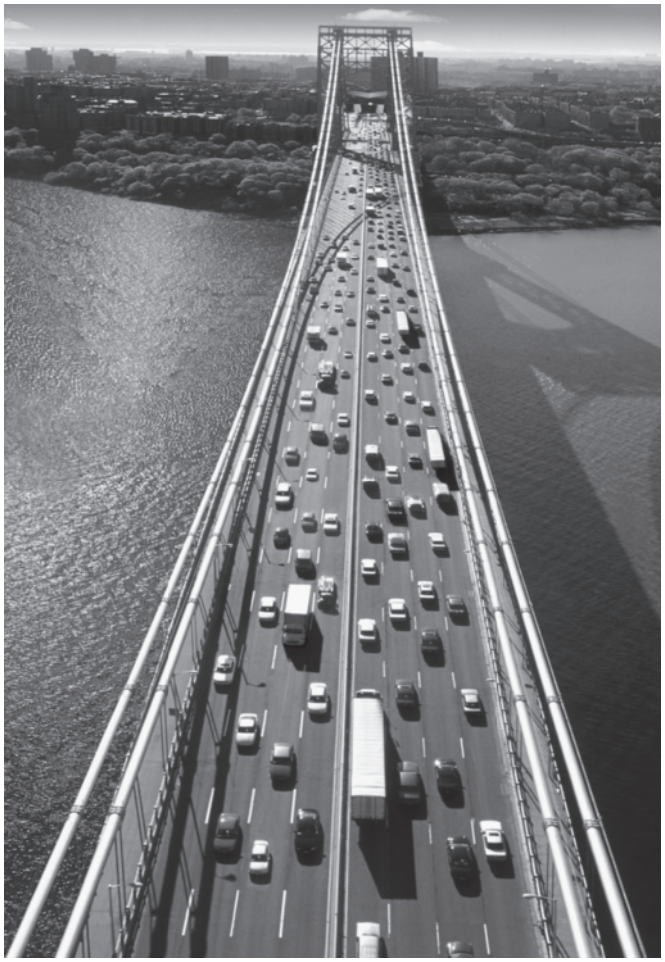
CHAPTER

5

ENGINEERING ETHICS

Engineers design many products and provide many services that affect our quality of life and safety. They supervise the construction of buildings, dams, highways, bridges, mass transit systems, and power plants. Engineers must perform under a certain standard of professional behavior which requires adherence to the highest principles of ethical conduct.



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As eloquently stated in the National Society of Professional Engineers (NSPE) code of ethics, "Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity; and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior which requires adherence to the highest principles of ethical conduct." In this chapter, we will discuss the importance of engineering ethics and will present the National Society of Professional Engineers code of ethics in detail. We will also provide two case studies that you may want to discuss in class.

5.1 Engineering Ethics

Ethics refers to the study of morality and the moral choices that we all have to make in our lives. Professional societies, such as medical and engineering, have long established guidelines, standards, and rules that govern the conduct of their members. These rules are also used by the members of the board of ethics of the professional organization to interpret ethical dilemmas that are submitted by a complainant.

As we discussed in Chapter 1, engineers design many products, including cars, computers, aircraft, clothing, toys, home appliances, surgical equipment, heating and cooling equipment, health care devices, tools and machines that make various products. Engineers also design and supervise the construction of buildings, dams, highways, and mass transit systems. They also design and supervise the construction of power plants that supply power to manufacturing companies, homes, and offices. Engineers play a significant role in the design and maintenance of nations' infrastructures, including communication systems, utilities, and transportation. Engineers are involved in coming up with ways of increasing crop, fruit, and vegetable yields along with improving the safety of our food products.

As you can see, people rely quite heavily on engineers to provide them with safe and reliable goods and services. There is no room for mistakes or dishonesty in engineering! Mistakes made by engineers could cost not only money but also more importantly lives. Think about the following: An incompetent and unethical surgeon could cause at most the death of one person at one time (when a pregnant woman dies on the operating table, two deaths may result), whereas an incompetent and unethical engineer could cause the deaths of hundreds of people at one time. If an unethical engineer in order to save money designs a bridge or a part for an airplane that does not meet the safety requirements, hundreds of people's lives are at risk!

You realize that there are jobs where a person's mistake could be tolerated. For example, if a waiter brings you Coke instead of the Pepsi that you ordered, or instead of french fries brings you onion rings, you can live with that mistake. These are mistakes that usually can be corrected without any harm to anyone. But if an incompetent or unethical engineer incorrectly designs

"A man who has committed a mistake and doesn't correct it is committing another mistake."
— *Confucius*

a bridge, or a building, or a plane, he or she could be responsible for killing hundreds of people. Therefore, you must realize why it is so important that as future practicing engineers you are expected to hold to the highest standards of honesty and integrity.

In the section that follows, we will look at an example of a code of ethics, namely, the National Society of Professional Engineers code. The American Society of Mechanical Engineers, the American Society of Civil Engineers, and the Institute of Electrical and Electronics Engineers also have codes of ethics. They are typically posted at their Web sites.

5.2 The Code of Ethics of the National Society of Professional Engineers

The National Society of Professional Engineers (NSPE) ethics code is very detailed. The NSPE ethical code of conduct is used in making judgments about engineering ethic-related cases that are brought before the NSPE's Board of Ethics Review. The NSPE ethical code of conduct follows.

5.3 Code of Ethics for Engineers*

Preamble

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety and welfare. Engineers must perform under a standard of professional behavior which requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health and welfare of the public.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts.
6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation and usefulness of the profession.

II. Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.
   a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.

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   b. Engineers shall approve only those engineering documents which are in conformity with applicable standards.
   c. Engineers shall not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or this Code.
   d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm which they believe is engaged in fraudulent or dishonest enterprise.
   e. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.
2. Engineers shall perform services only in the areas of their competence.
   a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
   b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
   c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.
3. Engineers shall issue public statements only in an objective and truthful manner.
   a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
   b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
   c. Engineers shall issue no statements, criticisms, or arguments on technical matters which are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.
4. Engineers shall act for each employer or client as faithful agents or trustees.
   a. Engineers shall disclose all known or potential conflicts of interest which could influence or appear to influence their judgment or the quality of their services.
   b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
   c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.
   d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.
   e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.
5. Engineers shall avoid deceptive acts.
   a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility

in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers or past accomplishments.

b. Engineers shall not offer, give, solicit or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect of intent to influence the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

III. Professional Obligations

1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.
   a. Engineers shall acknowledge their errors and shall not distort or alter the facts.
   b. Engineers shall advise their clients or employers when they believe a project will not be successful.
   c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment they will notify their employers.
   d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.
   e. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.
2. Engineers shall at all times strive to serve the public interest.
   a. Engineers shall seek opportunities to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
   b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
   c. Engineers shall endeavor to extend public knowledge and appreciation of engineering and its achievements.
3. Engineers shall avoid all conduct or practice that deceives the public.
   a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.
   b. Consistent with the foregoing, engineers may advertise for recruitment of personnel.
   c. Consistent with the foregoing, engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.
4. Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve.
   a. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the engineer has gained particular and specialized knowledge.

   b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the engineer has gained particular specialized knowledge on behalf of a former client or employer.
5. Engineers shall not be influenced in their professional duties by conflicting interests.
   a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.
   b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible.
6. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.
   a. Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised.
   b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.
   c. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice.
7. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.
   a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.
   b. Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
   c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.
8. Engineers shall accept personal responsibility for their professional activities, provided, however, that engineers may seek indemnification for services arising out of their practice for other than gross negligence, where the engineer's interests cannot otherwise be protected.
   a. Engineers shall conform with state registration laws in the practice of engineering.
   b. Engineers shall not use association with a nonengineer, a corporation, or partnership as a "cloak" for unethical acts.
9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.
   a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
   b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission.
   c. Engineers, before undertaking work for others in connection with which the engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents, should enter into a positive agreement regarding ownership.

d. Engineers' designs, data, records, and notes referring exclusively to an employer's work are the employer's property. Employer should indemnify the engineer for use of the information for any purpose other than the original purpose.

As Revised February 2001 "By order of the United States District Court for the District of Columbia, former Section 11(c) of the NSPE Code of Ethics prohibiting competitive bidding, and all policy statements, opinions, rulings or other guidelines interpreting its scope, have been rescinded as unlawfully interfering with the legal right of engineers, protected under the antitrust laws, to provide price information to prospective clients; accordingly, nothing contained in the NSPE Code of Ethics, policy statements, opinions, rulings or other guidelines prohibits the submission of price quotations or competitive bids for engineering services at any time or in any amount."

Statement by NSPE Executive Committee In order to correct misunderstandings which have been indicated in some instances since the issuance of the Supreme Court decision and the entry of the Final Judgment, it is noted that in its decision of April 25, 1978, the Supreme Court of the United States declared: "The Sherman Act does not require competitive bidding."

It is further noted that as made clear in the Supreme Court decision:

1. Engineers and firms may individually refuse to bid for engineering services.
2. Clients are not required to seek bids for engineering services.
3. Federal, state, and local laws governing procedures to procure engineering services are not affected, and remain in full force and effect.
4. State societies and local chapters are free to actively and aggressively seek legislation for professional selection and negotiation procedures by public agencies.
5. State registration board rules of professional conduct, including rules prohibiting competitive bidding for engineering services, are not affected and remain in full force and effect. State registration boards with authority to adopt rules of professional conduct may adopt rules governing procedures to obtain engineering services.
6. As noted by the Supreme Court, "nothing in the judgment prevents NSPE and its members from attempting to influence governmental action . . .".

Note: In regard to the question of application of the Code to corporations vis-a-vis real persons, business form or type should not negate nor influence conformance of individuals to the Code. The Code deals with professional services, which services must be performed by real persons. Real persons in turn establish and implement policies within business structures. The Code is clearly written to apply to the engineer and items incumbent on members of NSPE to endeavor to live up to its provisions. This applies to all pertinent sections of the Code.

5.4 Engineer's Creed

The engineer's creed, which was adopted by NSPE in 1954, is a statement of belief, similar to the Hippocratic oath taken by medical practitioners. It was developed to state the engineering philosophy of service in a brief way. The NSPE engineer's creed is:

- To give the utmost of performance;
- To participate in none but honest enterprise;

- To live and work according to the laws of man and the highest standards of professional conduct; and
- To place
  - service before profit,
  - the honor and standing of the profession before personal advantage, and
  - the public welfare above all other considerations.

In humility and with need for Divine guidance, I make this pledge.

The engineer's creed is typically used in graduation ceremonies or licensure certificate presentations.

These are additional definitions that should be studied carefully.

Academic Dishonesty—Honesty is very important in all aspects of life. Academic dishonesty refers to behavior that includes cheating on tests, homework assignments, lab reports; plagiarism; lying about being sick and not taking a test because of it; signing the attendance sheet for another student, or asking another student to sign the sheet for you in your absence. Universities have different policies that deal with academic dishonesty including giving the dishonest student a failing grade for the course or requiring the student to drop the class or placing a student on probation.

Plagiarism—Plagiarism refers to presenting someone else's work as your own. You may use or cite the work of others including information from journal articles, books, online sources, TV or radio, but make sure that you cite where you obtain the information from. In Chapter 4, we discussed in detail how you should give proper reference in your oral and written communications.

Conflict of Interest—A conflict between the individual's personal interests and the individual's obligations because of the position he or she holds.

Contract—Contract is an agreement among two or more parties, which they entered into freely. A legal contract is one that is legally binding, meaning if not fulfilled it could have legal consequences.

Professional Responsibility—It is the responsibility associated with the mastery of special kind of knowledge that a person possesses and the use of knowledge for well-being and benefit of the society.

Read the cases—from the following list—assigned to you by your instructor before class and be prepared to discuss them in class.

The 2002 NSPE Milton F. Lunch Ethics Contest

Facts Engineer A is a graduating senior with excellent credentials from X University. Engineer A has had a series of job interviews with engineering companies from around the U.S. Following interviews with several industrial companies, Engineer A decides to accept an offer with ABC Incorporated located in his hometown of Townville and plans to notify ABC the following week. In the interim period, Engineer A receives a call from Engineer B, an executive with XYZ Incorporated, a potential employer with whom Engineer A interviewed. On behalf of XYZ, Engineer B offers Engineer A (at XYZ's expense) a chance to visit XYZ's headquarters in Mountainville, a city located near a resort area following Engineer A's graduation. Engineer A earlier had decided he would not accept a position with XYZ if offered a position by ABC, because Engineer A wanted to live near Townville to be close to family and friends, and also because ABC provided better

long-term professional opportunities. However, after receiving the call from XYZ, Engineer A decides to accept the invitation to visit XYZ's headquarters and combine the trip with a post-graduation vacation, believing that the visit to XYZ will broaden Engineer A's knowledge of the employment market, as well as future professional opportunities with XYZ. A week after the trip, Engineer A calls ABC and informs the company that he will accept the position with ABC.

Question Was it ethical for Engineer A to accept the invitation to visit XYZ headquarters?

The 2003 NSPE Milton F. Lunch Ethics Contest

Facts Individual A is involved in a vehicular accident during which another individual, Individual B, is killed. During the police investigation, the police determine and recommend to prosecutors that the matter should be converted from a civil matter to a criminal prosecution, and Individual A is charged with homicide. As part of the prosecutor's investigation, the prosecutor (Prosecutor C) retains Engineer D (an engineering expert) to review the record and provide a supporting forensic report and testimony in the prosecution of Individual A. Following Engineer D's extensive review of the record, Engineer D finds technical evidence to demonstrate that the cause of the accident was noncriminal and determines that he cannot support the prosecution's theory that Individual A's actions support a criminal prosecution. Learning of Engineer D's determination, Prosecutor C continues the prosecution of Individual A, and does not call Engineer D as a witness at trial. The trial ends in a hung jury, and the case is expected to be retried in the near future.

Question What are Engineer D's ethical obligations under the facts and circumstances?

The following are ethics-related cases that were brought before NSPE's Board of Ethical Review. These cases were adapted with permission from the National Society of Professional Engineers.*

Confidentiality of Engineering Report: Case No. 82-2

Facts Engineer A offers a home owner inspection service, whereby he undertakes to perform an engineering inspection of residences by prospective purchasers. Following the inspection, Engineer A renders a written report to the prospective purchaser. Engineer A performed this service for a client (husband and wife) for a fee and prepared a one-page written report, concluding that the residence under consideration was in generally good condition requiring no major repairs, but noting several minor items needing attention. Engineer A submitted his report to the client showing that a carbon copy was sent to the real estate firm handling the sale of the residence. The client objected that such action prejudiced their interests by lessening their bargaining position with the owners of the residence. They also complained that Engineer A acted unethically in submitting a copy of the report to any others who had not been a party to the agreement for the inspection services.

Question Did Engineer A act unethically in submitting a copy of the home inspection report to the real estate firm representing the owners?

* *Source:* Reprinted by Permission of the National Society of Professional Engineers (NSPE) www.nspe.org

Gift Sharing of Hotel Suite: Case No. 87-4

Facts Engineer B is director of engineering with a large governmental agency that uses many engineering consultants. Engineer A is a principal in a large engineering firm that performs services for that agency. Both are members of an engineering society that is conducting a two-day seminar in a distant city. Both plan to attend the seminar, and they agree to share costs of a two-bedroom hotel suite in order to have better accommodations.

Question Was it ethical for Engineer A and B to share the hotel suite?

Credit for Engineering Work—Design Competition: Case No. 92-1

Facts Engineer A is retained by a city to design a bridge as part of an elevated highway system. Engineer A then retains the services of Engineer B, a structural engineer with expertise in horizontal geometry, super structure design, and elevations to perform certain aspects of the design services. Engineer B designs the bridge's three curved welded plate girder spans, which were critical elements of the bridge design.

Several months following completion of the bridge, Engineer A enters the bridge design into a national organization's bridge design competition. The bridge design wins a prize. However, the entry fails to credit Engineer B for his part of the design.

Question Was it ethical for Engineer A to fail to give credit to Engineer B for his part in the design?

Services—Same Services for Different Clients: Case No. 00-3

Facts Engineer A, a professional engineer, performs a traffic study for Client X as part of the client's permit application for traffic flow for the development of a store. Engineer A invoices Client X for a complete traffic study.

Later, Client X learns that part of the traffic study provided by Engineer A to Client X was earlier developed by Engineer A for a developer, Client Y, at a nearby location and that Engineer A invoiced Client Y for the complete traffic study. The second study on a new project for Client X utilized some of the same raw data as was in the report prepared for Client Y. The final conclusion of the engineering study was essentially the same in both studies.

Question Was it ethical for Engineer A to charge Client X for the complete traffic study?

Use of Alleged Hazardous Material in a Processing Facility: Case No. 99-11

Facts Engineer A is a graduate engineer in a company's manufacturing facility that uses toxic chemicals in its processing operations. Engineer A's job has nothing to do with the use and control of these materials.

A chemical called "MegaX" is used at the site. Recent stories in the news have reported alleged immediate and long-term human genetic hazards from inhalation of or other contact with MegaX. The news items are based on findings from laboratory experiments, which were done on mice, by a graduate student at a well-respected university's physiology department.

Other scientists have neither confirmed nor refuted the experimental findings. Federal and local governments have not made official pronouncements on the subject.

Several colleagues outside of the company have approached Engineer A on the subject and ask Engineer A to "do something" to eliminate the use of MegaX at the processing facility. Engineer A mentions this concern to her manager who tells Engineer A, "Don't worry, we have an Industrial Safety Specialist who handles that."

Two months elapse and MegaX is still used in the factory. The controversy in the press continues, but since there is no further scientific evidence pro or con in the matter, the issues remain unresolved. The use of the chemical in the processing facility has increased and now more workers are exposed daily to the substance than was the case two months ago.

Question Does Engineer A have an obligation to take further action under the facts and circumstances?

Software Design Testing: NSPEBER Case No. 96-4

Facts Engineer A is employed by a software company and is involved in the design of specialized software in connection with the operations of facilities affecting the public health and safety (i.e., nuclear, air quality control, water quality control). As part of the design of a particular software system, Engineer A conducts extensive testing, and although the tests demonstrate that the software is safe to use under existing standards, Engineer A is aware of new draft standards that are about to be released by a standard setting organization—standards that the newly designed software may not meet. Testing is extremely costly, and the company's clients are eager to begin to move forward. The software company is eager to satisfy its clients, protect the software company's finances, and protect existing jobs; but at the same time, the management of the software company wants to be sure that the software is safe to use. A series of tests proposed by Engineer A will likely result in a decision whether to move forward with the use of the software. The tests are costly and will delay the use of the software at least six months, which will put the company at a competitive disadvantage and cost the company a significant amount of money. Also, delaying implementation will mean the state public service commission utility rates will rise significantly during this time. The company requests Engineer A's recommendation concerning the need for additional software testing.

Question Under the Code of Ethics, does Engineer A have a professional obligation to inform his company of the reasons for needed additional testing and his recommendations that it be undertaken?

Whistleblowing: Case No. 82-5

Facts Engineer A is employed by a large industrial company that engages in substantial work on defense projects. Engineer A's assigned duties relate to the work of subcontractors, including review of the adequacy and acceptability of the plans for material provided by subcontractors. In the course of this work, Engineer A advised his superiors by memoranda of problems he found with certain submissions of one of the subcontractors, and urged management to reject such work and require the subcontractors to correct the deficiencies he outlined. Management rejected the comments of Engineer A, particularly his proposal that the work of a particular subcontractor be redesigned because of Engineer A's claim that the subcontractor's submission represented

excessive cost and time delays. After the exchange of further memoranda between Engineer A and his management superiors and continued disagreement between Engineer A and management on the issues he raised, management placed a critical memorandum in his personnel file and subsequently placed him on three months' probation, with the further notation that if his job performance did not improve, he would be terminated. Engineer A has continued to insist that his employer had an obligation to ensure that subcontractors deliver equipment according to the specifications, as he interprets same, and thereby save substantial defense expenditures. He has requested an ethical review and determination of the propriety of his course of action and the degree of ethical responsibility of engineers in such circumstances.

Question Does Engineer A have an ethical obligation, or an ethical right, to continue his efforts to secure change in the policy of his employer under these circumstances, or to report his concerns to proper authority?

Academic Qualifications: Case No. 79-5

Facts Engineer A received a Bachelor of Science degree in 1940 from a recognized engineering curriculum and subsequently was registered as a professional engineer in two states. Later, he was awarded an earned "Professional Degree" from the same institution. In 1960 he received a Ph.D. degree from an organization that awards degrees on the basis of correspondence without requiring any form of personal attendance or study at the institution and is regarded by state authorities as a "diploma mill." Engineer A has since listed his Ph.D. degree among his academic qualifications in brochures, correspondence, and otherwise, without indicating its nature.

Question Was Engineer A ethical in citing his Ph.D. degree as an academic qualification under these circumstances?

Advertising—Misstating Credentials: Case No. 92-2

Facts Engineer A is an EIT who is employed by a medium-sized consulting engineering firm in a small city. Engineer A has a degree in mechanical engineering and has performed services almost exclusively in the field of mechanical engineering. Engineer A learns that the firm has begun a marketing campaign and in its literature lists Engineer A as an electrical engineer. There are other electrical engineers in the firm. Engineer A alerts the marketing director also an engineer, to the error in the promotional literature, and the marketing director indicates that the error will be corrected. However, after a period of six months, the error is not corrected.

Question Under the circumstances, what actions, if any, should Engineer A take?

Advertising—Statement of Project Success: Case No. 79-6

Facts Engineer A published an advertisement in the classified section of a daily newspaper under the heading, "Business Services," which read in full: "Consulting Engineer for Industry. Can reduce present process heating fuel consumption by 30% to 70% while doubling capacity in same floor space. For more information contact Engineer A, telephone 123-456-7890."

Question Was Engineer A's advertisement ethical?

Using Technical Proposal of Another Without Consent: Case No. 83-3

Facts Engineer B submitted a proposal to a county council following an interview concerning a project. The proposal included technical information and data that the council requested as a basis for the selection. Smith, a staff member of the council, made Engineer B's proposal available to Engineer A. Engineer A used Engineer B's proposal without Engineer B's consent in developing another proposal, which was subsequently submitted to the council. The extent to which Engineer A used Engineer B's information and data is in dispute between the parties.

Question Was it unethical for Engineer A to use Engineer B's proposal without Engineer B's consent in order for Engineer A to develop a proposal that Engineer A subsequently submitted to the council?

Use of CD-ROM for Highway Design: Case No. 98-3

Facts Engineer A, a chemical engineer with no facilities design and construction experience, receives a solicitation in the mail with the following information:

> "Engineers today cannot afford to pass up a single job that comes by, including construction projects that may be new or unfamiliar.
>
> Now—thanks to a revolutionary new CD-ROM—specifying designing and costing out any construction project is as easy as pointing and clicking your mouse—no matter your design experience. For instance, never designed a highway before? No problem. Just point to the 'Highways' window and click.
>
> Simply sign and return this letter today and you'll be among the first engineers to see how this full-featured interactive library of standard design can help you work faster than ever and increase your firm's profits."

Engineer A orders the CD-ROM and begins to offer facilities design and construction services.

Question Was it ethical for Engineer A to offer facilities design and construction services under the facts presented?

SUMMARY

Now that you have reached this point in the text

- You should understand the importance of engineering ethics and why you should live by these codes of ethics.
- You should understand the engineer's creed and reasons why you should take the pledge.

"Keep company with good men, and you'll increase their number."
—*Italian Proverb*

Problems

5.1. The following is a series of questions pertaining to the NSPE Code of Ethics. Please indicate whether the statements are true or false. These questions are provided by the NSPE.

Note: This ethics test is intended solely to test individual knowledge of the specific language contained in the NSPE Code of Ethics and is not intended to measure individual knowledge of engineering ethics or the ethics of individual engineers or engineering students.

1. Engineers in the fulfillment of their professional duties must carefully consider the safety, health and welfare of the public.
2. Engineers may perform services outside of their areas of competence as long as they inform their employer or client of this fact.
3. Engineers may issue subjective and partial statements if such statements are in writing and consistent with the best interests of their employer, client or the public.
4. Engineers shall act for each employer or client as faithful agents or trustees.
5. Engineers shall not be required to engage in truthful acts when required to protect the public health, safety, and welfare.
6. Engineers may not be required to follow the provisions of state or federal law when such actions could endanger or compromise their employer or their client's interests.
7. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
8. Engineers may review but shall not approve those engineering documents that are in conformity with applicable standards.
9. Engineers shall not reveal facts, data or information without the prior consent of the client or employer except as authorized or required by law or this Code.
10. Engineers shall not permit the use of their name or their associate's name in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise, unless such enterprise or activity is deemed consistent with applicable state or federal law.
11. Engineers having knowledge of any alleged violation of this Code, following a period of thirty days during which the violation is not corrected, shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.
12. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
13. Engineers shall not affix their signatures to plans or documents dealing with subject matter in which they lack competence, but may affix their signatures to plans or documents not prepared under their direction and control where the engineer has a good faith belief that such plans or documents were competently prepared by another designated party.
14. Engineers may accept assignments and assume responsibility for coordination of an entire project and shall sign and seal the engineering documents for the entire project, including each technical segment of the plans and documents.
15. Engineers shall strive to be objective and truthful in professional reports, statements or testimony, with primary consideration for the best interests of the engineer's client or employer. The engineer's reports shall include all relevant and pertinent information in such reports, statements or testimony, which shall bear the date on which the engineer was retained by the client to prepare the reports.
16. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
17. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.

18. Engineers may not participate in any matter involving a conflict of interest if it could influence or appear to influence their judgment or the quality of their services.
19. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
20. Engineers shall not solicit but may accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible, if such compensation is fully disclosed.
21. Engineers in public service as members, advisors or employees of a governmental or quasi-governmental body or department may participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice as long as such decisions do not involve technical engineering matters for which they do not possess professional competence.
22. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.
23. Engineers shall not intentionally falsify their qualifications or actively permit written misrepresentation of their or their associate's qualifications. Engineers may accept credit for previous work performed where the work was performed during the period the engineer was employed by the previous employer. Brochures or other presentations incident to the solicitation of employment shall specifically indicate the work performed and the dates the engineer was employed by the firm.
24. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by a public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the award of a contract unless such contribution is made in accordance with applicable federal or state election campaign finance laws and regulations.
25. Engineers shall acknowledge their errors after consulting with their employer or client.

A Case Study From NSPE*

The following is an ethics-related case that was brought before NSPE's Board of ethics review.

Facts

Engineer A is a licensed professional engineer and a principal in a large-sized engineering firm. Engineer B is a graduate engineer who works in industry and has also worked as a student in Engineer A's firm during one summer. Although Engineer B was employed in Engineer A's firm, Engineer A did not have direct knowledge of Engineer B's work. Engineer B is applying for licensure as a professional engineer and requests that Engineer A provide him with a letter of reference testifying as to Engineer B's engineering experience and that the engineer (Engineer A) was in direct charge of Engineer B. Engineer B was under the assumption that Engineer A had personal knowledge of Engineer B's work. Engineer A inquired about Engineer B's experience from someone who had direct knowledge of Engineer B's experience. Based on the inquiry, Engineer A provides the letter of reference explaining the professional relationship between Engineer A and Engineer B.

Question

Was it ethical for Engineer A to provide the letter of reference for Engineer B attesting as to Engineer B's engineering experience even though Engineer A did not have direct control of Engineer B's engineering work?

*Materials were adapted with permission from the National Society of Professional Engineers (NSPE)

References

Section II.3.— Code of Ethics: Engineers shall issue public statements only in an objective and truthful manner.

Section II.3.a.— Code of Ethics: Engineers shall be objective and truthful in professional reports, statements or testimony. They shall include all relevant and pertinent information in such reports, statements or testimony, which should bear the date indicating when it was current.

Section II.5.a.— Code of Ethics: Engineers shall not falsify their qualifications or permit misrepresentation of their, or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers or past accomplishments.

Section III.1.— Code of Ethics: Engineers shall be guided in all their relations by the highest standards of honesty and integrity.

Section III.8.a.— Code of Ethics: Engineers shall conform with state registration laws in the practice of engineering.

Discussion

The Board has, on prior occasions, considered cases involving the misstatement of credentials of an engineer employed in a firm. In BER Case No. 92-1, Engineer A was an EIT who was employed by a medium-sized consulting engineering firm in a small city. Engineer A had a degree in mechanical engineering and had performed services almost exclusively in the field of mechanical engineering. Engineer A learned that the firm had begun a marketing campaign and in its literature listed Engineer A as an electrical engineer. There were other electrical engineers in the firm. Engineer A alerted the marketing director, also an engineer, to the error in the promotional literature and the marketing director indicated that the error would be corrected. However, after a period of six months, the error was not corrected. In ruling that the firm should take actions to correct the error, the Board noted that the firm's marketing director had been informed by the engineer in question that the firm's marketing brochure contained inaccurate information that could mislead and deceive a client or potential client. Under earlier BER Case No. 90-4, the marketing director had an ethical obligation to take expeditious action to correct the error. The Board noted that the marketing director, a professional engineer,

had an ethical obligation both to the clients and potential clients, as well as to Engineer A, to expeditiously correct the misimpression which may have been created.

The Board of Ethical Review can certainly understand in the present case the desire of Engineer A to assist another engineer (Engineer B) in enhancing career opportunities and becoming licensed as a professional engineer. Obviously such assistance should not come under misleading or deceptive circumstances. Engineers have an ethical obligation to be honest and objective in their professional reports, and such reports include written assessments of the qualifications and abilities of engineers and others under their direct supervision. Engineers that are not in a position to offer an evaluation of the qualifications and abilities of other individuals should not provide such evaluations or prepare reports that imply that they are providing such evaluations. Claiming to be in responsible charge of another engineer without actually having direct control or personal supervision over that engineer is inconsistent with the letter and the spirit of the NSPE Code.

By providing the report in the manner described, the Board believes Engineer A is sending the right message to Engineer B about what will be expected of Engineer B and his colleagues as professional engineers. Clearly, Engineer B desired the letter of reference from Engineer A, a principal in a consulting firm, in order to improve his chances to become licensed as a professional engineer, and Engineer B is taking conscientious action to address the request. Professional engineers must always be mindful that their conduct and actions as professional engineers set an example for other engineers, particularly those that are beginning their professional careers and who are looking for models and mentors upon which to build their professional identities. A professional engineer providing such a letter of reference should demonstrate that the author has obtained sufficient information about the candidate to write a letter of substance and detail the individual's technical abilities as well as the individual's character. A letter of recommendation for engineering licensure generally requires the recommending professional engineer to state in detail that the candidate possesses legitimate and progressive engineering work experience.

The Board is of the view that an alternative approach could have been for Engineer A to refer Engineer B back to the engineer in the firm that was in responsible charge of engineering for the letter of recommendation. However, the letter provided by Engineer A was just as adequate and ethical.

Conclusion

It was ethical for Engineer A to provide the letter of reference for Engineer B testifying as to Engineer B's engineering experience.