2021 ASEE ANNUAL CONFERENCE
Virtual Meeting | July 26–29, 2021 | Pacific Daylight Time
Paper ID #32397

Do Engineers Need A Code of Ethics?

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Abstract

Professional organizations and societies may have a Code of Ethics, Rules of Conduct, Canons of Conduct, or some similarly named set of operating rules governing the expected ethical conduct of their membership. In many cases, in the preamble of the documents will be found the word “guidelines”, or words within the document such as “perceived harm” or “where possible”. These words provide the engineer some personal insight into what is intended, not something cast in concrete. In short, the documents are more an ethical environment in which to operate rather than one of moral judgement. The questions that arise are; do engineers need a code of ethics and, if so, where in the normal curriculum of an associate or undergraduate engineering degree program is the subject matter of ethics discussed? This paper will suggest areas where the topic of ethics might be introduced, some ethical topics to be covered, and some of the ramifications that the engineer may encounter when faced with a situation calling for an ethical interpretation.

Discussion

The Illinois Institute of Technology (IIT) has assembled a large list of ethical codes from professional organizations world-wide with more than 2500 codes from more than 1500 organizations [1]. The list is of interest in that it is not an engineering society exclusive list, there are many professional organizations beyond those associated with engineering that have some written rule of ethics. The list is not limited to professional organizations but includes private industry and their interpretation of guidelines for use in conducting business [2]. It is interesting to note that in the case of industry, the code may extend beyond guidelines for conducting business, and may include what form of punishment will imposed in the case of violation of the guidelines such as termination of a contract or employment [2].

For engineering programs planning to submit a request for ABET evaluation and accreditation of their particular engineering or engineering technology program, part of the accreditation criteria states, “The curriculum must include topics related to professional and ethical

responsibilities...[3]" Note, there is no specific implementation process, only the requirement that such processes exist for both associate and undergraduate degree programs. In looking at the ASEE Code of Ethics, there is mention of "ethical responsibilities", the "code of ethics", and the statement that members will, "Ensure all graduates understand their professional and ethical responsibility [4]..." If one looks at code after code, the same admonition is included, that the professional engineer will comply with "ethical practices" – but there is no specific definition of "ethics" nor any recommendation of how to provide the guidance necessary to the student to understand that ethical need. The National Society of Professional Engineers (NSPE) has a lengthy Code of Ethics, divided into four sections; Ethics, Canons, Rules of Practice, and Professional Obligations. In the entire document, the word "ethics" is only used twice [5].

With all the references to the need of ethical implementation and protection, the question that must be answered is – where and when is the subject of ethics covered in the engineering curriculum? In thirty years of reviewing engineering programs seeking ABET accreditation, there has never been a program entitled ENG101 – Engineering Ethics or some similar offering. If ethics is so critical, where does this information get imparted to the student engineer? If it is not a semester long course presentation, is it then a brief thirty-minute discussion? There are many textbooks with the title including the words ethics and engineering (Amazon provides more than two dozen books with the word "ethics" or words "engineering ethics" on their website). Where are the courses to cover such important material? Should such a course be, at a minimum, an elective for the engineering student? Could it be a course offered in a department other than the Engineering Department? Perhaps the answer is that the subject matter of ethics is too personal, not something that is cut-and-dried like an equation or law of physics. Perhaps the subject matter is uncomfortable. How does one justify an ethical position without the experience of application of an ethical decision? Are ethical guidelines too strict in their interpretation, or are there areas of gray, where the interpretation varies from engineer to engineer based on their home teachings, beliefs, and experiences? And given these possibilities, what are the ramifications the engineer must understand if an ethical challenge is presented?

Ramifications

In projects that encounter an ethical dilemma, there is seldom a simple choice, yes or no, good, or bad, right or wrong. Most problems that have such a decision base are more centered on

moral grounds which are based on youthful teachings in the home. Most ethical problems are more centered on the possible impact both on the public and the engineer personally. It is important that the student engineers recognize that taking a position on a particular point may have serious repercussions – they could lose their job in some instances, a most unforgiving circumstance. What steps should the engineer take if there is a suspected problem that could affect customer acceptance of a new product?

- Provide technical support for position
- Do not let emotions enter the discussions
- Catch problems as early as possible
- Be sure the problem is sufficiently important
- Keep good engineering logs
- Use the channels provided
- Understand possible personal impacts

A brief example will demonstrate the steps noted and could be a typical classroom discussion in an ethics class.

A new cleaning product has been developed. The product announcement and first ship will be completed next week. The product is in its final usability test, with ten users using the product in controlled environments with different temperature ranges from 50 °F to 90 °F. User comments have noted no problems through 70 °F, but one user noted some irritation during the test. At the upper temperature, three users noted some irritation, about like a Level 1 sunburn – red skin but no blistering. The symptoms disappeared within three days after use. There are no warnings on the product label or container. It will take two weeks to produce a new label and prepare for product ship. It is estimated that the two-week delay and cost of the change will be $225,000 dollars. If new labels are ordered and implemented on the line at the time they arrive, the cost will be $75,000. The planned shipment is for 5,000 units per week. Should the product continue with its current plan or accept the delay and inherent costs? The current marketing plan indicates 90% of new users will use the product in environments of 70 °F or less and the test indicated that only 30% of those above that temperature had indicated any problem, a number less than 300 based on the forecast shipment of 10,000, a minimal exposure to any problem. What should the engineer do in terms of their ethics perspective?

The engineer has the test data to support a position of stopping the current ship schedule but must look at the importance of any delay and the public impact of the current product shipment. From a statistical perspective, the exposure is minimal. The engineer has two fundamental choices, push to stop the shipment of the product or assume the risk is minimal therefore acceptable. Which should the engineer choose – from an ethics perspective? If the choice is to push to stop the shipment, to what end is the engineer willing to pursue? If the second choice, has the engineer set an acceptable level of agreement with future ethical decisions?

In some cases, a rigorous analysis may be completed, with the final decision to proceed with the product even when human lives are threatened. How does one put a price on a human life when measured against corporate profits? This is best illustrated in the Ford Pinto case where the design of the fuel system was known to be a major problem, the fix for the problem was costly. In the analysis that was completed, the cost to modify the fuel system was approximated at $137 million dollars, whereas the cost of paying families for any deaths that might incur was set at $49 million dollars – a reasonable financial trade [6]. However, based on a variety of ethical codes to protect the public from harm, was the decision not to re-design the right one or not? That decision continues to prompt arguments on the ethics of similar problems faced today.

Conclusion

With the emphasis placed on ethics in professional and industrial organizations appearing to satisfy the question as to whether or not engineers need a code of ethics, the question remains – where does the engineering student get introduced into the world of ethical decisions and the understanding of the career exposures that may occur? If ethics are as important as they appear to be, then greater emphasis must be placed on the subject. Engineering students must be exposed to hypothetical, or real, examples of ethical decisions and the choices made discussed in the classroom. We cannot continue to short-shift the subject if we are going to continue to insist that students practice in an “ethical” manner. Discussions on ethics may prove uncomfortable. Discussions may prompt opposing points of view. Given such possibilities simply reinforces the need for discussion. We must prepare the student’s understanding of what is considered ethical actions and understand the challenges that ethical decisions may entail. Perhaps it comes down to nothing more than the guidance of “Do No Harm!” That is a similar response to a question

the author once asked at a CIEC conference, “Is It Ethical To Lie? [7]”. The final comment on both an ethical and moral question was simple – “It Depends”.

References

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About the Author