NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Key Concepts in Engineering Ethics:

Signing and Sealing of Documents
Conflicts of Interest
Public Health, Safety, and Welfare

May 2017

Arthur E. Schwartz, CAE
Deputy Executive Director & General Counsel
National Society of Professional Engineers
Alexandria, Virginia
aschwartz@nspe.org

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

"Among the universal ethical values are honesty, integrity, promise-keeping, fidelity, fairness, respect for others, responsible citizenship, pursuit of excellence and accountability."

– Michael Josephson

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

- **Black and White Areas – Easy**
  - Right *vs.* Wrong
- **Gray Areas – Tougher**
  - Right *vs.* Right
  - Lesser of the Evils/Dilemma
- **Other Factors**
  - Time/Money
  - Family
  - Career
  - Reputation

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

- **Why Study Engineering Ethics?**
  - To Understand the Standards Governing What is Acceptable Behavior in the Practice of Engineering
- **Why Practice Engineering Ethically?**
  - Personal Injury/Property Damage
  - Disciplinary Action
  - Impact on Reputation, Employer, Clients, Profession
  - Possible Loss of Job, Business, etc.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

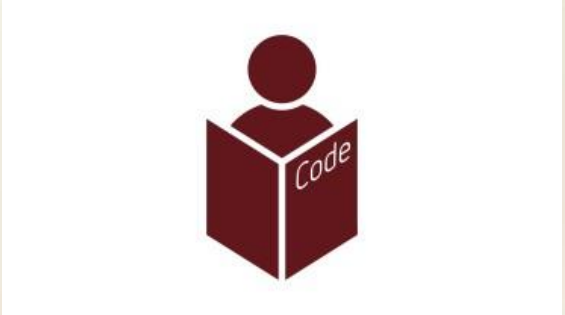
Engineering Ethics

- *"All products of technology present some potential dangers, and thus engineering is an inherently risky activity… Engineering should be viewed as an experimental process. It is not, of course, an experiment conducted solely in a laboratory under controlled conditions. Rather, it is an experiment on a social scale involving human subjects"*
  - Martin and Schinziger, Ethics in Engineering

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

- **Professional Codes of Ethics**
  - A code of professional ethics results when a field organizes itself into a profession. The resulting code is central to advising those professionals how to conduct themselves, to judge their conduct and to understand the profession.

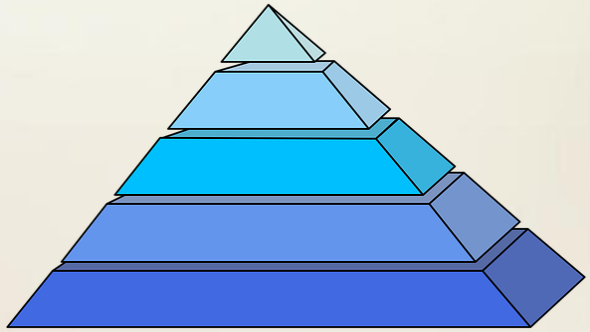


NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Hierarchy of Ethical Obligations

- **Primary**: Ethical Obligations to the Public
- **Secondary**: Ethical Obligations to Employer or Client
- **Tertiary**: Ethical Obligations to Other Professionals and Other Parties



NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Three Basic Ethical Obligations – (1) Public, (2) Employer/Client and (3) Other Professionals...

- Never Mutually Exclusive - Reciprocal
- Not A "Zero Sum Game"
- All Need To Be Considered At All Times
- Should Be Complementary to Integrated With One Another to the Fullest Extent Possible
- Ethical Integration = Professional Integrity

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Seven Principles Impacting Each Obligation

1. *Protecting The Public Health, Safety and Welfare*
2. *Demonstrating Professional Competence*
3. *Maintaining Objectivity/Truthfulness*
4. Addressing Conflict of Interest
5. Preserving Confidentiality
6. Receiving and Providing Valuable Consideration
7. Emerging Areas/Emerging Challenges

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

- This session will focus on signing and sealing of documents—fire sprinkler layout drawings; conflict of interest—overlapping service arrangements; public health, safety, and welfare—driverless/autonomous vehicle; and conflict of interest—design of playground as favor to public official.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Signing and Sealing of Documents—Fire Sprinkler Layout Drawings

Case No. 16-2

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Facts:

- Engineer A is a professional engineer with significant expertise in fire protection engineering. Recently Engineer A was contacted by a fire sprinkler contractor and asked to review, sign and seal the fire sprinkler contractor's proposed layout design document developed solely by the fire sprinkler contractor without the involvement of a professional engineer in order for the document to be submitted to the local code official for review and approval. Under the state law, fire sprinkler design documents are required to be prepared by or under the responsible charge of a licensed professional engineer. Engineer A has significant experience preparing detailed fire sprinkler layout drawings and performing hydraulic calculations and fluid delivery time calculations as required by National Fire Protection Association standards.

Engineering Ethics

Question:

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

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section I.2. - Code of Ethics:

Engineers, in the fulfillment of their professional duties, shall perform services only in areas of their competence.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.2. - Code of Ethics:

Engineers shall perform services only in the areas of their competence.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.2.a - Code of Ethics:

Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.2.b - Code of Ethics:

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.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.2.c. - Code of Ethics:

Engineers may accept assignments and assume responsibility for coordination of 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.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Conclusion:

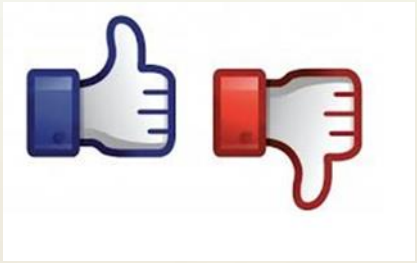
- Engineer A should decline to review, sign and seal the fire sprinkler contractor's proposed layout design documents developed solely by the fire sprinkler contractor. Instead, Engineer A should propose that Engineer A should initiate the design process, taking into account an evaluation of the broad range of hazards and protection schemes required to develop a workable, integrated solution to address fire safety concerns and then move forward in preparing design documents for the fire protection system. Following this process, the fire sprinkler contractor and its competent engineering technicians should perform system layout, prepare shop drawings and develop material submittals, all in accordance with the professional engineer's design, and support the installation of fire protection systems under the direction of the professional engineer.

Engineering Ethics

Polling Question:

Under the facts in the present case, if Engineer A had agreed to review, sign and seal the contractor's proposed layout design documents, Engineer A would have been engaged in unethical "plan stamping"?

1. Yes
2. No
3. Not Sure



NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Conflict of Interest—Overlapping Service Arrangements

Case No. 16-4

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Facts:

- Engineer A serves as managing director and president, and reports to the Board of Directors, of a startup company (XPro), in which he is also an investor. XPro is involved in the development of a new low-cost technology to purify drinking water in developing countries. Engineer A also has a separate engineering company that is under contract with XPro to provide engineering services. The XPro board is aware of this relationship and does not object.

- Fabrico, a fabrication company, has begun to provide technical services to XPro. Fabrico is now requesting professional engineering services—unrelated to its work with XPro—from the Engineer A's engineering company. Fabrico does not want to invoice the startup. Instead, Fabrico has proposed that Engineer A's company perform the engineering services for Fabrico for free and that Fabrico provide technical support to the startup on a "pro bono" basis.

Engineering Ethics

Question:

- Would it be ethical for Engineer A's company to perform the engineering services for Fabrico for free and to permit Fabrico to provide technical support to the startup on a "pro bono" basis?

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.4. - Code of Ethics:

Engineers shall act for each employer or client as faithful agents or trustees.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.4.a. - Code of Ethics:

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.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.4.b. - Code of Ethics:

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.


NSPE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Code of Ethics for Engineers

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.1.e. - Code of Ethics:

Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.2. - Code of Ethics:

Engineers shall at all times strive to serve the public interest.


NSPE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Code of Ethics for Engineers

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.5. - Code of Ethics:

Engineers shall not be influenced in their professional duties by conflicting interests.


NSPE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Code of Ethics for Engineers

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.5.a. - Code of Ethics:

Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

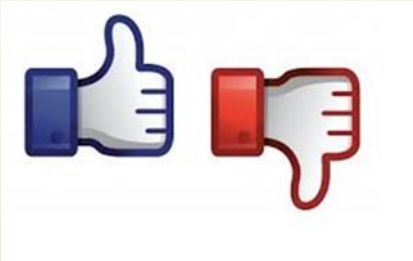
Engineer A's new relationship as an engineering service provider to Fabrico as well as the details of the "three-part arrangement" proposed by Fabrico must be fully disclosed to the XPro Board of Directors in order for the XPro Board of Directors to determine the appropriate manner for Engineer A to proceed. While the mission of XPro is admirable and consistent with the public interest, under the proposed "three-part arrangement", Engineer A's services and relationship with Fabrico, including its unrelated engineering work for Fabrico, could raise contractual liability issues for XPro and its Board of Directors that could potentially harm the interests of XPro and create compromising circumstance over which XPro has no direct involvement or control. Should there be a significant imbalance of the work done by Engineer A for Fabrico or the work done by Fabrico for XPro, there is a possibility of substandard or incomplete work by Engineer A for Fabrico or by Fabrico for XPro which would also be an ethical violation.

Engineering Ethics

Polling Question

I believe that "bartering" (exchanging goods or services for other goods or services) is an ethically acceptable way to perform engineering services today.

1. Yes
2. No
3. Not Sure



NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Public Health, Safety, and Welfare—Driverless/Autonomous Vehicle

Case No. 16-5

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Facts:

- Engineer A is a professional engineer working as a consultant to an automobile manufacturer that is considering the development of a driverless/autonomous vehicles operating system. Engineer A is assigned to an engineering risk assessment team whose members are being asked to make a recommendation relating to potential situations that could arise in connection with the operation of driverless/autonomous vehicles.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Facts:

- The following scenario is among the situations that are being considered by the engineering risk assessment team: In the event of an unavoidable crash, does the vehicle's system choose the outcome that will likely result in the greatest potential for safety for the vehicle's passengers or does the vehicle's software system instead choose an option where the least amount of potential harm is done to any of those involved in an accident, such as having the car crash into a stationary object (e.g., telephone pole, etc.) with the probability of causing some passengers serious but non-life threatening injuries instead of striking and potentially causing a fatal injury to a pedestrian, cyclist, or motorcycle rider?

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Question:

- What are Engineer A's ethical obligations?

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section I.1. - Code of Ethics:

Engineers, in the fulfillment of their professional duties, shall hold paramount the safety, health, and welfare of the public.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.1. - Code of Ethics:

Engineers shall hold paramount the safety, health, and welfare of the public.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.1.b. - Code of Ethics:

Engineers shall approve only those engineering documents that are in conformity with applicable standards.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.3.b. - Code of Ethics:

Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.1.b. - Code of Ethics:

Engineers shall advise their clients or employers when they believe a project will not be successful.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

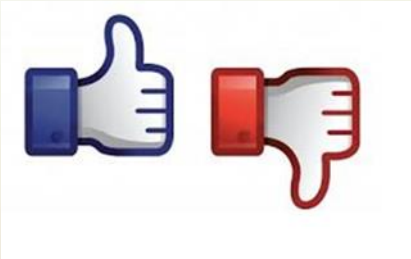
Engineer A has a responsibility to fully and actively participate as a member of the engineering risk management team and clearly and unambiguously express any and all concerns Engineer A has regarding the safety of the proposed autonomous vehicle operation system and explore additional potential technical options that could mitigate the risks identified in the proposed autonomous vehicle operating system. In light of the fact engineers should strive to seek to do no harm in the performance of their professional services, if necessary, Engineer A should propose that further study be undertaken by the company before the autonomous vehicle operating system be utilized. That being said, to address the specific question posed in the case, Engineer A has an obligation to state the prime ethical obligation of the vehicle operation is to minimize the harm to effect the least number of persons.

Engineering Ethics

Polling Question:

Driverless/autonomous vehicles present significant issues for professional engineers and professional engineers must be actively involved in future discussions concerning this important topic.

- 1. Agree
- 2. Disagree
- 3. Not Sure



NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Conflict of Interest

<u>Design of Playground As Favor To Public Official</u>

Case No. 16-11

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Facts:

- Engineer A is the owner of an engineering firm in a small town. Engineer A and his firm frequently perform engineering services for the small town and also for other local agencies that are overseen by the town council. Recently Engineer A and his firm were selected by a local agency to design a major public project in the town.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Facts:

- Following the firm's completion of the project, Engineer B, the town engineer who leads a panel that approves the selection of engineering firms performing services for the town and other local agencies, asks Engineer A and his firm to donate engineering services to design a playground on behalf of a local not-for-profit organization that the city council member is active in and supports. Before Engineer A has a chance to reply, Engineer B advises Engineer A that Engineer A's firm's design of the playground will "keep Engineer A and his firm in good graces" with Engineer B in the future with regard to future work with the town or other public work.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Questions:

1. Was it ethical for Engineer B to ask Engineer A and his firm to donate engineering services to design a playground on behalf of a local not-for-profit organization that the city council member is active in and supports under the facts?

2. Would it be ethical for Engineer A to donate engineering services for the playground design under the circumstances?

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section II.5.b. - Code of Ethics:

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.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.2. - Code of Ethics:

Engineers shall at all times strive to serve the public interest.


NSPE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Code of Ethics for Engineers

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.3. - Code of Ethics:

Engineers shall avoid all conduct or practice that deceives the public.


NSPE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Code of Ethics for Engineers

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.5.a. - Code of Ethics:

Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

Section III.6. - Code of Ethics:

Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

1. It was not ethical for Engineer B to ask Engineer A and his firm to donate engineering services for the design of a playground on behalf of a local not-for-profit organization which Engineer B is active in and supports.

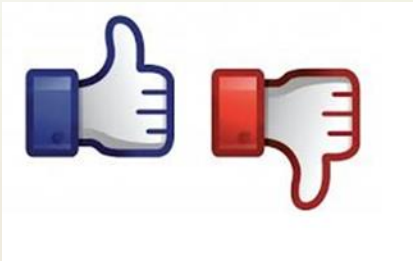
2. It would not be ethical for Engineer A to agree to donate engineering services for the design of the playground under the circumstances.

Engineering Ethics

Polling Question

If Engineer B had not made the statement that Engineer A's firm's design of the playground will "keep Engineer A and his firm in good graces" with Engineer B in the future with regard to future work with the town or other public work, it would have been ethical for Engineer A to donate the engineering design services as requested.

1. Agree
2. Disagree
3. Not Sure



NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Review of Key Issues

Engineering Ethics

- It is important to study engineering ethics because it is critical to understand the standards governing what is acceptable behavior in the practice of engineering.
- It is important to practice engineering ethically because if you do not, the following could occur - personal injury, property damage, disciplinary action, impact on the reputation or the employer, clients, profession and possible loss of job or business.
- Engineers having knowledge of any alleged violation of this Code should 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.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics

- Among the universal ethical values are honesty, integrity, promise-keeping, fidelity, fairness, respect for others, responsible citizenship, pursuit of excellence and accountability.
- Black and white areas – right *vs.* wrong issues are easiest to resolve.
- Other factors such as time, money, family, career, reputation affect ethical decision-making.

Engineering Ethics

Arthur E. Schwartz, CAE

Deputy Executive Director & General Counsel
National Society of Professional Engineers
Alexandria, Virginia
aschwartz@nspe.org

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics:
Signing and Sealing of Documents

To receive credit for this course, each registrant will need to take the quiz below and pass with a score of 70 or above. Click link

http://quiz.nspe.org/quiz/2017springethics3.aspx

to take the quiz.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineering Ethics:
Signing and Sealing of Documents

NSPE would like your feedback regarding this live webinar. Click link https://www.surveymonkey.com/r/SVRM533

to take a short survey.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS