

GEEN 1201

Engineering as a Career

Lecture 2 – Ethics & Standards (In Engineering)

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Case study

R&M Machinery had for years provided XYZ Inc. with sophisticated equipment and reliable repair service. XYZ Inc. returned a failed piece of equipment. A meeting was held which included Archie Hunter, a representative from XYZ Inc.; Norm Nash, R&M's returned goods area representative, and Walt Winters, an R&M engineer intimately acquainted with the kind of equipment XYZ Inc. had returned. Norm Nash represented R&M's "official position": the piece of equipment is all right. However, during the course of the meeting it becomes apparent to Walt Winters that the problem has to be R&M's. He suspects that the equipment was not properly tested out by R&M, and that it failed because of an internal problem.

Walt keeps silent during the meeting. After the meeting he talks with Norm about his diagnosis. He suggests they tell XYZ Inc. that the problem is R&M's fault, and that R&M will replace the defective equipment. Norm replies, "I don't think it's wise to acknowledge that it's our fault. There's no need to hang out our wash and lessen XYZ Inc.'s confidence in the quality of our work. A 'good will' gesture to replace the equipment should suffice." R&M management decides to tell XYZ Inc. that they will adjust to the customer's needs "because you have been such a good customer all these years." Although R&M replaces the equipment at its own expense, it does not tell XYZ Inc. the real nature of the problem.

Few Questions:

1. Should Walt had said anything about this in the presence of the customer, or should he wait until after the meeting to discuss this with Norm Nash?
2. Discuss R&M's resolution of the problem. Should R&M's way of handling the problem be of any concern to Walt Winters at this point, or is it basically a "management problem"?

Codes of ethics in Engineering

- Serves as a framework for making correct judgements
- Expresses the right, duties and obligations of being an engineer
- They are not laws but violating them may result is expulsion from professional society
- Different societies have own set of ethics
- Different ethics or moral guidelines may be created or stated but they exhibit similar themes in a different format
- Some professional organization
 - National Society of Professional Engineers(NSPE)
 - Institute of Electrical & Electronics Engineers(IEEE)
 - American Society of Mechanical Engineers(ASME)
 - American Institute of Chemical Engineers(AIChE)
 - Society of Automotive Engineers(SAE)

NSPE Code of ethics

- Engineers shall hold paramount the safety, health and welfare of the public
- Engineers shall perform services only in areas of their competence
- Engineers shall issue public statements only in an objective and truthful manner
- Engineers shall act for each employer or client as faithful agents or trustees
- Engineers shall avoid deceptive acts
- Engineers shall conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession

These are also called 6 Fundamental Canons of NSPE

IEEE code of ethics

- to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
- to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
- to be honest and realistic in stating claims or estimates based on available data;
- to reject bribery in all its forms;
- to improve the understanding of technology; its appropriate application, and potential consequences;
- to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
- to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
- to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
- to avoid injuring others, their property, reputation, or employment by false or malicious action;
- to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Standards in Engineering

- A standard is *a document that defines the characteristics of a product, process or service, such as dimensions, safety aspects and performance requirements*
 - Code tells you what you need to do
 - Standards tells you how to do it
- Acts as a common language that allows engineers to talk at same level when reacting to products or processes
- Standards may refer to *a set of conditions & requirements of precise & limited application that provide a detailed description of a procedure, process, material, product or service for use primarily in procurement and manufacturing*. These are specifications
- Engineering products often also satisfy mandatory government requirements that defines the characteristics and/or the performance requirements of a product, service or process

Different types of standards

- Voluntary
 - Written in an open environment with consensus of professionals from private and public sectors (example: ISO film speed code)
- De facto
 - Standards which are not officially approved by standards organization or government but widely used (QWERTY keyboard layout)
- Regulatory
 - Standards written or adopted by government agencies (example: Americans with Disabilities Act (ADA))
- Other
 - Standards created and used within individual companies (example: Customer technical support tickets to be worked on within a week)

Why are they important?

- Uniformity: Parts and components made in different locations must have same specifications
- Reliability in service: Services offered in one store outlet should be the same at another
- Product safety: Services and components should be safe for use no matter who or where they are offered or manufactured
- Ease of information exchange: Components designed in US can be manufactured in factories around the world and assembled together

Examples of Different Standards Organizations and search engines

- ASTM(American Society for Testing and Materials develops standards and test procedures for determining material properties pertaining to the field of application)
- UL(Underwriters Laboratories for product safety tests & certification)
- ANSI(American National Standards Institute helps develop standards)
- NFPA(National Fire Protection Association to reduce fire hazards)
- ISO(International Standards Organization promotes & develops standards which are used world wide)
- SAE(Society of Automotive Engineers develops standards for components used for different modes of transportation)
- IEEE(Institute of Electrical and Electronics Engineers for standards pertaining to electronics components)
- OSHA(Occupational Safety and Health Act to assure safe & healthful working conditions by enforcing standards)
- Deutches Institut fur Normung(DIN is a member of ISO in Germany which has developed many industry standards)
- [NSSN](#)- Search engine provided by ANSI
- [IHS standards store](#)

(Standards can be searched using keywords, title or document number eg ISO 9000)

NSPE Engineers' Creed



Engineers' Creed

As a Professional Engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare.

I pledge:

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;

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.*

Assignment # 2

- a. Study ASME Code of ethics and correlate them with NSPE and IEEE code of ethics
- b. Identify different National and International Standards organizations that are responsible for creating standards in Aerospace Engineering.

(It has to be a typed report with references; you need to turn in as hard copy at the beginning of class)

Due next Thursday (Sept 13, 2022) by 5:00 PM