

9

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SENSES OF ENGINEERING ETHICS

SENSES OF 'ENGINEERING ETHICS' :

(The word ethics has different meanings but they are correspondingly related to each other. In connection with that, Engineering ethics has also various senses which are related to one another.)

Comparison of the senses of Ethics and Engineering Ethics:

Ethics

1. Ethics is an activity which concerns with making investigations and knowing about moral values, finding solutions to moral issues and justifying moral issues and justifying moral judgments.
2. Ethics is a means of contrasting moral questions from non-moral problems.
3. Ethics is also used as a means of describing the beliefs, attitudes and habits related to an individual's or group's morality. Eg. : Ethics given in the Bhagavat Gita or the Bible or the Quran.
4. As per the definition of dictionaries 'moral principles' is about the actions and principles of conduct of the people. i.e. ethical or unethical. obligation, rights and ideals in engineering and by applying them to take a correct decision.

Engineering Ethics

1. Like the ethics, engineering ethics also aims at knowing moral values related to engineering, finding accurate solutions to the moral problems in engineering and justifying moral judgments of
2. Engineering Ethics gives a total view solve these issues specifically related
3. Engineering ethics is also using some currently accepted codes and standards which are to be followed by societies.
4. Engineering ethics also concerns with discovering moral principles such as

The Senses of Engineering Ethics:

- An activity and area of inquiry.
- Ethical problems, issues and controversies.
- Particular set of beliefs, attitudes and habits.
- Morally correct.

VARIETY OF MORAL ISSUES:

There are so many engineering disasters which are greater / heavier than the level of acceptable or tolerable risk. Therefore, for finding and avoiding such cases such as nuclear plant accident at Chernobyl (Russia), Chemical plant at Bhopal (India) where a big disaster of gas leakage, occurred in 1980, which caused many fatal accidents. In the same way, oil spills from some oil extraction plants (the Exxon Valdez plant), hazardous waste, pollution and other related services, natural disasters like floods, earth quake and danger from using asbestos and plastics are some more cases for engineering disasters. These fields should be given awareness of engineering ethics. Hence, it is essential for engineers to get awareness on the above said disasters. They should also know the importance of the system of engineering.

Skills for improving moral autonomy :

1. The engineers must have the competence for identifying the moral problems and ethical issues related to the field of engineering – they must have the ability to distinguish and relate these moral problems with the problems of law, economics, religions principles etc. They must possess the skills of understanding, clarifying and assessing the arguments which are against the moral issues.
2. They must have the ability to suggest the solutions to moral issues, on the basis of facts. These suggestions must be consistent and must include all the aspects of the problem.
3. They must have the imaginative skill to view the problems from all view points and also be able to suggest a proper alternative solution.
4. They must be able to tolerate while giving moral judgments and decisions which may cause trouble. i.e. they have to understand the difficulties in making moral decisions.
5. They must have adequate knowledge and understanding about the use of ethical language so as to defend or support their views with others.
6. They must have some better knowledge in understanding the importance of suggestions and better solutions while resolving moral problems and also about the importance of tolerance on some critical situations.
7. They must understand the importance of maintaining the moral honesty i.e. the personal convictions and beliefs and individual's professional life must be integrated. They must have this skill of doing so.

KOHLBERG'S THEORY :

Moral Autonomy is based on the psychology of moral development. The first psychological theory was developed by Jean Piaget. On the basis of Piaget's theory, Lawrence Kohlberg developed three main levels of moral development which is based on the kinds of reasoning and motivation adopted by individuals with regard to moral questions.

The Pre Conventional Level

It is nothing but self-centered attitude. In this level, right conduct is very essential for an individual which directly benefits him. According to this level, individuals are motivated by their willingness to avoid punishment, or by their desire to satisfy their own needs or by the influence of the power exerted by them. This level is related to the moral development of children and some adults who never want to go beyond a certain limit.

Where and How do Moral Problems arise in Engineering?

Any product or project has to undergo various stages such as planning, idea, design, and manufacturing which is followed by testing, sales and services. This has to be done by engineers of various branches like Civil, Mechanical, Electrical, Chemical etc. These engineers may be grouped together as a team or they may be separated from each other with an interconnection or co-ordination.

The method used to solve an Ethical problem:

- Recognizing a problem or its need.
- Gathering information and defining the problem to be solved or goal to be achieved.
- Generating alternative solutions or methods to achieve the goal.
- Evaluate benefits and costs of alternate solutions.
- Decision making & optimization.
- Implementing the best solution.

TYPES OF INQUIRY :

Inquiry means an investigation. Like general ethics, Engineering ethics also involves investigations into values, meaning and facts. These inquiries in the field of Engineering ethics are of three types.

- ✓ 1. Normative Inquiries
- ✓ 2. Conceptual Inquiries
- ✓ 3. Factual or Descriptive Inquiries.

Normative Inquiries:

These inquiries are mostly helpful to identify the values which guide the individuals and groups in taking a decision. These are meant for identifying and justifying some norms and standards of morally desirable nature for guiding individuals as well as groups.

Conceptual Inquiries :

These are meant for describing the meaning of concepts, principles, and issues related to Engineering Ethics. These inquiries also explain whether the concepts and ideas are expressed by single word or by phrases.

Factual / Descriptive Inquiries :

These help to provide facts for understanding and finding solutions to value based issues. The engineer has to conduct factual inquiries by using scientific techniques. These help to provide information regarding the business realities such as engineering practice, history of engineering profession, the effectiveness of professional societies in imposing moral conduct, the procedures to be adopted when assessing risks and psychological profiles of engineers. The information about these facts provide understanding and background conditions which create moral problems. These facts are also helpful in solving moral problems by using alternative ways of solutions.

MORAL DILEMMAS:

Engineering ethics is not only teaching moral behaviour in knowing about immoral and amoral in a set of beliefs, but also increasing the ability of engineers and other professionals to face boldly with the moral problems arising from technological advancements, changes and other related activities.

MORAL AUTONOMY:

Autonomy means self-governing or self-determining i.e act independently. Moral autonomy means the right or the wrong conduct which is of independent on ethical issues. It deals with the improvement of an individual's moral thoughts which make hi to adopt good habits. Moral autonomy is concerned with the independent attitude of a person related to ethical issues.

ENGINEERS AS RESPONSIBLE EXPERIMENTERS:

Engineers have so many responsibilities for serving the society.

primary duty is to protect the safety of human beings and respect their right of consent. [A conscientious commitment to live by moral values].

giving a clear awareness of the experimental nature of any project, thoughtful forecasting of possible side effects, and an effort to monitor them reasonably. [A comprehensive perspective relative information].

unrestricted free personal involvement in all the steps of a project. [Autonomy]

being accountable for the results of a project [Accountability]

exhibiting their technical competence and other characteristics of professionalism.

Engineers shall be completely objective and truthful in all professional reports, statements or mony. They shall include all relevant and pertinent information in such reports, statements or mony.

Engineers, when serving as expert or technical witnesses before any court, commission, or other tribunal, shall express an engineering opinion only when it is founded on adequate knowledge of the facts in issue, their background of technical competence in the subject matter, and their belief in the accuracy and propriety of their testimony.