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General Principles of Engineering Ethics

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Chapter 1

Professional Responsibility

Engineering Ethics

Engineering ethics is (1) the study of moral issues and decisions confronting individuals and organizations involved in engineering and (2) the study of related questions about moral conduct, character, ideals and relationships of peoples and organizations involved in technological development (Martin and Schinzinger, *Ethics in Engineering*).

Principles of Professional Responsibility

We, as Professional Engineers, are expected to take reasonable precautions and care in fulfilling our engineering duties, and uphold the honor and integrity of our profession. To understand further what this means, let's review the following principles of professional responsibility:

- *You must hold the utmost safety, health, and welfare of the public when practicing your profession.*
- *You must perform services only in the areas of your competence.*
- *You may issue public statements in an objective and truthful manner and disclose any personal connections you may have with the subject.*
- *You must represent each employer or client as a faithful trustee and avoid conflicts of interest.*
- *You must build your professional reputation on the merit of your services and must not compete with others unfairly.*
- *You must respect the proprietary information and intellectual property rights of other engineers.*

Now, to understand further what these principles mean, let's review the ethical standards associated with each principle individually.

How should you hold the utmost safety, health, and welfare of the public when practicing your profession?

If your professional judgment is overruled such that the safety, health and welfare of the public are compromised, you must inform your client, employer, or both of the possible outcomes or consequences.

If you believe that another person is in violation of engineering ethics, you must:

- present such information to the proper authority in writing, and
- cooperate with the proper authority in furnishing such information or assistance as required.

You must strive to advance the safety, health, and well-being of your community.

You must understand that the safety, health and welfare of the public are reliant on your sound engineering applications and judgments integrated into buildings, structures, machines, products, processes and devices.

You may approve or seal design documents only when they are:

- reviewed by you,
- designed safely, and
- in conformance with accepted engineering standards.

What does it mean to perform services only in the areas of your competence?

You must not affix your signature or seal to any plan or document if:

- it does not comply with applicable technical standards, or
- it was not prepared under your supervisory guidance and control.

You may conduct engineering work only when qualified by your academic background and professional experience in the specific field of engineering you are involved with.

You must always continue to advance your professional development in your engineering field by:

- engaging in professional practice,
- participating in continuing education programs,
- reading technical literature, and
- attending professional seminars.

You may accept an assignment requiring education and experience outside of your field of competence, provided that each technical segment of this assignment is reviewed, signed and sealed only by the qualified engineers who were in responsible charge of their respective segments.

Under what conditions you may issue public statements?

When serving as an expert or technical witness, you may express an engineering opinion only if it is founded on:

- your adequate knowledge of the facts,
- your technical competence in the subject matter, and
- your honest belief in the accuracy of your testimony.

You must not issue any statements, criticisms, or arguments on technical matters which are inspired or paid for by interested parties, unless you preface your comments by:

- identifying the interested parties on whose behalf the statements are made, and
- disclosing any financial interest you may have in such matters.

You must strive to extend the public knowledge and appreciation of engineering and its achievements, and must avoid the use of untrue or exaggerated statements pertaining to engineering.

You must be objective and truthful in all your professional reports, statements, or testimony, and must include all relevant information in such reports, statements, or testimony.

You must be honest in explaining your work and merit, and must not promote your own interests at the expense of the integrity, dignity and honor of the profession.

How should you represent each employer or client as a faithful trustee, and avoid conflicts of interest?

You must avoid all known conflicts of interest with your employer or client and immediately inform your employer or client of any business relationship, interest, or other situations that could influence your judgment or quality of your services.

You must not accept payment or other types of compensation from more than one party for services pertaining to the same project, unless the conditions are fully revealed to, and agreed to by, all interested parties.

You must not accept employment outside of your regular work before notifying your employer.

You must not propose or receive gifts or gratuities from outside parties who have a business affiliation with your employer or client associated with professional work for which you are in responsible charge.

If you are a member, advisor, or employee of a governmental body, you must not participate in decisions or actions that involve services you or your organization provide in any type of engineering practice.

Based on your research and evaluation, you must advise your employer or client of your belief that a project will be unsuccessful.

You must not use confidential information provided to you while executing your assignment as a means of personal gain, if such action contradicts the interests of your employer, your client, or the public.

You must not solicit or accept financial or other valuable considerations from material or equipment suppliers for specifying their product.

You must not solicit or accept an engineering contract from a governmental body or other entity on which a principal, officer, or employee of your organization serves as a member.

How do you build your professional reputation on the merit of your services and not compete with others unfairly?

You must not influence the award of a contract. You may bid and negotiate a contract for professional services impartially based on your proven competence and qualifications for the type of professional service being solicited.

You must not strive to gain employment or advance your professional career by falsely condemning other engineers, or by other improper means.

You must not falsify your educational background, or your professional experience or qualifications.

You must not offer or accept any gift, gratuity or unlawful valuable consideration to secure work, exclusive of securing salaried positions through employment agencies.

You must not request, propose, or accept a commission on a provisional basis if your professional judgment may be compromised.

You must not use another engineer's ideas or written materials without due credit and advance notification to such engineer. You must, whenever possible, name the person who may be responsible for his or her designs, inventions, writings, or other accomplishments.

You must not harm the professional reputation, prospects, practice or employment of another engineer.

You may prepare engineering articles to be published provided:

- they are within the context of your competency, and
- you do not claim credit for work performed by others.

How should you handle proprietary information and intellectual property rights of other engineers?

You must not promote or arrange for new employment or practice in connection with a specific project in which you have gained specialized knowledge without the consent of all interested parties.

You must not disclose confidential information concerning the business affairs or technical processes of any present or former employer or client without the approval of your employer or client.

If you are using designs supplied by your client, you must be aware that such designs remain the property of your client and may not be duplicated for others without your client's expressed permission.

Before undertaking work for others in which you may make improvements, plans, designs, inventions, or other records that may justify copyrights, patents, or proprietary rights, you must enter into a positive agreement regarding ownership.

You must be aware that your designs, data, records and notes referring exclusively to your employer's work are the property of your employer.

Chapter 2

Disciplinary and Ethical Case Studies

As explained in Chapter 1, we, as Professional Engineers, are expected to take reasonable precautions or care in the practice of our engineering profession as we must hold paramount the safety, health and welfare of the public. So, what happens when we fall short of our professional responsibilities, for which we were entrusted by the public when we earned our honorable title of “Professional Engineer”, thereby committing ethical violations?

The following ethical and disciplinary case studies were randomly selected and extracted from various state board websites. Although they may not be specific to your state, it probably has a law or rule that says something like “if you violate a rule in another jurisdiction, it is considered that you violated that rule here” making each of these cases relevant to you. This is because every state wants its licensed engineers to be law-abiding in their engineering profession everywhere – not just in their state of licensure!

These case studies depict the different scenarios of ethical (and outright thoughtless) violations of the engineer’s professional responsibilities and their consequences.

Disciplinary Cases

Case 1: Practicing Engineering without a License

Facts of the Case: (This is a Texas case.)

- The Respondent has never been licensed in Texas as a professional engineer.
- He is the owner of an 1880 building in McKinney, Texas, which is in need of repairs.
- City building officials informed the Respondent that due to a “structural separation”, he would need an engineer’s report regarding the repair.
- The Respondent submitted to the City an “engineering type report” which he signed as “**private engineer**” (**PE?**) after his name on the report.

Board Ruling:

- Cease and desist order, assessment of \$3,900.00 administrative penalty
- Assessment of \$359.09 for court and investigative costs

Case 2: Practicing Engineering without a License

Facts of the Case: (This is a Louisiana case.)

- The Respondent falsely represented himself as a “Principal” and a “PE” of an “Engineering” firm on his LinkedIn page and in the Louisiana Civil Engineer magazine.
- Since at least 2010, he has been residing and conducting engineering services in Louisiana.

Board Ruling:

- Assessment of \$1,000.00 fine
- Assessment of administrative costs of \$586.53
- Cease and desist order for the use of the business name in Louisiana until such time as either the business is duly licensed by the Board as a professional engineering firm or the business name is changed to include the Respondent’s full name.

Case 3: Disciplinary Action by another State

Facts of the Case: (This is a Louisiana case.)

- The Respondent was licensed in the States of Louisiana and Kansas.
- Kansas Board took disciplinary action against the Respondent for gross negligence, incompetency and misconduct or wanton disregard for the right of other by designing, preparing and sealing plans for the fire alarm systems in:
 - a church building, which contained 12 deviations, and
 - a retail store building, which contained 9 deviations.
- Kansas Board placed the Respondent on probation for two years and assessed him with \$19,729.46 in fines and \$5,270.54 in fees.
- While the violations were committed in the State of Kansas, the Louisiana Board imposed additional penalties for the violations committed in another state.

Board Ruling: (This is Louisiana’s penalty which is in addition to his Kansas penalty.)

- Placement of the Respondent’s license on probation for five years and subject to revocation
- Assessment of a \$2000.00 fine
- Assessment of \$1,172.11 administrative costs
- Completion of the Board’s Laws, Rules and Ethics Quiz within 60 days.

Case 4: Incompetent to Offer Structural Engineering Services

Facts of the Case: (This is a Delaware case.)

- A complaint was filed concerning structural engineering services provided by the Licensee on a three-story professional office building.
- Design deficiencies revealed that the Licensee is not competent by education or training to offer structural engineering services.

Board Ruling:

- Placement of the licensee on probation for one year
- Mandatory enrollment in and successfully completing a course in ethics
- Cease and desist the offering of structural engineering services

Case 5: Tax Filing Falsification

Facts of the Case: (This is a New Jersey case.)

- The Board received information that a “Judgment in a Criminal Case” was entered in the U.S. District Court of New Jersey, in connection with the criminal conviction of the Respondent for violation of 26 U.S.C. §7207 (1) (Subscribing a False Corporate Tax Return).
- The Respondent was sentenced to imprisonment for 3 months, placement on supervised release for 2 years thereafter, and payment of \$15,000.00 fine.

Board Ruling: (This is New Jersey’s penalty in addition to the Federal penalties.)

- Suspension of the Respondent’s license for 3 years
- Retirement of his license to practice engineering permanently thereafter
- Prohibition from seeking reactivation or reinstatement

Case 6: License Renewal with Incomplete Continuing Education

Facts of the Case: (This is a Florida case.)

- The Respondent was charged with violating Section 471.033(1)(a), Florida Statutes, and Rules 61G15-19.001(6)(s) and 61G15-22.006, Florida Administrative Code, renewing a Professional Engineer license without having completed all required continuing education on or before the renewal date.
- The Respondent did not respond to the complaint or produce documentation showing completion of continuing education.

Board Ruling:

- Suspension of the Respondent’s PE license
- Assessment of a \$1,000.00 fine and costs of \$48.75
- Completion of the Board Study Guide, and an online professional ethics course
- Completion of all required continuing education, and appearance before the Board

Case 7: Practicing Engineering with an Expired License

Facts of the Case: (This is a Minnesota case.)

- Respondent self-reported to the Board that he had practiced professional engineering during the time of expiration of his license.
- The Respondent prepared and signed one set of professional engineering drawings for an apartment complex, and one professional engineering report for another apartment complex during the time of expiration.
- The Respondent also provided professional engineering work on five additional

Minnesota projects during the time of expiration.

Board Ruling:

- Censuring and reprimand of the Respondent's PE license
- Assessment of a \$5,000.00 fine

Case 8: Negligence in the Practice of Engineering

Facts of the Case: (This is a Florida case.)

- The Respondent was charged with violating Section 471.033(1)(g), Florida Statutes, and Rule 61G15-19.001(4), Florida Administrative Code; negligence in the practice of engineering.
- The Respondent did not exercise due care in preparing structural engineering documents that he signed and sealed for a church project in Lakeland, FL., which resulted in a roof collapsing twice.

Board Ruling:

- Assessment of an administrative fine of \$1,000 and costs of \$4,858.80
- Placement of the licensee on probation for two years
- Completion of an intermediate engineering professionalism and ethics course within one year
- Completion of the Board's Study Guide within 30 days
- Submission of all completed projects for review at 6 and 18 month intervals

Case 9: Negligence in the Practice of Engineering

Facts of the Case: (This is a New Mexico case.)

- The Respondent admitted to the Board's investigator that he did not prepare the project drawings or review the project plans and specifications prior to completing the calculations and certification for the formwork brace of the project.
- The Respondent provided a formwork sketch which did not include any dimensions regarding height, spacing, distance from formwork to anchor and other dimensions typically on a shop drawing.
- The Respondent failed to respond to the board.

Board Ruling:

- Assessment of a \$2,500.00 fine
- An order to review the Respondent's previous work for the last 12 months
- An order to provide a list of the Respondent's clientele for the last 12 months

Case 10: Misconduct in the Practice of the Profession

Facts of the Case: (This is a Pennsylvania case.)

- The Respondent who is a licensed professional engineer asked another professional engineer/professional land surveyor to assist with some land surveying aspects of the land development plan. The Respondent did not obtain express written permission to affix the professional land surveyor's seal on the initial land

development plan, and presented the development plan with the professional land surveyor's seal.

- Respondent violated section 4(g) of the Act, 63 P.S. § 151 (g), by engaging in misconduct in the practice of the profession, as evidenced by the Respondent placing a professional land surveyor's seal on documentation without the surveyor's permission.

Board Ruling:

- Placement of a public reprimand on the Respondent's permanent disciplinary record with the Board
- Assessment of \$5,000.00 civil penalty
- Assessment of investigation costs of \$525.97

Case 11: Misrepresentation and Practicing Without a License

Facts of the Case: (This is a Maryland case.)

- The Respondent, who has never been a licensed professional engineer in the state of Maryland, gave his client a business card with a false designation by listing himself as "P.E".
- The Respondent delivered a retaining wall design to the client, which contained the forged signature and seal of another professional engineer licensed in the state of Maryland.
- The licensed professional engineer did not review, approve or sign the design. His seal was affixed by the Respondent without his knowledge or permission.

Board Ruling:

- Assessment of \$15,000.00 civil penalty

Hypothetical Ethical Cases

Case 12: Public Safety and Welfare - Trading a Safety Concern for another

Ada is director of a building department in a big city. Because of budget concerns, the city has been unable to hire a sufficient number of qualified individuals to perform building inspections.

This makes it difficult for the inspectors to do a good and thorough job. At the same time, a new and tougher building code was adopted by the city. While this code promotes greater public safety than the last one, it also contributes to the difficulty inspectors have done a good and thorough job.

Ada sets up an appointment with the chairman of the city to discuss her concerns. The chairman agrees to hire additional code officials for the building department on the condition that Ada agrees to permit certain specified buildings under construction to be inspected under the older, less rigid enforcement requirements.

Should Ada agree to concur with the chairman's proposal?

Case 13: Is it Lying if You're Protecting Your Job?

XYZ Corporation permits its employees to borrow company tools. Engineer Jack took full advantage of this privilege. He went one step further and ordered tools for his unit that would be useful for his home building projects even though they were of no significant use to his unit at XYZ.

Engineer Tom had suspected for some time that Al was ordering tools for personal rather than company use, but he had no unambiguous evidence until he overheard a revealing conversation between Jack and Simon, a contract salesman from whom Al frequently purchased tools. Michael was reluctant to directly confront Al. They had never gotten along well, and Al was a senior engineer who wielded a great deal of power over Michael in their unit. Michael was also reluctant to discuss the matter with the chief engineer of their unit, in whom he had little confidence or trust.

Eventually Michael decided to talk with the Contract Procurement Agent, whose immediate response was, "This really stinks." The Contract Procurement Agent agreed not to reveal that Michael had talked with him. He then called the chief engineer, indicating only that a reliable source had informed him about Al House's inappropriate purchases. In turn, the chief engineer confronted Al. Finally, Al House directly confronted each of the engineers in his unit he thought might have "ratted" on him. When Al questioned Michael, Michael denied any knowledge of what took place. Later Michael explained to his wife, "I was forced to lie. I told Al, 'I don't know anything about this'."

What different moral issues do you see in this situation?

Case 14: A Vacation Opportunity

Nathan is the engineer assigned to deal with vendors who supply needed parts to the XYZ Company. Larry, a sales representative from one of XYZ's regular vendors, plays in the same golf league as Nathan.

One evening they go off in the same foursome. Sometime during the round Nathan mentions that he is really looking forward to vacationing in Florida next month. Larry says his uncle owns a condo in Florida that he rents out during the months he and his family is up north. Larry offers to see if the condo is available next month -- assuring Nathan that the rental cost would be quite moderate.

What should Nathan say?

Larry tells Nathan he can rent his uncle's condo for \$100 a week. "My uncle," Larry says, "gets nervous when he rents to total strangers. He likes to have reliable people stay in his condo; the condo is paid for, and my uncle isn't interested in making money on it -- he just wants a little help meeting basic operating expenses and the taxes."

Nathan accepts the offer and begins making plans for his vacation. Just before leaving, an XYZ vice president sends out a new policy statement that says, among other things: "Accepting incentives from vendors is strictly prohibited".

What should Nathan do?

Larry's offer looks like a benefit for both Nathan and Larry's uncle. Nathan needs a place

to stay at a moderate price; Larry's uncle needs to rent his condo. It looks like a mutually beneficial arrangement.

In asking Larry to see if the condo is available, Nathan does not put himself under any greater obligation to buy from Larry's company than he has already done by playing golf with him, does he?

Is there any reason for him to refuse the offer?

When Larry tells Nathan that the condo is available for \$100 a week, Nathan might well feel that he is getting into something more than a business transaction, for the going rate for condos in vacation areas is several times that. The cheapest motel room would cost more than that. But Larry reassures him that his uncle isn't interested in renting to strangers at the market rate. After all, although he is getting it through Larry's recommendation of Nathan as a reliable renter, it is Larry's uncle's condo, not Larry's or Larry's company's. And it is a bargain, not a free gift.

When the vice president issues the new policy statement, two questions arise. First, is Nathan accepting an incentive from a vendor? And, second, if he is, isn't he still obligated to go through with the rental since he has agreed to do so and he agreed to do so before the new policy was stated? Nathan could easily claim that he has not accepted an incentive from a vendor. Larry has done Nathan a favor, but he has done it as an individual acquaintance in the golf league, not as a representative of his firm.

Does this make any difference? If the company that Larry represents is not paying for anything, does that mean that it does not classify as an incentive? If this is not an incentive, what could count as one, given by the representative but not the company? If Larry had gotten the condo for him for free, would that have been an incentive? If Larry had said something about remembering him the next time he called as a sales representative, would that have made it an incentive?

From the description of the case, it sounds as if Nathan and Larry Newman are only golf and business acquaintances, not close friends. If they were close friends, accepting a favor would be different; but it could still involve delicate ethical issues when company policy prohibits accepting incentives from vendors. Supposing that Nathan does interpret the favor as an incentive, what should he do? Since the vice president statement is a "new" policy, Nathan might feel that it does not apply to an agreement made before the statement came out.

Would that be true? Should Nathan have known without such a statement that he should not accept incentives from vendors? Having agreed to take the condo, Nathan is under some obligation to Larry's uncle. Larry's uncle is now counting on him to occupy the condo and to pay the rent. He could get in touch with the uncle and explain the situation, offering to pay the rent but not occupy the condo or offering to pay a full market price for it so that it does not count as an incentive.

Would one of those be an appropriate way out?

Suppose Larry's uncle says that he has no connection to Larry's company, and if Nathan doesn't take the condo at that price, he wants to find someone else who will. He is looking for someone to occupy the place so that it won't be burglarized and to merely cover his costs, not to make money. So he would still like for Nathan to take it. In fact,

Nathan's telephone call convinces him more than ever that Nathan is a responsible person who could be relied upon to take care of the place.

Should that ease Nathan's qualms about it being an incentive, so that he could now take it with a clear conscience?

Case 15: A Case of Contract Termination

A supplier of information technology hardware, ABC Hardware ("ABC"), submitted a fixed price bid on a computer installation project for a large accounting firm. ABC's bid price of six million dollars was very low in comparison to the other bidders. In fact, three other bidders had each bid amounts in excess of nine million dollars.

The contract was awarded to the lowest bidder. The contract conditions expressly entitled the contractor to terminate the contract if the owner did not pay monthly invoices within thirty days following receipt of an invoice.

ABC commenced supplying computer hardware on the project and soon determined that it would likely suffer a major loss on the project, as it had made significant judgment errors in arriving at its bid price. ABC also learned that, in comparison with the other bidders, ABC had left three million dollars on the table.

After the fifth invoice was delivered, ABC was approached by the accounting firm for additional information and explanation of bills from an equipment parts supplier, the cost of which comprised a portion of the fifth invoice amount. The accounting firm requested that the additional information be provided prior to payment of the fifth invoice being due.

Although the signed contract did not obligate ABC to obtain such additional information, a representative of ABC verbally informed the accounting firm that ABC would provide the additional information. However, ABC never did so.

Thirty-one days after the fifth invoice had been received, ABC notified the accounting firm that ABC was terminating the contract as the accounting firm had defaulted in its payment obligations under the specified wording of the contract.

Was ABC entitled to terminate the contract?

ABC was approached by the accounting firm for extra information and a representative of ABC gave a verbal agreement to provide extra information before the payment was made. This agreement by ABC constituted a gratuitous promise as it was not associated with any consideration. ABC did not produce the information and therefore induced the accounting firm to breach the contract. Consequently, this is a question of equitability and it is likely that the courts would equitably stop ABC from enforcing the strict terms of the contract.

Note that because the agreement was verbal, it would be insufficient for the accounting firm to do nothing once the agreement was reached. For example, as the agreement was verbal, the precise wording would have been open to interpretation. Due diligence would have insisted that the accounting firm make inquiries with the ABC to follow up on the request for information and on the day the payment was contractually due, the firm should have sent a letter indicating that it is not providing the payment with the justification that the requested information has not yet been sent. In this case, ABC

would have had the opportunity to indicate that it was reverting back to the strict interpretation before the accounting firm breached the contract in which case, the accounting firm would likely have been required (provided sufficient notice was given) to pay within the contractual 31 days.

Note that had the verbal agreement to supply the information occurred before the signing of the contract and that agreement had not been included in the terms of the contract, the accounting firm could not use the agreement.

Appendix A

References

NSPE Code of Ethics

<https://www.nspe.org/resources/ethics/code-ethics>

ASCE Code of Ethics

<https://www.asce.org/career-growth/ethics/code-of-ethics>

ASME Code of Ethics

<https://www.asme.org/about-asme/governance/ethics-in-engineering>

Disciplinary Case Studies - Texas

<https://pels.texas.gov/disciplinary.htm>

Disciplinary Case Studies - Louisiana

https://www.lapels.com/Disciplinary_Actions.html

Disciplinary Case Studies - Delaware

<https://www.dape.org/> (View Newsletters)

Disciplinary Case Studies – New Jersey

<https://www.njconsumeraffairs.gov/pels/Pages/actions.aspx>

Disciplinary Case Studies – Minnesota

<https://mn.gov/aelslagid/enforcement.html>

Disciplinary Case Studies – New Mexico

<https://www.sblpes.state.nm.us/enforcement/disciplinary-actions/>

Disciplinary Case Studies – Pennsylvania

<https://www.pals.pa.gov/#!/page/search>

Disciplinary Case Studies – Maryland

<https://www.dllr.state.md.us/license/pe/pedisc.shtml>

Disciplinary Case Studies – Florida

<https://fbpe.org/legal/disciplinary-actions/>

Ethical Case Studies for Engineers

<https://onlineethics.org/>