Professionalism and Ethics of Engineering

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ABSTRACT: Ethics is the branch of philosophy that involves systematizing, defending, and recommending concepts of right and wrong conduct. Ethics is qualitative. It may change with time, circumstance and environment. Practice of ethics requires proper understanding of the time frame. Many professional engineering organizations have a set of Code of Ethics or Code of Practice to regulate or guide their members. Basically they all center around public welfare, sustainable development, professional competence, truthful and faithful, honorable, responsibly and lawfully. Success of engineering projects not only depends upon the engineering professional, but it also closely related to other non-engineering professionals. In the paper, discussions are presented about engineering ethics for non-engineering professionals.

KEYWORDS: Ethics, Engineering ethics, Professionals, Attitude, Conscience.

1. INTRODUCTION

1.1 Wikipedia

A "professional" is a member of a profession or any person who earns their living from a specified activity. Undoubtedly, engineers are professionals. Engineers' contribution to the mankind is unlimited. They affect the advancement of civilization and sustainability of the world.

Most professionals are subject to strict codes of conduct enshrining rigorous ethical and moral obligations. This is even more so for the engineering profession. Sir John Armitt, in his interview with the New Civil Engineer magazine (2015) as the incoming President of the Institution of Civil Engineers UK, stated "The role of engineers should be to create excitement about opportunities around new products, new materials, new ways of doing things." "We have to be showing the opportunity and advantage in overcoming the innate conservatism in clients who want safe investment and to be assured."

Ethics is the branch of philosophy that involves systematizing, defending, and recommending concepts of right and wrong conduct. As a branch of philosophy, ethics investigates the questions: "what is the best way for people to live? and "what actions are right or wrong in particular circumstances?" In practice, ethics seeks to resolve questions of human morality, by defining concepts such as good and evil, right and wrong, virtue and vice, justice and crime. Applied ethics concerning what a person is obligated (or permitted) to do in a specific situation or a particular domain of action.

Ethics is qualitative, not like engineering design work which is quantitative. Ethics may change with time, circumstance and environment. Practice of ethics requires proper understanding of the time frame.

1.2 Encyclopedia Britannica

The ethics or morality of person or group consists not merely in what they habitually or customarily do but in what they think it is fitting, right or obligated to do.

The central concern of moral philosophy has two tasks:

(i) Of analyzing the meaning and nature of this normative moral element in man's action, thought and language.
(ii) Of evaluation this element by presenting and appraising criteria for justifying rules and judgments of what is morally right and wrong, good or bad.

2. CODES OF ETHICS FOR ENGINEERS

Practically speaking, every professional organization or organizations supervising conduct of engineering professionals around the world have a set of Code of Practice and/or Code of Ethics. The following quotes some of the more notable ones.

2.1 International Federation of Consulting Engineers (FIDIC)

(1) Responsibility to Society and the Profession
(2) Competence
(3) Integrity
(4) Impartiality
(5) Fairness to others
(6) Corruption

In addition, FIDIC has two important statements. They are:

(1) Work of the engineering profession is critical to the achievement of sustainable development of society and the environment.
(2) Society must respect the integrity and trust the judgment of members of the profession and remunerate them fairly.

2.2 US. National Society of Professional Engineers (US-NSPE)

In the 2007 revision of the Code of Practice, the US-NSPE states that Engineering is an important and learned profession. Engineers are expected to exhibit the highest standards of honesty and integrity. Services provided by engineers require honesty, impartiality, fairness and equity.

The US-NSPE Code contains:

(A) Six Fundamental Canons
  (i) Hold paramount the safety, health and welfare of the public.
  (ii) Perform services only in areas of their competence.
  (iii) Issue public statements only in an objective and truthful manner.
  (iv) Act for each employer or client as faithful agents or trustees.
  (v) Avoid deceptive acts.
  (vi) Conduct themselves honourably, responsibly, ethically, and lawfully so as to enhance the honour, reputation and usefulness of the profession.
(B) Five Rules of Practice
(C) Nine Professional Obligations

2.3 Chinese Taipei APEC Engineers

The 2004 edition of the Chinese Taipei APEC Engineer Code of Ethics has the following four statements.

(i) Responsibilities to the Society.
  •Dedicate and adhere to the law
  •Respect nature

(ii) Responsibilities to the Profession.
- •Commit to Professionalism and duty
- •Be creative and enterprise

(iii) Responsibilities to the Client.
- •Render services with sincerity
- •Faithfully seek mutual benefit

(iv) Responsibilities to the Colleagues.
- •Cooperative with specialists in other fields
- •Insure the continuity of professional contributions

2.4 The Board of Engineers Malaysia (BEM)

In Circular (No. 3/2005), the BEM's Guidelines for Code of Professional Conduct contains the following five sections.

(i) A registered Engineer shall at all times hold paramount the safety, health and welfare of the public.
(ii) A Registered Engineer shall undertake assignments only if he is qualified by education and experience in the specific technical fields in which he is involved.
(iii) A Registered Engineer shall issue public statement only in an objective and trustful manner.
(iv) A Registered Engineer shall act for each employer or clients as faithful agent or trustee.
(v) A Registered Engineer shall conduct himself honorably, responsibly, ethically and lawfully so as to enhance the honor, reputation and usefulness of the profession.

2.5 Summary

(1) Ethics is one of the most important elements for the engineering profession. It is a philosophy, abstract and not quantitative.
(2) Every professional organization has their own Code or Practice of Ethics. Basically, they all center around the following:
   (i) For public welfare, public health and sustainable development
   (ii) Competence
   (iii) Truthful and faithful
   (iv) Honorable, responsibly and lawfully

3. ETHICS FOR NON-ENGINEERS

3.1 Engineering Projects

To carry out any engineering project successfully, whether big or small, cooperation and mutual respect among all the professionals and non-professionals are essential. They include:

- •Client or owner (public or private),
- •Engineering professional (planning, design and management),
- •Constructors (execution).

Engineers' duty covers time period from before event, during design, during construction, and post construction. With the advancement of world economy, types and formats of construction contracts have expanded from simple and conventional design–bid-build to design-built, BOT, BOO etc., where closer coordination and cooperation among all parties become of paramount importance. Although every sector has their own ethics for practice, but the mutual understanding and coordination are essential. The line between ethical versus lawful sometimes is vague and difficult to delineate. However, it is important to understand and appreciate each other.

3.2 Ethics for Non-engineers

The following section, discuss some of the ethics requirements for non-engineers which have great effect or impact on engineering professionals.

3.2.1 Academic Ethics

Before an engineering professional is qualified to become a professional, he or she has to go through a series of training including formal schooling and post-graduation practical training. The behaviour of teachers and professors has immeasurable effect and impact on youngsters.

The four most important ethical or responsible conducts for academics are:

- •Misconduct
- •Fabrication
- •Falsification
- •Plagiarism

One of the most commonly asked question is "should university faculty members be allowed to compete with the professional consulting firms?" In the writer's opinion, university faculty members are specialists, experts, and/or authorities. They should be advisors to the consulting industry and not directly involved in the execution work. This is also an example of academic ethics.

Other academic ethics involve accreditation of degree programs and assessment of academic qualifications.

Charles M. Vest said in his speech as MIT's President in 2005 "Educating Engineers for 2020 and beyond – how to get students to think about professional ethics and social responsibility is always an important issue.

3.2.2 Ethics for Other Professionals

As explained in previous sections, an engineering project can only be successful if and when close communication and coordination among all people involved in the project are carried out as illustrated below:

- Client (owner) -
  - Administration
  - Financial
  - Legal
  - Audit
- Planning & Design -
  - Professionals
  - Planners
  - Architects
  - Engineers
- Construction -
  - Professionals – Architects, Engineers
  - Constructors
  - Technicians & labours
  - Procurement

Therefore, besides professional engineering staff, all others who are involved in the projects should also observe and respect the engineering ethics. The following lists some of the important items for which engineering ethics are involved: determination of reasonable budget, selection of codes and specifications, fairness of conditions of contracts, transparent selection process, respect intellectual properties, reasonable and fair payment conditions, time extension, project acceptance, and project guarantees. The last but not the least is the so called "favouritism to people versus favouritism to government treasury."

4. PROFIT AND ETHICS

The following questions are often asked, particularly for public works or other government financed projects. They are:

(i) Should the professional (engineers) make any profit?
(ii) How to determine the profit margin?
(iii) What is "reasonable" profit?

Engineering professionals belong to the service industry with special qualifications and experience. The work or product produced by engineering professionals are based on manpower inputs which involve physical input, intellectual input, research and

development, and facilities. Profit for professional services must be reasonable, ethical and legal. It is to encourage the professionals to advance and to improve. It provides encouragement and motivation. Most important of all, selection of professional service should be "quality-based" not price-based.

5. SUMMARY

In summary, the following points are emphasized:

(1) To carry out professional services, the engineering professionals must observe "engineering ethics", including respect laws and rules, provide sincere and proper services, and maintain dignity and honour.
(2) Engineering ethics must be applied to the whole society, including educators, professionals, workers, and clients (government as well as private).
(3) Ethics is abstract and philosophical. It depends greatly on "Attitude" and "Conscience".

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