

Ethics *in* Engineering, and Engineering *of* Ethics

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Abstract

Engineers are expected to observe the codes of ethics adopted by their respected professional societies. Code of ethics adopted by a professional engineering society is briefly presented. Reasons for violating the codes are given. Among them are mentioned reasons of self interest, which are for securing more wealth, fame or power. Efforts to secure more wealth, fame and power is based on the wrong belief that they lead to happiness. We are living to be happy, and all our efforts should be aimed at maximizing our life-time or long-range happiness. There is a Universe by the Order of which everything happens. This Universe is abundant, and depending on our thoughts, and actions, we can be benefited from this abundance. Engineers should consider their jobs and their efforts as opportunities to serve, while holding paramount the safety, health and welfare of the public. They should have high respect for all beings and consider themselves as the stewards of the natural environment. Through this approach, and through the Order of the Universe, their material needs will be met, and their peace of mind and long-range happiness will be secured. We can change, or modify our attitudes for securing happiness, and accept that the greatest long-range or life-time happiness comes from rendering of the most effective and unselfish service to those who need it most. This service should be accompanied with unconditional love, and by us cultivating human values in ourselves, and observing the codes of ethics adopted by our respected professional societies.

Key words: Ethics, Happiness, Service.

Introduction

We can use the following definitions for ethics and engineering:

“Ethic(s), the discipline dealing with what is good and bad, and with moral duty and obligation, a set of moral principles or values, a theory or system of moral values, the principles of conduct governing an individual or a group”,

“Engineering, the application of science and mathematics by which the properties of matter and the sources of energy in nature are made useful to man, in structures, products, systems, and processes”. (Webster Collegiate Dictionary)

Engineering is a profession which has been playing the most significant role in human life. Engineers are responsible for creating processes and products to improve health care, food production and utilization, shelter design and construction, energy production and utilization, transportation, communication, protection against natural calamities, and much more. In short, engineers are expected to bring comfort to people’s lives. Engineers are expected to continue accomplishing these through complete integrity, fairness, justice, and preservation of the environment [1].

Engineers know that safety, health and welfare of people, as well as the preservation of environmental beauty, all depend on their judgment and decisions. They are expected to render their services with utmost care and attention paid to human safety, and be committed to the highest level of engineering ethics [1]. Following is an excerpt of code of ethics by *National Society of Professional Engineers* [2]. Most professional engineering societies in North America, Europe, and elsewhere in the world, have adopted similar codes of ethics for their members.

“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 that requires adherence to the highest principles of ethical conduct.

Fundamental Cannons

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 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.*

Professional Obligations

1. *Engineers shall be guided in all their relations by the highest standards of honesty and integrity.*
2. *Engineers shall at all times strive to serve public interest.*
3. *Engineers shall avoid all conduct or practice that deceives the public.*
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.*
5. *Engineers shall not be influenced in their professional duties by conflicting interests.*
6. *Engineers shall not attempt to obtain employment or advancement or professional engagement by untruthfully criticizing other engineers, or by other improper or questionable methods.*
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.*
8. *Engineers shall accept personal responsibility for their professional activities. 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.*
9. *Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interest of others". [2]*

Reasons for Deviating from the Code of Ethics

In order to cultivate engineering ethics in engineers, we need to find out the reasons for one deviating from them.

The code of ethics may be violated by an engineer because of one or more of the following reasons [3]:

1. Not being familiar with the code, and not knowing the correct procedure for performing one's job appropriately.
2. Carelessness in one's work and duties, and not having any sense of belonging to the company or the institution one works for.

3. There are no rewards for observing the code of ethics and doing things right, nor is there any punishment for disobeying the code, and doing one's job wrong.
4. Reasons of self-interest, which may be for the acquisition of wealth, fame, and/or power.
5. Being desperate.

Engineering of Ethics

In order to cultivate ethics in engineers or to “engineer ethics”, we need to pay attention to the reasons for their violating the code of ethics.

Observing ethics in engineering, or in any other profession, is similar to observing the rules and regulations in driving automobiles, or other vehicles.

First, the codes of ethics should be developed by professional societies, and be kept up-to date. We then need to educate engineering students of the codes of ethics in their profession. The rules of conduct, the punishment for violating the codes, as well as the rewards for observing them, should be made clear to engineers. Companies and institutions hiring engineers should take care of engineers' material needs, so that they will not violate the code out of desperateness.

Out of the reasons mentioned earlier for deviating from the code of ethics, there remains reason number 4, which is the reason of self interest. It is for the acquisition of wealth, fame, and/or power, which many people believe lead to attaining happiness. It is this point which we like to pay more attention to in this paper. We like to assert that, instead of seeking wealth, fame and power in order to be happy, we need to render unselfish service, observe ethics in our profession, and cultivate human values in ourselves. This process will bring us material comfort, as well as long-range or life-time happiness.

Cultivation of engineering ethics, or “***engineering of ethics***”, is based on the following belief:

1. For whatever we are doing there is always a better way of doing it. We need to find it out.
2. For whatever life style we have there is always a better way for it too. We need to find it out.
3. This effort is a dynamic one, and should be considered as a continuous task in our life.

4. Betterment of our efforts should be aimed at maximizing our life-time, or long-term, happiness, for which we are living on this planet.
5. The greatest long-range happiness comes from ***rendering of the most effective and unselfish service to those who need it most.***
6. ***This service should be accompanied with unconditional love for those we serve, and cultivating of human values in ourselves.***
7. *Rendering of the most effective and unselfish service to those who need it most is the most proper way of thanking the Universe for all we have, and all we have accomplished.*
8. To be able to render the most effective service, we need to keep our knowledge up-to date at all times.
9. Ethics is considered to be the highest quality one can possess in one's profession.
10. Social, industrial and economic progress of any society is achieved when people possess human values and have love for their country, for nature, and for environment, as the whole. In these societies, the engineers follow their codes of ethics, are creative, and have a sense of belonging to their institutions and to their country.

We can also mention the following criteria for progress in a society:

- a. Genuine desire and motivation for success and prosperity,
- b. Honesty in all aspects of life—thoughts, words, and behavior,
- c. Doing one's duties with complete care and accuracy, and within a specified time limit,
- d. Hard work and persistence,
- e. Respect for others' rights, and believing in holistic development,
- f. Proper utilization of natural resources such as water, energy, materials, food, etc.,

g. Self-confidence and self-reliance.

If we somehow evaluate the above qualities possessed by people in different societies, we find out that the progress of different nations in science, technology, economics, etc. depend highly on the possessing of these values.

Methods of Attaining Long-range Happiness

Engineering of ethics is based on the belief that by observing ethics in our profession, we can increase our happiness. Discussion follows.

There is an order in the Universe, called Universal Order. There is nothing which can occur that is not according to this Order. According to this Order, we are born to be happy, or we are here on this planet to be happy. All events in our lives are intended by the Universe to maximize our life-time, or long-range, happiness. We can therefore consider the job we have, or the work we are engaged in, as opportunities provided for us (according to the Universal Order) just for this purpose.

We observe that people everywhere are seeking happiness. But majority of them pursue happiness through acquiring more wealth, or fame or power. These efforts can bring physical comfort and conveniences in life, and not necessarily peace of mind and happiness [4].

To maximize our life-time happiness, we need to change or modify our attitudes, and re-examine our belief system for securing happiness, so that every one of us can state the following [3, 4]:

- 1 I accept that there are joys in life much deeper than the physical pleasures.
2. I accept that I alone am responsible for my happiness, or the lack of it, in my life.
3. By re-examining my belief system, or adopting a new one, I can increase my long-range happiness.
4. I accept that the greatest happiness can be attained through *rendering of the most effective and unselfish service to those who need it most, along with unconditional love for them.*
5. Depending on my talents and interests, I select an activity that I can render the most effective service. I prepare for it fully. I keep on visualizing that I am successful in serving those who need it most, giving them unconditional love. I am therefore very happy.

6. I accept that the Universe is abundant and is very generous. Depending on my efforts, and my possessing of human values and engineering ethics, I trust Universe to meet more than my needs. The generosity of the Universe in providing for me may be expressed by the following equation:

$$CU = 10^S$$

Where CU represents the generosity or the cooperation of the Universe for the service (S) I am rendering. This service is to the people who need it most, accompanied with my unconditional love for them, while I possess human values and engineering ethics.

7. In the service I undertake, I never think of wealth, fame, or power that it might bring me. I only think of *rendering of the most effective and unselfish service*. If it brings me such fortunes, I never become conceded and arrogant, but use them to even serve more effectively and unselfishly.
8. I use my knowledge and all I have in my power to plan my activities in the most proper way possible. I consider the results, whatever they might be, as valuable experience to be used for my future activities.
9. I consider whatever happening to me, and the situation and the condition that I am in, here and now, as the result of the thoughts, actions and the deeds I have put out to the Universe in the past. The Universe, having my welfare and long-range happiness in mind, has provided it for me in a complete love and affection. I therefore consider this condition as to be the best possible situation.
10. I think only of good qualities of people who occupy my mind. I wish only well for everybody.

References

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Today

I resolve

To render the most effective and unselfish service

To those who need it most, along with

Unconditional love for them, and

Cultivating human values and

Engineering ethics in myself.

With this resolution, and with the generosity of the Universe, I will have comfortable material life, and will attain the highest degree of peace, and long-range happiness.