recorded via the SER [Supplemental Experience Record]



Supplemental Experience Record (SER)

- Document each work assignment from day 1-
- Use Engineering Action VERBS
 - You *designed, calculated, measured, engineered, built, constructed, modeled.....*
 - You DID NOT coordinate, attend, assist, aid, compile.....



Professional Engineering Examination

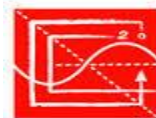
- **Normally** completed after 4 years of practice
 - However, some states allow you to take PE Exam immediately after passing FE exam
 - Texas, Nevada allow this– others do as well!
- **Must have** 5 Engineering References, 3 of which are PEs
- **Some** states make allowances for Engineering Educators, i.e, no testing to become a PE
- Industrial PE exam given in April each year
 - 80 questions, about 6 minutes per question
- Fees



PE Exam Content

Topic	Weighting
Systems Analysis and Design	20%
Facilities Engineering and Design	20%
Supply Chain and Logistics	20%
Work Design	20%
Quality Engineering	20%

Full specification published online at NCEES.org



NCEES
advancing licensure for
engineers and surveyors



Comity vs. Reciprocity

- **Comity**: Accepting the status of engineers licensed in other states, regardless of whether the state in question does the same.
 - Comity is requirements-based
- **Reciprocity**: An agreement between two states that allows each state to accept the licensure status of the other state's licensed engineers (an equal exchange).
 - Reciprocity is agreement-based
- All states have some comity provisions in their licensure laws, most allow comity if the applicant meets the licensure requirements in effect at the time the PE obtained the license from the primary jurisdiction
- Some states (NV, NE, ND, NH, TX) have reciprocity agreements with Canada and reciprocity agreements with Mexico



International Engineers

- Thirty-six states accept degrees earned at foreign universities as meeting the educational requirement
- Forty states adhere to the Washington Accord, an agreement between English speaking nations that recognizes their accreditation process as being equivalent



Licensure vs. Certification

- What are the similarities and differences between licensure and certification?
 - Certification is generally voluntary
 - Licensure is a **privilege** granted by state and territorial legislatures



Licensure vs. Certification

- Don't confuse licensure with certification:
 - Many businesses and professional organizations offer voluntary certification programs that attest to an individual's expertise in certain knowledge areas
 - Some certifications are vendor specific - Cisco (CCNA), Microsoft (MCSE), etc.
 - Others are vendor neutral – ASQ (Quality Engineer), IEEE Computer Society (CSDP), etc.



Licensure vs. Certification

- What are the similarities and differences between licensure and certification?
 - Both require education, experience and testing
 - Each results in the award of a credential attesting to an individual's knowledge, skills and abilities
 - Both provide procedures for disciplining credential holders for illegal, unprofessional or unethical practices



Bottom Line

- Engineering licensure is the hallmark of a true professional
- True Differentiator in the hiring process
- Signifies competence in field
- Recognized Internationally
- Normally, a higher salary is paid to a PE



Questions?

