

# Presentation on Ethics



Ethics

**Professional engineers take seriously their responsibility** – not just for the quality of the jobs they work on – but for the safety and well-being of the public at large. Since its founding, NSPE has been the profession's most respected voice on the practice of ethical engineering.



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NSPE Queens Chapter

# Outline of This Lecture:



I. Ethics

II. Code of Ethics of Learned Professions

III. Application of Ethics

IV. NSPE Code of Ethics

V. Association of Computing Machinery (ACM) Code of Ethics

VI. Engineering Licensure

VII. Case Studies

VIII. Ethical Cases Specific to IT and Computer Science

# I. Ethics



- Definitions
  - A system of moral principles
  - Well established standards that prescribe how individuals ought to act
  - A system of values that serve to guide an individual's actions
  - A simplified definition: "Do the right thing"
    - a) Guiding principle: Act for the common good not personal good

## II. Code of Ethics of Learned Professions

- A. Learned Profession
  1. Body of knowledge
  2. Licensure
  3. Code of Ethics
- B. All Learned Professions (Engineering, Medicine, Law, etc.) have a Code of Ethics
- C. Code of Ethics is a fundamental component of any Learned Profession



# III. Application of Ethics

- A. Ethics: Complex field whose roots go back to ancient Greece (Socrates, Aristotle)
- B. Apply simplified definition of Ethics (applicable in most situations)
- C. Apply Ethics in daily work environment
- D. Review Case Studies



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## IV. NSPE Fundamental Canons of Ethics

Engineers, in the fulfillment of their duties, shall:

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



# Rules of Practice: A Breakdown of the Fundamental Canons

- Engineers shall hold paramount the safety, health, and welfare of the public.**  
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.  
Engineers shall approve only those engineering documents that are in conformity with applicable standards.  
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.  
Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.  
Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.  
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.
- Engineers shall perform services only in the areas of their competence.**  
Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.  
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.  
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.
- Engineers shall issue public statements only in an objective and truthful manner.**  
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.  
Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.  
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.
- Engineers shall act for each employer or client as faithful agents or trustees.**  
Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.  
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.  
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.  
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.  
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.
- Engineers shall avoid deceptive acts.**  
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.  
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 or intent of influencing 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.
- Engineers shall Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.**

# V. Association of Computing Machinery (ACM) Code of Ethics

- A. Comparison of ACM to NSPE Code of Ethics
  1. General Moral Imperatives
    - Contribute to Society and Human Well-being
      - » NSPE Fundamental Canon 1
    - Avoid Harm to Others
      - » NSPE Fundamental Canon 1, Rules of Practice 1.a.

“In the work environment the computing professional has the additional obligation to report any signs of system dangers that might result in serious personal or social damage. If one’s superiors do not act to curtail or mitigate such dangers, it **may be** necessary to “blow the whistle” to help correct the problem or reduce the risk.”

- Be Honest and Trustworthy
  - » NSPE Professional Obligation 1
- Honor Contracts, Agreements and Assigned Responsibilities

“A judgment that a specific assignment should not be performed may not be accepted. Having clearly identified one’s concerns and reasons for that judgment, but failing to procure a change in that assignment, one may yet be obligated, by contract or law, to proceed as directed. The computing professional ethical judgment should be the final guide in deciding whether or not to proceed. Regardless of the decision, one must accept the responsibility for the consequences.”

- B. Licensed vs. Unlicensed Professionals
  1. Legal obligation
  2. Moral obligation
- C. No Licensing requirements
- D. Efforts to license IT/Computer Science Professionals



# VI. Engineering Licensure

- A. History
  1. 1907 – Wyoming passes first Engineering Registration Law
  2. 1934 – NSPE was formed
  3. 1947 – Montana is last state to enact Engineering Registration Law
  4. David B. Steinman
    - Founder of NSPE
    - Instrumental in passing state Engineering Registration Laws
  
- B. PE (Professional Engineering) Requirements
  1. BS from an ABET accredited curriculum
  2. Pass PE Exam (Part A and B)
  3. Four years of progressive Engineering experience under a PE.

# VII. Engineering Ethics Case Studies

- NSPE's Board of Ethical Review (BER) is a panel of engineering ethics experts that has served as the profession's guide through ethical dilemmas. The board consists of seven licensed members who are appointed by the NSPE president. The purpose of the BER is to render impartial opinions pertaining to the interpretation of the NSPE Code of Ethics, develop materials, and conduct studies relating to ethics of the engineering profession.
- **NSPE MEMBERS' ETHICS HOTLINE: 888-384-4295**
- Case I: Board Ruling on As-Built Reconciliation.
- Case II: Signing and Sealing Subcontractor's Calculations.
- Case III: Conflict of Interest—Public Health and Safety—Design and Construction of House in Flood Area.
- Case IV: Observing Off-Site Safety Issues Public Health and Safety—
- Case V: Conflict of Interest.
- Case VI: Latest Design Methods Vs. Industry Standards.
- Case VII: Engineer Inspecting Own Work Conflict of Interest.



# Case I: As-Built Reconciliation



## Facts:

- Engineer A prepares a set of drawings for a client for the design and construction of a building. Owner contracts with Contractor X, not an engineer, for construction, but does not retain Engineer A for construction phase services. Engineer A is paid in full for his work. Engineer A's drawings are filed with town code officials and a building permit is issued. Contractor X builds the building, but does not follow Engineer A's design, relying upon Contractor X's own experience in construction. Following construction, Contractor X, with the assistance of Engineer C, prepares a set of record "as built" drawings based upon the actual construction of the building as reported by Contractor X. Because the design and the construction drawings are not reconciled, the building official refuses to issue an occupancy permit to the Owner. Owner asks Engineer A to "reconcile" the original design and the record drawings. Engineer A, not wanting to perform additional studies, agrees to perform the "reconciliation."

## Questions:

- **1. Was it ethical for Engineer A to perform the design reconciliation?**
- **2. Was it ethical for Engineer C to prepare a set of record drawings based on the construction without notifying Engineer A?**

# Case I: Board Ruling on As-Built Reconciliation

## Conclusions:

- **1. It was not ethical for Engineer A to reconcile his original design documents without extensive investigation to assure that all original design intent was followed.**
- **2. The Owner is the ultimate client, therefore, it was not ethical for Engineer C to prepare a set of record drawings based on the construction without notifying Engineer A. Moreover, there is a possibility that Engineer C was aiding and abetting the unlicensed practice of engineering.**

## Explanation:

- **The Board interprets the facts to suggest that Engineer A is being asked to adopt a design that was neither prepared by Engineer A, not under Engineer A's direct control or supervision, and does not reflect the professional judgment and intent of Engineer A. Instead, it appears that the Owner is seeking to have Engineer A seal the drawings in question to satisfy the requirements of the building official.**
- **Engineer A is being asked to sign and seal work for which the engineer was neither in responsible charge nor which the engineer was involved in preparing. In essence, it can be argued that the facts present the appearance that Engineer A's services were used by the Owner merely to gain approval for the project with no intent on the part of the Client or Contractor X to follow Engineer A's design intent.**
- **In unilaterally altering Engineer A's design, Contractor X may have engaged in the unlicensed practice of engineering. There appears to be substantial reason that the structure might not be approvable as built since Contractor X is not an engineer.**

# Case II: Signing and Sealing Subcontractor's Calculations



## Facts:

- Engineer A is the engineer of record for a building renovation project on behalf of Client B. The plans and specifications for the project include the installation of skylight curbs for roof skylights. Smith, the owner of XYZ Skylight Curbs, was selected as a subcontractor on the project to provide the specified skylight curbs. Since Engineer A prepared the plans and specifications and is knowledgeable about building renovations, although not specifically with respect to skylight curbs, Smith proposes to retain Engineer A to review and stamp XYZ Skylight Curbs' calculations and design documents in connection with the project.

## Question:

- **Would it be ethical for Engineer A to review and stamp the calculations and design documents as requested in connection with the project?**

<http://www.nspe.org/resources/pdfs/Ethics/EthicsResources/EthicsCaseSearch/2011/BER%20Case%20No%2011-1-APPROVED.pdf>

# Case II: Signing and Sealing Subcontractor's Calculations

## Conclusion:

- It would not be ethical for Engineer A to review and stamp the calculations and design documents as requested in connection with the project, because he was not in responsible charge for the design of the skylight curb.

## Discussion:

- In the present case, there clearly was an existing relationship between Engineer A and Client B, suggesting the potential for a clear conflict of interest. As the Board has stated on numerous occasions, it is generally not possible to serve two masters with competing or potentially competing interests. In addition, the facts indicate the obvious circumstances where Engineer A could be placed in a situation where he may be called upon to review his own work—a clear violation of the NSPE Code of Ethics. Such actions could expose Engineer A to potential liability and endanger the interests of Engineer A's client. Further, based upon the facts, there is a clear question as to whether and to what extent Engineer A had any direct involvement in the preparation of the calculations and design documents in question and if not, whether Engineer A could properly stamp the calculations without exercising the requisite responsible charge over the work.

# Case III: Design and Construction of House in Flood Area

## Conflict of Interest—Public Health and Safety—

### Facts:

- First Owner wants to build a house and hires Architect A and Engineer B. Following
- disagreements over the location of the house due to potential flooding and drainage
- issues, First Owner terminates Architect A and Engineer B after paying their fee. First
- Owner then hires Architect C and Engineer D to design the house. After the house
- construction is completed, First Owner then sells the House to Second Owner.
- Following a heavy rain, Second Owner discovers that the house has serious flooding
- and drainage issues and sues First Owner. Second Owner hires Architect A and
- Engineer B to perform redesign services for the house. Engineer B is a fact witness and
- could also serve as an expert witness in the lawsuit.

### Questions:

1. In light of Engineer B's concerns, did Engineer B have any ethical obligation to report to appropriate public authorities First Owner's decision to locate the house in an area subject to potential flooding and drainage issues?
2. Would it be ethical for Engineer B to perform redesign services for the house?
3. Would it be ethical for Engineer B to serve as an expert witness in connection with the litigation between First Owner and Second Owner?

# Case III: Design and Construction of House in Flood Area



## Conclusions:

1. In light of the facts that there was no imminent danger to the public health and safety and presumably competent professionals [Architect C and Engineer D] were involved in the design and construction process, which suggested that technical issues were being appropriately addressed, the Board does not believe Engineer B has an affirmative obligation to report First Owner's actions or inactions.
1. Engineer B cannot ethically perform redesign services for the house for Second Owner, either independently or in collaboration with Architect A. Clearly Engineer B and Architect A had serious concerns regarding potential flooding and drainage issues in connection with the site, the placement of the house, design and construction of the house itself, or based upon other factors. Engineer B was paid for his professional services by First Owner and owes a continuing obligation not to disclose information to Second Owner gained during his service to First Owner.
3. It would not be appropriate for Engineer B to serve as an expert witness in connection with the litigation between First Owner and Second Owner. NSPE Code provisions make it clear that representing an adversary interest in connection with a specific project in which an engineer has gained particular specialized knowledge on behalf of a former client is inconsistent with the NSPE Code. Additionally, Engineer B may be called upon as a fact witness in connection with the services provided to First Owner regarding the house, which is another reason why it would be inappropriate for Engineer B to serve as an expert witness on behalf of Second Owner.



# Case IV: Observing Off-Site Safety Issues

— Public Health and Safety—



## Case No. 10-5: Facts:

- Engineer A works for ES Consulting, a consulting engineering firm. In performing engineering services for ES Consulting, Engineer A performs construction observation services on a project for Client X. During the performance of the construction observation services for Client X, Engineer A observes potential safety issues relating to the performance of work by a subcontractor on a project being constructed on an adjacent piece of property for Owner Y, a party with whom neither Engineer A, ES Consulting, or Client X has any direct relationship.

## Question:

- **What are Engineer A's ethical obligations under the circumstances?**

## References:

- Section I.1 - NSPE Code of Ethics: Engineers, in the fulfillment of their professional duties, shall hold paramount the safety, health, and welfare of the public.
- Section II.1.f. - NSPE Code of Ethics: 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.

# Case IV: Observing Off-Site Safety Issues

## Conclusion:

- Engineer A should bring this potential safety issue to the attention of Engineer A's supervisor and ES Consulting, particularly if the safety issues involved could cause some disruption and have some bearing on the progress of the work on Client X's property. The Board assumes that the potential safety issues do not pose an imminent danger; therefore, Engineer A does not have an obligation to report this issue beyond his superiors in ES Consulting.
- In the Board of Ethical Review's opinion, this is a personal judgment and does not constitute an ethical obligation that can be imposed on Engineer A to take immediate or direct action. To do otherwise would make Engineer A accountable for a wide range of public duties and responsibilities that are beyond the bounds of reason.

<http://www.nspe.org/resources/pdfs/Ethics/EthicsResources/EthicsCaseSearch/2010/BER%20Case%20No%2010-5-APPROVED.pdf>

# Case V: Conflict of Interest

## Facts:

- PE A is responsible for the design of a major city library.
- Following completion, the library experiences significant structural problems.
- The city retains PE B, an independent consulting professional engineer, to investigate the problems.
- Ten years earlier, B worked in A's firm for two years. That employment relationship did not work out. Immediately after departing from A's firm, B went to work for Contracting firm C, the company that was later responsible for constructing the library, also for two years. In his earlier employment for A and for C, B was not involved in any work for the city.
- Following an investigation of the failure, engineer B assesses responsibility for the structural failure jointly to both A and C.
- PE A claims B's unsuccessful employment history with A and also C raises a conflict of interest. A believes the total responsibility belonged to C and that B's action demonstrates extreme bias against A and favorable treatment to C.

## Question:

Does engineer B has a conflict of interest or acted unethically with A, C and/or the City?

# Case V: Board Ruling on Conflict of Interest



## Conclusion:

- The Board believed that engineer B was not trying to mislead anyone and that his employment with both A and C is sufficiently removed from his current relationship with the city and there is nothing to suggest any prejudgment on his part. A's suggestion that B is biased is based on supposition and is not supported by the facts. Moreover, the Board is troubled that if A had concerns over the issue of bias, he should have raised the issue of bias earlier and not waited until after the decision. Instead, it appears that A sat on the issue and raised it only when he believed his interests were affected.
- In addition, the Board is of the belief that it would have been necessary for B to have alerted the city of his previous employment relationship with A and C, assuming that the city was not aware of this fact. B's actions did not constitute a conflict of interest in violation of the NSPE Code of Ethics, only when assuming that B alerted the city of his previous employment relationship with A and C.

# Case VI: Latest Design Methods Vs. Industry Standards

## **Facts:**

- A PE is involved in the design of the structural system on a building project in an area of the country that experiences severe weather conditions.
- He designs the structural system based on what he believes are sound structural engineering principles.
- New and improved design methods have recently been developed to address the severe weather conditions in the location where the PE practices. These new standards have been published in the most recent technical literature.
- The PE completes his design and the building is built.
- Within one year following construction, severe weather causes significant structural damage to the building.
- It is determined that if he had followed the severe weather design parameters, the structural failure would not have occurred.

**Question:** Was it ethical for the PE to fail to follow the most recent design parameters published in the most recent technical literature?



# Case VI: Board Ruling on Latest Design Methods vs. Industry Standards

## Conclusion:

- It was not unethical for the PE to fail to follow the most recent design parameters for design in severe weather areas published in the most recent technical literature.
- The Board believes that the PE's actions were within the basic standards of the engineering profession, as well as most professions, and the Board cannot conclude that the PE acted unethically and that engineers cannot be expected to incorporate every new and innovative technique that has not been fully tested or peer reviewed. Once those techniques are well defined and become part of the body of technical knowledge, they become standards that should be followed.
- The PE's design was "grandfathered" as it was using the design standards that existed at the time of the PE's work.

# Case VII: Engineer Inspecting Own Work Conflict of Interest



## Case No. 04-9

## Facts:

- Engineer A is a professional engineer in private practice. Development Contractor X (Contractor) for whom Engineer A works from time-to-time as a consultant, was asked by a local building inspector to have a foundation the Contractor built inspected by a Professional Engineer since the foundation had cracks that were visible to the inspector. Since Engineer A's firm designed the house foundation for the Contractor, Engineer A performed the inspection for the Contractor. Engineer A determined the foundation had some minor surface cracks but nothing that Engineer A considered unsafe. In Engineer A's estimation, the cracks were not unusual for the type of foundation involved. Engineer A sends the building inspector a letter (which Engineer A also sealed) stating that Engineer A had inspected the foundation and in Engineer A's professional opinion, the foundation was structurally safe. The building inspector responded with a letter to the contractor stating he was not accepting Engineer A's letter and told the contractor to hire another engineer to inspect the foundation.

## Question:

- Was it ethical for Engineer A to inspect his own work or should an independent professional engineer be retained to inspect Engineer A's work?

# Case VII: Engineer Inspecting Own Work Conflict of Interest

## Conclusion:

- It was not ethical for Engineer A to inspect his own work. In view of the fact that a question has been raised by the building inspector concerning the sufficiency of the foundation, it would be appropriate for there to be an independent third-party review of the foundation. In most cases it is not uncommon for the design engineer to also perform construction inspection services within the scope of customary services for the benefit of the client. Those services are entirely consistent with the role of the design engineer in providing professional services to the client. However, there may be situations such as here where an independent review may be necessary to resolve issues raised by public officials charged with approving the work on the site. In the instant case, Engineer A was involved in the actual design of the house foundation about which actual questions were raised by the inspector. In this connection it was inappropriate for Engineer A to perform an inspection of foundation for the benefit of the party that retained Engineer A. Reviewing one's own work raises fundamental issues relating to conflicts of interest.



# VIII. Ethical Cases Specific to IT and Computer Science

## A. InfoWorld Article by Peter Wayner: “12 Ethical Dilemmas Gnawing at Developers Today”

Quote: “The tech world has always been long on power and short on thinking about the ramifications of this power. If it can be built, there will always be someone who will build it without contemplating a safer, saner way of doing so, let alone whether the technology should even be built in the first place. The software gets written. Who cares where and when it’s used? That’s a task for somebody in some corner office.

More troubling: While ethics courses have become a staple of physical-world Engineering degrees, they remain a begrudging anomaly in computer science pedagogy. Yet as software takes over more of our life, the ethical ramifications of decisions made by programmers only become greater. Now that our code is in refrigerators, thermostats, smoke alarms, and more, the wrong moves, a lack of foresight, or downright dubious decision-making can haunt humanity everywhere it goes.”

### (1) Ethical Dilemma No. 5: To bug-fix or not to bug-fix?

- a. Fix it later
- b. Do it now
- c. How serious is the bug?
- d. Is public safety endangered?

### (2) Ethical Dilemma No. 6: How much to code to prevent misuse

- a. Consider consequences of misuse
- b. Is public safety compromised?

### (3) Ethical Dilemma No. 7: How far to defend customers against data requests

- a. Is request legal?
- b. Comply with government request
- c. Hire a lawyer

**Thank you.**

**NSPE MEMBERS' ETHICS HOTLINE:  
888-384-4295**

