Biomedical Engineering Ethics

Hilal KANBER

Ankara University
Department of Biomedical Engineering

Development of Engineering Ethics Studies

1700s, Age of Enlightenment
Many Europeans first came to believe that enlightenment, that is, **scientific learning**, would **bring peace**, **prosperity** and **continuous improvement**.

With the Age of Enlightenment, people began to act on the **belief that the world could be made much better.** Engineering has this belief built into it.

The concept of 'engineering ethics' has emerged with the aim of preventing the unrecognized rule that comes to the fore in the globalization process and organizing the competition within the profession.

Development of Engineering Ethics Studies

Unlike Medicine, there was no clear Request for Engineers to express their views on Ethical Issues affecting their profession.

Whereas, it isn't possible for a doctor to think about the ethical issues related to **abortion** or **euthanasia** around him/her

Similarly it is unacceptable for also an engineer not to think about equally effective and serious ethical engineering issues.

In other words, **it isn't possible for engineers to stay away from ethical issues more than doctors**.

History of Engineering Ethics Codes

In order for a job to be counted as a profession; professional knowledge should be used for an ethically commendable purpose and colleagues should be subject to standards collected under ethical rules.

Until the early 1900s, engineers lacked distinctive ethical standards. They did not see the need.
There were relatively few engineers.
Seemed likely to continue to increase rapidly by 1900, most engineers were young.

Old systems of apprenticeship were being swamped.

History of Engineering Ethics Codes

We said that engineering is a "new power in the world"

Power, neither **Good** nor **Bad**, but **Dangerous**

Because of the scale on engineers work,
engineering is particularly dangerous.
So engineers realized this, set about to assure that engineering would be used for good rather than evil.

They organized as a profession, adopted codes of ethics,
tried to put the codes into practice.

At the beginning of the 20. century, starting from the idea
that the **social image of engineering** wasn't
as strong as doctors and lawyers, their deficiencies as a
profession were questioned and
ethical rules were started to be established.

History of Engineering Ethics Codes

The old men of the profession naturally sought new means to do what they could no longer do by the old. A formal code of ethics must have seemed one way to help the young understand what was expected of them. So, early in this century, each of the major engineering societies set up a committee to Draft a Code of Engineering Ethics.

The drafting proved harder than expected.

The first studies on the establishment of engineering ethics rules in the world were made mainly in the USA. With the formation of the concept of engineering profession, 'The American Institute of Architects' established rules that Regulate Professional Competition in 1870.

History of Engineering Ethics Codes

All of these First Rules relate to the professional behavior of engineers who work in the market or have an office. For this reason, the phenomenon of **autonomy** of mostly engineers **working with salary** in a government agency or private company with non-engineer boss has been ignored.

The First Ethical Codes issued were accepted at the level of **Personal Responsibility** with the obligation to keep **Public Interest** at the top

and

there was no concern about being an element of professionalism.

This situation continues to a great extent today.

History of Engineering Ethics Codes

But when many more public and individual projects, such as bridges, tunnels, factories, individual or public transport, and power stations, started to hurt the public, this thought began to change and led to the creation of broader ethical rules by professional engineering communities.

'American Society of Civil Engineers, ASCE' and
'American Institute of Electrical Engineers, AIEE'
soon prepared a draft in 1907,
with suggestions on ethical issues on the AIEE.

In 1912, the first engineering code of ethics was determined by AIEE, the same principles were accepted by 'American Institute of Chemical Engineers, AIChE' that year and by 'American Society of Mechanical Engineers, ASME' in 1914.

History of Engineering Ethics Codes

Founded in 1932, 'Engineering Council for Professional Development, ECPD' (Accreditation Board for Engineering and Technology, Inc., ABET) issued its first code of ethics in 1947 in terms of being a partner for engineers,
and finally in 1977 has revised.

The **Oath of Engineers**, which is seen as the essence of ethical principles, was accepted in 1954 by 'National Society of Professional Engineers, NSPE' in the USA. These basic principles, adopted by 82 engineering organizations operating in the USA in 1955, are still used today with various updates.

Also 'The World Engineers Association' adopted the 'Code of Engineering Ethics' in order to help its affiliated institutions in 1977.

History of Engineering Ethics Codes

Over time, ethical rules have been published by many different international professional engineering communities that contain similar values for engineers.

'World Federation of Engineering Organizations, WFEO', in its ethical codes accepted in 2001; emphasized the importance of issues such as **Loyalty**, **Competence**, **Equality** and **Integrity in the workplace**, **professional responsibility** and **leadership** towards customers and employers with sustainable development, protection of the society and the environment.

The common emphasis in the ethical rules of organizations is the need for engineers to use their professional activities with **Social Responsibility Awareness** and only for **Social Benefit**.

Turkey/History of Engineering Ethics Codes

2003, Congress of TMMOB (Türk Mühendis ve Mimar Odaları Birliği); the title of "Professional Conduct Principles that the engineers should consider in their work, the task of developing 'Ethical Rules', which will guide their decisions in applications and audits, have taken place.

Emphasized that future engineers should recognize the effects of their work on society, their resulting personal responsibilities, the values that help them make decisions and ethical dilemmas.

For this purpose, it has been adopted to punish members who do not comply with professional ethics with sanctions up to dismissal.

…then all the chambers have determined ethical rules representing their engineering fields.

History of Engineering Ethics Codes

There were 'Inconsistencies'...

First codes were criticized almost as soon as they were adopted. Though they often speak of "Employers" as well as of "Clients" the early codes seemed designed primarily for the **Engineer who isn't Dependent on anyone of them**.

The majority, **engineers who are without significant management responsibilities**, seemed almost Forgotten.

But most serious, sometimes One Code Permitted Conduct Others Forbad.

Engineering codes of ethics were undertaken revisions more than once.
Chief among the explanations often advanced for the number of codes is that engineering is simply too diverse for one code of ethics to apply to all.

History of Engineering Ethics Codes

Some engineers are independent practitioners.
Some are employees of large organizations.
Some are managers.
Many are closely supervised.
Some, whether in large organizations or on their own, are more or less their own boss.

In sum, engineering is not a single profession but a family of historically related professions.

Thinking of codes of ethics as moral rules rather than legal rules seems to suggest new difficulties. If codes of ethics are merely moral rules, why worry about them at all? Why should each engineer not let his private conscience be his guide?

Why Engineers Should Obey Their Profession's Code?

Imagine what engineering would be like if engineers did not generally act as the Canons require.

If engineers didn't generally hold paramount the safety, health, and welfare of the public,
what would it be like to be an engineer?

The day-to-day work would be much the same.
But an engineer might be asked to do something which, though profitable to employer or client and legal, would put other people at risk, some perhaps about whom she cared a great deal.

Without a professional code,
an engineer couldn't object <u>as an engineer</u>.

The engineer would be under tremendous pressure to keep own "personal opinions" to oneself and get on with the job.

Why Engineers Should Obey Their Profession's Code?

Engineer's interests would conflict with
own interests as a person; conscience etc.
No one wants to be forced to choose between conscience
and self-interest.

Using a Code of Ethics

The more detailed a code, the more guidance…
Well, is this the right answer? How are we to know we
have? We can go through a **Check list**. But how are we to
know that the list is complete? **Past experience** is an
indication, but now and then something unprecedented
occurs. So, what are we to do?

In engineering ethics, **it is often easier to demonstrate
the fault of alternatives than to demonstrate that
this or the other answer must be right**.