Engineering Ethics is Fundamental to Sustainable Development in the Engineering Colleges

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Abstract. The university is the cradle of cultivating engineers, engineering communities’ lack of engineering ethics consciousness would cause corruption, engineering quality problems. The cultivation of engineering ethics requires the joint efforts of the state, society, school and individual, country promote virtue and promote positive energy and punish evil; Social supervision institutions play normal function; At School, engineering ethics idea penetration to each teaching link, personal lay ethics, professional ethics, laws and industry standards to heart, and the project of quality would be a perfect combination of the environmental benefits, social benefits and economic benefits.

1. Introduction

Engineering accidents happened repeatly in China in recent years, the central, all levels of government, the media and the general public anger were all angry, they asked condemn and strictly punish persons in charge, those responsible engineering accident have also accepted the law severely, however the most obvious criticism of engineering accidents is its links to rampant corruption. When engineering accident happened, it often shall be investigated for responsibility from the improper design, unqualified construction quality, improper material shortage, supervision and even political perspective, But rarely in the professional ethics of the engineering community level to consider and seek to improve methods. And all kinds of engineering accidents its cause contain the issue of engineering ethics. It is obvious that infusion of engineering ethics and professional ethics concept is imminent. Modern engineering are usually large investment funds, link is various, including the bidding, planning, design, production and acceptance and so on, each link will encounter many dilemma choice, if the choice is right and can be solved, then would ensure the safety of engineering, improve the quality of engineering, resolve engineering disputes, shorten project cycle, ensuring the project quality. But usually in the solution of the dilemma there are no standard procedures and methods, so it is very necessary that To make the right ethical choice under the relevant ethics, cooperate to engineering ethics education, community education project in engineering problems in order to achieve the effect to prevent corruption and engineering accident.
2. The Evolution of Engineering Ethics

Ethics (Ethics) is a science that systematic thinking and studying on the human moral life, about the establishment of good moral and realization ways.

The aim of ethics is to explore people's behavior nature, judge the behavior of good and evil and conduct, discuss the moral principle, moral evaluation and moral choice, analysis purpose and means of people.

The essence of modern ethics is the absolute normative science, and philosophical discussion and practical behavior. It studies moral and all kinds of social phenomenon, through the establishment of judgment standard and code of conduct, from the height of the philosophy to reveal the essence of morality, the principle of moral norms, moral function and laws of changes and developments, and so on.

French sociologist Love Milton, Durkheim thought "the law is the social rules, regulations from official, it is in relation to the whole social common basic values and habits and will be able to play a mandatory role of individual and beyond the individual". Morality and law are two sides in playing the same social integration function to the people. Morality is the basis of legal, law is the guarantee of moral. Shaw Xiaofang summarized "law is the minimum standards of ethics and the law itself is the limitation of structure, including the limitation of finiteness and the limitation of the law and legal use of finiteness". These restrictions is not enough to completely correct and guide people's behavior only relying on law, and need to be assisted to ethics, moral as the basis of rationalization, to make up for the law cannot cover.

From engineering perspective, ethics moral is tend to focus on moral-related problems facing engineering problems and decision making for the engineering community; From the development of science and technology perspective, for engineering community, engineering ethics focuses on the moral behavior, characteristics and concept of the problems coming from engineering. Engineering ethics can be seen as engineering accident prevention measures, engineering ethics is defined as the study of community itself, the content of the research is of power and responsibility, the purpose is of the study in order to analysis and solve the problem of the ethical conflicts in engineering correctly, the core of ethics moral studying is engineering community’s behavior and decision criteria.

Engineering ethics education is the basis of engineering ethics research, which is the core issue of it. A full ethical education can be practiced only holding good codes of engineering ethics.

Engineering ethics problems, in terms of engineers, when he is a representative of the engineering community, common engineering ethics for him has five categories: one is the difference in ethical sensitivity, he is often in a dilemma. Due to the ethics or codes are abstract in the law, everyone's understanding and grasping is different, in fact, some people don't know how to choose when faced with a dilemma. Even some people have no attention for their own ethical situation, and drop in themselves in an unethical situation. One when he confronted ethical problems, how to make a judgement and choice, will be affected by the internal factors (ethics sensitivity, values, knowledge, etc.) as well as the external factors (social pressure of public opinion, the enterprise culture, etc.). The second one is that it is coming from managers' pressure. Engineer is the implementer of one project, but he still carry out the enterprise manager’s instructions. From the benefit of the enterprise itself the enterprise managers asked engineers to make modification of design, shorten the construction period and cheating on workmanship and materials, engineer facing these pressure, thinking of his income, job
prospects, and even life safety threatened at the same time, how to make the right engineering ethical decisions, in addition to the moral and values, also his perseverance, intelligence and ability are all tested. If the engineer does not accept the manager's instructions, usually need to pay a heavy price. The third one is the personal fame and wealth temptations. Illegal interests in engineering is often wandering in the edge of the law and morality, engineers solve the difficulties in a variety of professional engineering, also face the temptation of their own personal fame and wealth. Some engineers often have the idea of trusting to luck, embark on the criminal road. The fourth one is that whistle-blowing is difficult. If engineers find shortcomings in the quality of engineering that endangering public security and other issues and put forward to report, they will immediately face serious harms to the life safety of themselves and their family from huge interest group of revenge. And in many China's private enterprises, the company pays more attention to employee loyalty, even some engineers try to report the violation behavior in engineering, there not a complete set of measures to protect whistleblowers or regulations. The fifth one is from the natural environment. For a large engineering project, it is inevitable that it would destruct the natural environment. When the engineering community promoting the project, they consider economic input more and considering the less damage about the natural environment. The essence of the natural environment problems is the contradiction and conflict between personal value and social value, personal interests and social interests, the solution of the dilemma is more dependent on strict supervise and environmental protection policy.

3. The Present Situation and the Existing Problems of Engineering Ethics Education in Colleges and Universities

College students are the new force of modern society, as well as the future backbone of the society, even the critical force of social development. Therefore, in the ideological quality education of college students, environmental protection education cannot be left out, this is a required attribute. But at present, it is regrettable that the vast majority of colleges and universities in addition to the environmental protection professional students has not set up compulsory courses related to the protection of environment, even courses-related environmental tend to hurry in our country. In 2016 year, the G20 summit held in Hangzhou has attracted attention all over the world, but our college students did not pay enough attention, even quite a few students don't know this thing. Ignoring environmental events and indifference, it's not an exception in groups of college students. Due to the increase of social pressure, job searching becomes the priority of the modern college students, which leads to the environmental consciousness of college students is still in high school students' level of moral character. Even various environmental policies have been put into affection, our university education is still not timely follow up, not to take corresponding measures to improve student's environmental protection consciousness, the environmental education in colleges and universities is facing the severe situation. Needless to say, today, for china, environmental protection is extreme importance, and also for college students, who are the backbone of the future society. Therefore, to realize the Chinese dream blueprint, improving the environmental awareness of college students is an indispensable measure. College students are the future of society, their cognition of environmental protection, will influence the future of our country to a great extent.
As engineering colleges’ students, the formation of engineering ethics or not will decide his life career. Now, in addition to the colleges participating in the project certification of colleges and universities, the vast majority of colleges and universities, especially engineering colleges and universities is still in the state of zero for the cultivation of engineering ethics, this would lead to works corruption in the future, it is the biggest hidden dangers.

4. Advice about Engineering Ethics Education

4.1 Promote Ethical Sensitivity

Most engineers get into trouble on ethical issues, maybe who have not some sort of a character flaw, but because they don't realize what they are faced with of an ethical problem, made a bad or inappropriate decision, sullied his reputation, make their own life compromised. The engineering ethics education, which can make students understanding what quality engineer should have and what can be done in the engineering practice, what behavior is a violation of professional ethics and what actions cannot to be done. The aim is to let students understand how should deal with the relationship between the various stakeholders in the future when they are in the face of certain moral dilemma. Finally, an engineering ethics education can make engineering college students realized that a responsible engineer, in the work should not only responsible for the product, engineering, to some risks, for something they should respect customers and the autonomy of the public.

4.2 Increasing the Ethical Knowledge

Combine ethics and professional knowledge, integrate the abstract concept of ethics to into the daily learning and work, especially how to realize the ethical idea. At university stage, in the first place, ethics as a course can cause the attention of students. Through the study of ethical knowledge, make the engineering college students broader knowledge of ethics in the future project decisions, design, management and evaluation, helps to guarantee the quality of engineering.

4.3 Promotion Ethical Judgment

By studying engineering ethics rules, help the engineering college students know about professional ethics more comprehensive, more in-depth. In order to achieve the university student to the ethical judgment, of course, the first thing is to have a complete and operable ethical rules, not simply based on the theory and concepts, and to indicate consequence after the destruction of the consequences of ethical norms, in order to achieve the role of warning.

4.4 Moral Willpower

To some extent, improving engineers’ moral willpower can reduce jeopardize from their behavior to the natural, the social and the public. Through the cases, its purpose is to let students view think and express in the context of a specific ethical case. Especially Through some negative cases, to alert students that they should resist some actions against the ethical and moral in engineering practice of the future, develop their own explicit and implicit knowledge. For example, modified organisms of Monsanto’s genetically have overt and covert influence on human itself and the environment.
4.5 The Promotion of the Positive Energy of the Whole Society on the Formation of College Students' Engineering Ethics

The ancients cloud “If you live with a lame person you will learn to limp”. If the positive energy is lack while the negative energy is spread in the whole society, then university education will be of no avail no matter how the contents of the teacher's lesson plan is complete, how to perfect the teaching design and to vivid lectures. All kinds of social atmosphere will have a great influence on college students, because the school is just a small element in the entire society, although it has the function to wash dirty ingredients in the soul, but it is closely linked with the society. In the so advanced information era, the university is no longer the ivory tower. If a society can draw a clear demarcation between whom or what to hate or love, punish severely ugly behavior, promote the beauty of civilization, then the formation of ethics is also a matter of course. The outlook on life, values and aesthetics have great influence on the formation of College Students' engineering ethics. Since the 18th CPC National Congress, the government's determination and enforcement efforts to punish corruption is the embodiment of positive energy, it will play a good role in guiding the engineering ethics education in colleges and universities. At the same time, specification and supervision measures of engineering ethics should be formulated as soon as possible, then, the future engineers come from the university will be a generation of professional ethics, sustainable development in China will be able to count for the days. Einstein once said, "It is not enough to educate people with professional knowledge. Through professional education, he can become a useful machine, but cannot be a people of harmonious development. It is the most basic to make the students understand the value and produce intense feelings. He must have a distinct sense of beauty and moral goodness. Otherwise, he, along with his professional knowledge, is more like a well-trained dog than a man of harmonious development.

Summary

Environmental protection is the responsibility of all mankind; everyone should pay attention to Environmental issues. Environmental protection is neither a slogan, nor a gimmick; it is a small thing that everybody can do in daily life. We should cultivate good living habits. For example, put the rubbish in the garbage pigeon-hole, do not throw litter, do not spit everywhere, Save water, the tap tight, Collect home waste water to flush the toilet, Save electricity, turn off the lights, protect plants and trees, don't casually pick off branches and arbitrarily trample on the lawn, try not to use plastic bags and disposable lunch box, reduce the white pollution and so on. In work, we need to integrate environmental benefits with economic benefits and social benefits to solve the engineering problems. We need to integrate sustainable development with engineering ethics to protect the interests of future generations. For the government, it is necessary to incorporate economic ethics into the scope of the assessment of managers. For managers, it is necessary to perfect the supervision mechanism in order to make the engineering ethics become a visible, tangible constraint. For engineers, environmental ethics should be a code of conduct like the law. Then, the revival of China will soon become true.

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