

Guidance

For

Engineering Students in Texas

On the

Licensed Practice of Engineering

From the

Texas Board of Professional Engineers

Developed and Published for the Texas Board by the Murdough Center for Engineering Professionalism
Texas Tech University, Lubbock, Texas, August 2000

What is a Licensed Engineer?



The Texas legislature created the Texas Engineering Practice Act (Act) in 1937 *to protect the health, safety and welfare of the citizens of Texas*. The Act defines engineering practice and establishes requirements (below) to become licensed as a Professional Engineer (PE). However, having an engineering license means more than just meeting the state's minimum requirements. It means you have

accepted both the technical and the ethical obligations of the engineering profession. As a Professional Engineer, you can take pride in being officially recognized by the state and by the public as an "engineer." The license grants you the opportunity to perform engineering services for the public, take responsibility for your designs, reports, professional opinions, plans, etc., and have the privilege of applying your state-authorized engineering "seal" to your engineering work.

What are the Requirements to Become a Licensed Engineer?



Passing two national exams and the Texas ethics exam, and obtaining acceptable experience are the basic requirements. You are encouraged to carefully prepare for the national Fundamentals of Engineering (FE) Exam, which we recommend you take during your senior year. After passing the FE and receiving your BS degree,

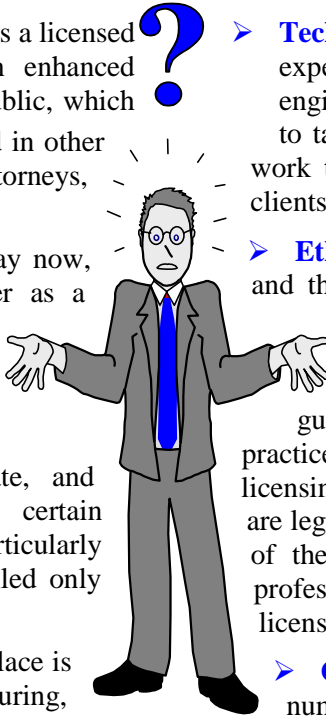
you then need to obtain 4 years (or 3 years after a MS degree) of acceptable engineering experience, with increasing levels of responsibility, preferably under the guidance of one or more licensed engineers. Finally, you apply to take the national Principles and Practice (P&P) Exam in your own specialty area and to take the Texas Engineering Ethics Exam. Passing these exams qualifies you to join the proud ranks of approximately 50,000 other Texas licensed engineers.

Should I Become a Licensed Engineer?



You are strongly encouraged to become licensed. Although many engineers work in an industrial setting where a license is not required to do engineering work inside the company, some have faced a point in their careers where they have had to pass up an opportunity -- because the opportunity required a *licensed* engineer. Let us share with you a few other reasons, some of these were based on those reasons suggested by the National Society of Professional Engineers (NSPE) to become a licensed engineer:

- **Public Recognition:** As a licensed engineer, you achieve an enhanced status in the eyes of the public, which equates you with professionals licensed in other fields such as physicians, attorneys, accountants, etc.
- **Private Practice:** If you think you may now, or someday, want to pursue a career as a consulting engineer, or own your own engineering firm, or be in responsible charge of engineering work, you will need to be licensed.
- **Public Practice:** Many federal, state, and municipal agencies require that certain responsible engineering positions, particularly those considered “higher level,” be filled only by licensed engineers.
- **Changing Workplace:** Today’s workplace is rapidly changing -- restructuring, downsizing, privatization, and outsourcing (where firms terminate employees and then hire them back as consultants) are common. You should be prepared to face a possible transition into a consulting or contract relationship with a former employer in the event of corporate outsourcing. Such a relationship requires an engineering license.
- **Technical Responsibility:** Your education and experience will prepare you for technical engineering work. Your license legally allows you to take personal responsibility for the engineering work that you may perform for public and private clients.
- **Ethical Responsibility:** Licensure also aids you and the profession in the important area of ethics. While most technical societies, such as AIChE, ASAE, ASCE, ASME, IEEE, IIE, and NSPE, have codes of ethics for guidance, none have “legal” standing in the practice of engineering. On the other hand, state licensing boards have standards of ethical conduct that are legally binding. The recognition and enforcement of these standards gives greater definition to our profession, and significantly enhances the image of licensed engineers in the eyes of the public.
- **Other Sources Available:** In addition to numerous National Society of Professional Engineers publications on licensure (see www.nspe.org), an excellent Power Point presentation on “*Ten Reasons to Become a Professional Engineer*” developed by Dr. John Steadman, former president of NCEES may be downloaded free from the IEEE Web Site: www.ieeeusa.org/careers/ieeep1.ppt.



What are the Technical and Ethical Responsibilities of a Licensed Engineer?

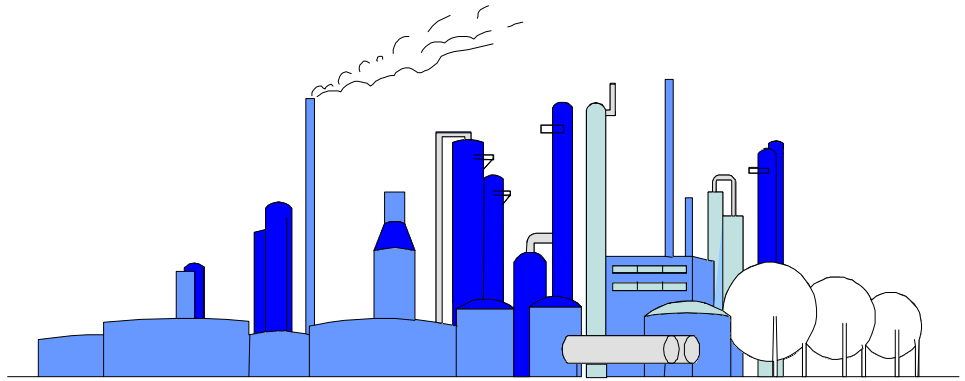


Most of an engineer’s education focuses on technical matters, that is, “how to do things right,” and most of an engineer’s professional practice is devoted to these technical matters. However, another important element of both education and practice involves ethics, or “how to do the right thing.” Engineering ethics is therefore a vital part of the engineering profession.

The ethical issues that face engineering students, young engineers, and licensed professional engineers are not always easy to answer. Choosing between “good” and “bad” appears easy until unseen variables are introduced such as time constraints, family, promotion opportunities, job security, peer pressure, supervisor pressure, and professional reputation. Also, choosing between competing goods often confronts the engineer and these choices are sometimes difficult, but nevertheless critical to continued growth of the profession.

Real-Life Experiences in the Practice of Engineering

In order to help you be better prepared to face and resolve ethical dilemmas, we present the following story about an engineer named “Joe.” Drawn from real-life situations that actually occurred to practicing engineers, this story includes some typical ethical situations that confront engineers during the course of an engineering career. We designed this story to help you:



- **Recognize** ethical issues which relate to engineering,
- **Realize** the frequency at which ethical issues occur, and the types of ethical issues which you may encounter in the future,
- **Consider** how you would react if you were faced with Joe’s situations or similar ones,
- **Be aware** that guidance on ethical dilemmas is available from a variety of sources, and
- **Be prepared** to resolve difficult questions by using traditional inquiry methods in engineering by listing your options on ethical issues, testing the options, making a decision, and most importantly, acting.

Remember: The following experiences have actually happened to engineers in the past and could happen to you. You will benefit from these experiences best if you think of yourself as being in **Joe’s** situations, viewing them as your own potential experiences. Try to answer the questions as if you were really ‘in’ the scenario, considering the importance of your family, your clients, your job, your reputation, the public, and the future of the engineering profession.

Joe’s Story

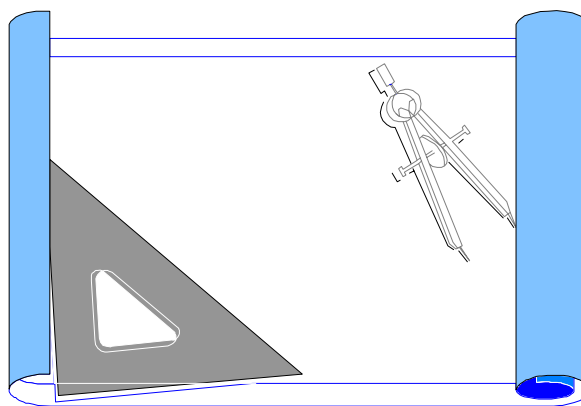
After graduating with a degree from an ABET-accredited program in Engineering, Joe went to work for an engineering firm in his home city. He worked for two years ‘crunching numbers’ for the firm, and then decided to become a licensed engineer in Texas. He learned from studying the *Texas Engineering Practice Act* that to become licensed, he must have experience in which he had progressively increasing levels of responsibility. His employer was not giving him increasing responsibilities in engineering work, so Joe went to work for a different firm so he could eventually become licensed.

Joe was excited with the prospects of his new job. His firm was retained to investigate the structural integrity of an apartment complex that their client was planning to sell. Joe’s employer

informed him that the client’s agreed terms required that the structural report remain confidential. During the field work, the client informed Joe that he planned to sell the occupied property “as is.”

During Joe’s investigation he found no structural problems with the apartment complex. However, he did observe some electrical deficiencies which he believed violated city codes.

In his report Joe made reference to the electrical problems because they were a potential life-safety issue and he felt obligated to tell his client about them. However, several weeks later, Joe learned that his client did not inform the residents of the apartment complex nor the prospective buyer about his concerns.



Upon completion of his first assignment with his new firm, Joe felt confident and pleased with his work. However, the situation about the electrical deficiencies kept nagging at the back of his mind. He wondered whether he had an ethical obligation to do more than just put his concerns in his report, but to also inform the proper authorities, especially in light of the fact that the client was not disclosing the potential safety concerns to either the occupants or buyer.

He wanted to ask his immediate boss, but felt awkward considering his short period of employment. He decided that it really did not matter. Joe assumed that he should be satisfied since his employer and his client were satisfied.

Six months later the apartment complex caught on fire. It was determined that the fire was caused by the electrical deficiencies which Joe had pointed out in his report.

Questions (assuming you were Joe):

- What were the main issues Joe was wrestling with in this situation?
- Do you think Joe had a “right” or an “obligation” to report the deficiency to the proper authorities?
- Who might Joe have spoken with about the dilemma?
- Who should be responsible for what happened: Joe, or Joe’s employer, or the client, or someone else?
- How does this situation conflict with Joe’s obligation to be faithful to his client?
- Is it wise practice to ignore “gut feelings” that arise in regard to your engineering judgment?

Discussion: It is important for Joe, or any engineer, when faced with an ethical dilemma to realize the engineer’s paramount responsibility is for the safety of the public. The occupants of the apartment complex were not aware of the electrical deficiencies.

Although not an electrical engineer, Joe had some knowledge of city building codes and the ability to foresee the possible dangers of the inadequacies with the electrical systems.

Joe could have referred to *the Texas Engineering Practice Act, the NSPE Code of Ethics, and Opinions of the NSPE Board of Ethical Review (BER)* before making a decision. If he had done so, here is some of the guidance he would have found for licensed engineers.

From the Texas Engineering Practice Act – “Engineers shall notify involved parties or the board of any engineering decisions or practices that might endanger the health, safety, property, or welfare of the public.

When, in an engineer’s judgment, any risk to the public remains unresolved, that engineer shall report any fraud, gross negligence, incompetence, misconduct, unethical or illegal conduct to the board or to the proper civil or criminal authorities” § 131.151 (c).

NSPE Code of Ethics: “Engineers shall hold paramount the safety, health, and welfare of the public” § II.1. In a similar situation, the NSPE Board of Ethical Review found, in BER Case #89-7, that an engineer had an obligation to report safety violations to the proper authorities.



Back to our story: The firm which employs Joe was contemplating submitting a proposal for the structural design related to a rural school project. Joe’s mother is an elected official of the school board in that school district and could be influential in the final selection of an engineering firm.

Joe recalls a section in the Act & Board Rules regarding conflicts of interest: “The engineer shall disclose a possible conflict of interest to a potential or current client or employer...” §131.152 (c).

Joe discloses this possible conflict of interest to his boss who tells him it’s “OK with him” and proceeds to submit the firm’s proposal for consideration, making no mention of Joe’s employment in the submittal. Joe is concerned but believes he has done all he needs to

by informing his employer of the possible conflict of interest. Also, Joe talks with his mother and believes that she would not grant any favors because of Joe's involvement in the project.

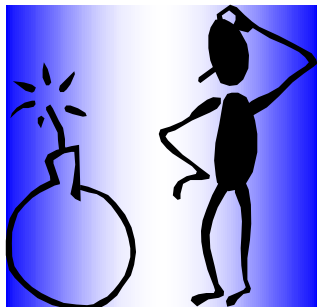
When reviewing the proposal (before he sends it out), Joe notices that the proposal includes fee information – a *bid* for engineering design services to the school district. But Joe recalls that the Texas Engineering Practice Act states that the “engineer shall not submit or request, orally or in writing, a competitive bid to perform engineering services for a political subdivision of the State of Texas...” §131.155(c)(7). Joe informs his boss, who reluctantly removes the bid portion of the proposal, and submits only the firm's qualifications.

In the end, the firm gets the job and Joe is assigned the task of doing the design. Joe has confidence in his design, but notices that his boss, a licensed professional engineer in Texas, is neither checking nor directly supervising Joe's work before sealing and submitting Joe's design to the client to begin the construction phase. Joe wonders if his boss is in violation of the Act & Board Rules and decides to discuss the matter with him.

Joe's boss appears to agree with Joe that a licensed engineer is supposed to do the design or directly supervise the design. His boss then studies the design in detail, noting a few minor errors in the wind loading used in Joe's design but nothing of consequence that would require changes in the design when constructed at that location.

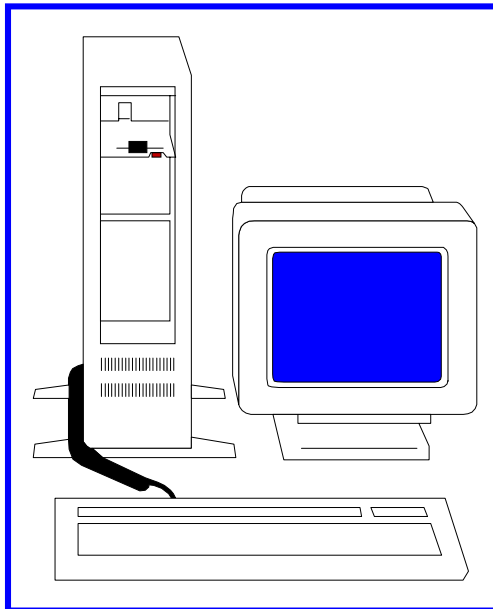
Joe is somewhat relieved, but still wonders whether “just checking” his work is acceptable under the Act. He studies the Act and determines that his boss should have done more than simply check the final design—he should have been directly involved in the entire design process in order to legally sign and seal the design.

Then things take a turn for the worse and Joe believes the situation may become dangerous when he learns that his boss has sent Joe's design to a brother-in-law (a contractor, not an engineer) in another state who uses it *without review* in a proposal to a same-



size (small) school. That other state has an engineering practice act and board rules similar to those in Texas, namely, “The engineer shall not ... aid or abet, directly or indirectly, any unlicensed person, or business entity in the unlawful practice of engineering” §131.155(c)(1).

The licensing board in the other state requires that the person performing or supervising the engineering design be licensed in their state. Joe's boss is not licensed in that state, but has a good friend who has an electrical engineering degree and is licensed in both Texas and the other state. Joe's boss asks the electrical engineering friend to seal the design for the out-of-state project.



Although the electrical engineering friend has no experience in structural design, he seals the design, because of his relationship with Joe's boss and his awareness that a respected professor has done a sophisticated computer analysis of the project.

Discussion: This is *bad practice*. Licensing boards in virtually all states prohibit “plan stamping,”

that is, – sealing work that the engineer did not perform or directly supervise. Thus, even if instead of being an electrical engineer, the friend had been a qualified structural engineer, he could not have legally sealed the design.

Again, back to our story: Although Joe has patiently tried to work through these concerns with his boss, he is now convinced that his employer does not follow the letter nor the spirit of the ethics portion of the Board Rules. He decides to seek employment in another engineering firm whose ethical and technical reputation is much higher.

Joe resigns his position, but wonders if resigning is all he should do in light of several issues, including the possible use of his design in another state, which may have different code requirements (such as loads from earthquake, wind and/or snow). He struggles with the question of whether to report the actions of his (now former) boss to the Texas Board. This appears to Joe to be whistle-blowing.

After studying the Board Rules, he determines that the best approach is to personally discuss his concerns with his former boss, and if the situation is not corrected, he is then obligated to report the matter.

* * *

Joe does this, but his former boss takes no action, and Joe reports the situation in detail to the State Board. Joe's former boss is sanctioned by the Board.

The Texas Board of Professional Engineers wishes you a long and prosperous engineering career.

Joe updates his resume and sends it to several engineering design firms in Texas. Because he is concerned that his former employer will give him a bad reference, he wonders whether to include that experience in his resume.

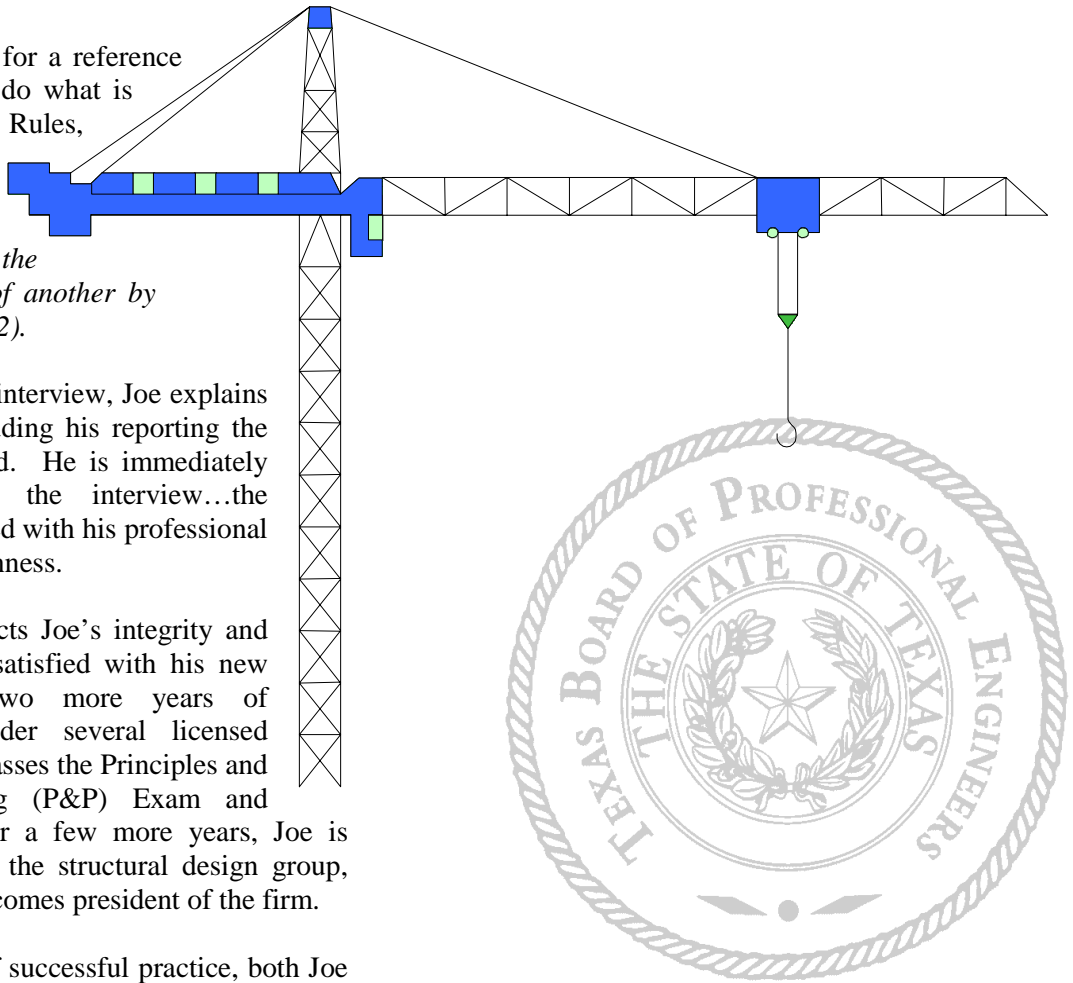
He asks his former boss for a reference anyway, trusting him to do what is required by the Board Rules, namely, *"the engineer shall not ... maliciously injure or attempt to injure or damage the professional reputation of another by any means"* §131.155(c)(2).

During his first personal interview, Joe explains the entire situation, including his reporting the matter to the State Board. He is immediately offered a job during the interview...the company is very impressed with his professional attitude, courage and openness.

The new company respects Joe's integrity and judgment. Joe is very satisfied with his new employer and after two more years of experience working under several licensed engineers, he takes and passes the Principles and Practice of Engineering (P&P) Exam and becomes licensed. After a few more years, Joe is promoted to manager of the structural design group, and later in his career, becomes president of the firm.

Over many more years of successful practice, both Joe and his firm prosper, although he has many instances where he had to stand firm regarding the integrity of his firm. On some occasions, he even refused to accept certain work that would be in violation of both his personal code of ethics and the Professional Conduct and Ethics of the State Board.

Joe is a role model for many young engineers entering the profession. He has a simple philosophy: *"Do things right, and do them the right way -- Honestly."*



Texas Board of Professional Engineers

Visit our Web Site
www.tbpe.state.tx.us