ETHICS IN ENGINEERING

- What is Meant by Ethics?
- System of moral principles
  - Principles of right and wrong
- Principles of conduct governing behavior of an individual or a group

A person's behavior is always ethical when one:

A. Does what is best for oneself
B. Has good intentions, no matter how things turn out
C. Does what is best for everyone
D. Does what is legal

ETHICS IN AN ENGINEERING COURSE????

We have been studying engineering, such as design, analysis, and performance measurement.

Where does ethics fit in?

How Ethics Fits into Engineering

- Engineers . . .
  - **Build products** such as cell phones, home appliances, heart valves, bridges, & cars. In general they advance society by building new technology.
  - **Develop processes**, such as the process to convert salt water into fresh water or the process to recycle bottles. These processes change how we live and what we can accomplish.

Products and Processes have Consequences for Society:

- If the bridge has an inadequate support, it will fail.
- If the gas tank is positioned too close to the bumper, it might explode from a small accident.
- If the process for recycling bottles produces too much pollution, then it is counterproductive.
- If the process for refining gas produces too much toxins, it harms the local community.

Decisions made by engineers usually have serious consequences to people -- often to multitudes of people.

Ethics and ethical reasoning guide decision-making.

THE ESSENCE OF YOUR ENGINEERING CAREER

- Engineering is one of the most important professions in society.
- As engineers we *don't just build things and develop processes.*
- We build things and make processes *in order to better society.*
- In order to make society better we have to reflect constantly on the products and processes that we make.

Social Responsibility

- One main connection between ethics and engineering comes from the impact that engineered products and processes have on society.
- Engineers have to think about designing, building, and marketing products that benefit society.
- Social Responsibility requires taking into consideration the needs of society.

Typical Ethical Issues that Engineers Encounter

- Safety
- Acceptable risk
- Compliance
- Environmental health
- Conflict of interest
- Honesty/Dishonesty
- Societal impact
- Fairness
- Accounting for uncertainty, etc.

Two Dimensions of Ethics in Engineering

- Ethics is part of engineering for two main reasons.

a) Engineers need to be socially responsible when building products and processes for society.

b) Social responsibility requires professional responsibility.

Part 1: The Code of Ethics for Engineers

Ethics in Engineering

- There are many fields of engineering, such as
  - Civil
  - Mechanical
  - Electrical
  - Software
  - Industrial
- However, there are many ethical issues that arise across all of these fields of engineering.
- The code of ethics for engineers pertains to engineers of all kinds.

Engineers should follow their professional code of ethics because:

A. The public will trust engineers more if they know engineers have a code of ethics.
B. It helps them avoid legal problems, such as getting sued.
C. It provides a clear definition of what the public has a right to expect from responsible engineers.
D. It raises the image of the profession and hence gets engineers more pay.

THE END ....!!!

THANK YOU !

1) ETHICS

* The word "Ethics" is derived from a Greek word meaning 'custom'

- Limited to the normative science i.e. what is wrong or right, good or bad.

- Normative science of the Conduct of human being living in societies

- A science that judges his conduct

- BRIEF HISTORY OF EUROPEAN ETHICS:.

(1) GREEK PERIOD (500 BC – 500 AD)

* Formation of Greek City state
* Duties of citizens toward the city state (i.e) moral life
* Idea of the good

(2) MEDIEVAL PERIOD (500 AD – 1500 AD)

* Dominance of Church in Europe
* Morality was linked to the Church and religious belief
* New dimension given to a individual
* Importance of Bible (Christian)

3 MODERN ETHIC (1500 AD – 1900 AD)

* Church/state not important to moral life)
* Respect of individual become important
* Importance of Human Freedom and Human Accomplishment
* Standards of human rights
* Concept of right or wrong changed.

ENGG. ETHIC : HISTORICAL PERSPECTIVE:

* Since Late 1970's, Systematic attention has been devoted by Engineers and members of other Scholarly discipline.
* In the Late 19th century nearly emerging professional societies wrote code of Ethics
* In the after math of 2nd world war, emergency of organization and journals to address the responsibility of Scientists to address the responsibility of Scientists & Engg is consequence of their professional work.
* Engg. Ethic, Social science, management Science more Clearly Specified

* In USA, Professionalism gives rise to Engineering Societies

* Emphasis on personal decision making

"Engineering Ethics"

* The study of moral issue and decision confronting individual & organizations Engaged in Engineering."

"

The study of related questions about the moral ideas, characters, policies & relationship of people & corporations involved in technical activity"

= Engineering ethics is wider in scope than the Engineers Ethics

"SENSES OF ENGG. ETHICS

* An activity & Area of inquiry

* ✓ Justifying moral Judgement

* ✓ Moral problems and issue related to Engg.

* ✓ Currently accepted codes & standards of conduct endorsed by various groups of Engg. and Engg. Societies.

H → Highest

INTEGRITY:- (4)

The unity of character on the basis of moral concern & Especially on the basis of honestly.

UNITY:-

- Integrity is a bridge b/w responsibility in private & professional life.

Morality requires that our lives be unified,

- Maintaining integrity makes Complicated that the few jobs allows a perfect mesh b/w ones personal steal once. work activities

HONESTY:-

Unity, integrity implies basic honesty.

(a) Truthfulness (Meeting responsibilities Concerning truth)

(b) Trust worthiness (Meeting responsibilities Concerning truth)

BOTH ARE INTER.

FORM OF HONESTY

(1) Honesty is Speech.

(2) Honesty is beliefs (intellectual honesty)

(3) Privacy of the employs or client with Regard To confidential information Honesty can be difficult to fully achieved.

SELF RESPECT:-

→ Varying oneself in morally appropriate ways (varying)

→ Finding meaning in once life and work

→ Self respect is related to self esteem

→ Good judgement (practical wisdom) in moral matters lies at the core of all Virtues ~~is~~ including self respect.

SENSES OF RESPONSIBILITIES

Moral judgments are involved whenever there is moral responsibility, judgement may be of following types:-

1) Virtue
2) Obligation
3) General moral capacities of people
4) Liabilities and accountability for action
5) Blame worthiness or praise worthiness.

CASUAL & LEGAL RESPONSIBILITIES

→ Casual Responsibility consist simply in being a cause of some event.

→ Legal responsibility should be distinguished from moral responsibilities.

→ An Engineer or Engineering firm can be held legally responsible for harm that has so unlikely and unforeseeable that little or no more responsibility is involved

→

RIGHT ACTION THEORIES

→ virtue provide rough guide line about how to act

→ three additional types of Ethical theories attempt to formulate the fundamental principle of obligation, applicable to both professional & personal conduct in every day life

VIRTUE ETHICS

(5)

Right action are simply those express, build or reinforce good character traits.

2 FOCUS on the Bad Consequences of Action

Discovery of the scheme can be held to a loss of trust in public officials, a trust is important for the well functioning of a project of Government.

3 KICK BACKS

what is wrong of one Engaged in a kickback will focus on directly the nature of action involving the participants, intentions and motives rather than the consequences.

KICKBACK SCHEMES :-

- why it was wrong

① It violates the right of other people

② officials will give acts/cont not kickback

③ officials will not violates Equality of opportunities, public right in a public form fair competition unbiased consideration

WHY WE STUDY ENGG ETHICS

A PROBLEM OF VAGUENESS

Uncertainty - which moral principle or consideration may be applied in a particular situation

* PROBLEM OF CONFLICTING REASON

Two or more right principle may come into conflict
: the "real moral dilemma"

↳ PROBLE OF DISAGREEMENT:

Reasonable & respectable individual or group may disagree.
= Issue become more complicated in Engg authority, corporation or in any well structed authority.

STEPS IN CONFRONTING MORAL DILEMMAS

(1) Identify moral factor that Causing clash of Ideas.
(2) Gathering all facts relating to moral factors
3 Narrate factors in accordance with their priority
4 Discuss with Colleagues Students and seeking their suggestion
5 Arrive at carefully reasoned justification in the list of all facts.

MORAL AUTONOMY

Aim should be Empower individuals →

* To invoke a term widely used in Ethics
* Increase "Moral Autonomy"
* Habit of thinking rationally moral Ethics on the line of moral concern

* Improving various practical skills that can provide independent thoughts about moral issue.

Some skills are :-

(1) proficiency in recognising moral problem and Engineering issue.

(2) Skill that Justifing counter argument

(3) Ability to form Consistent and Comprehensive view point

(4) Awareness of alternative issue

(5) sensitivity of genuine difficulties.

(6) Scence of importance of integrating individual view point

(2.)

GILLIGAN'S THEORY

- Highlight Male/female approach to morality

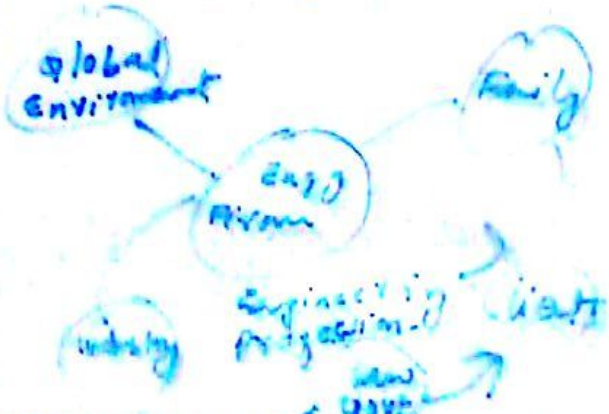
She recasted two level of more development as stages of growth Toward Ethics.

a The pre-conventional level :-

- person is pre-occupied with self centered reasoning

b The post-conventional level :-

The individual become able to strike a reasoned balance b/w caring about others people



MORAL REASONING AND ETHICAL THEORIES

(3)

* First crash of fully loaded DC-10 JET over the suburb of paris.
* 346 people killed
* Engineers of Mc Donnell Douglas Earlier wrote a letter to the management highlight danger in the design
* cost of re-design criteria
* Competing disadvantage
* Responsibility of Engineer and managment

THEORIES OF MORAL AUTONOMY

KOHLSBERG THEORY

* Psychological theory of moral development (1927-1987)
* Three major levels of moral development
* Reasoning & motivation of individuals.

(a) PRE-CONVENTIONAL LEVEL

Individuals are motivated primarily by the desire to avoid punishment

(b) CONVENTIONAL LEVEL

Norm of one group family a society are acceptable as the final standard of morality.

(c) POST CONVENTONAL LEVEL

What should be said about its emphasis on abstract universal rules and right.

DUTY ETHICS

REASON FOR PERSON

DUTIES AS FUNDAMENTAL

* Right actions are those required by a list of duties such as
  - (a) Be honest
  - (b) keep promise
  - (c) Don't inflict suffering on other people
  - (d) Be fair
  - (e) Make preparation when you have been unfair
  - (f) Show gratitude for kindness.

DUTIES TO OURSELVES:-

Seek to improve one's own intelligence & Character.

* Develop one's talent
* Don't Commit suicide.

RESPECT FOR PERSON.

→ Most important valid fundamental principle.

→ people have the capacity for autonomy and for Exercising a good will Autonomy and governing over own lives in the light of universal moral principle

→ Capacitive for autonomy and goodwill make people worthy of respect and given the Human dignity.

RIGHT ETHICS

Human right ethicists assert that duties arose because people have right not vice versa.

Locks views have Enormous impact on French and American Revolution.

→ Locks own version of Human rights was individualistic (UN. Human. Charles).

→ Locks own versions of Human rights was individualistic.

→ LIBERTY AND WELFARE RIGHT.

- Moral right pre-supposes the capacity to show concern and to be accountable to other in a moral community.
- Ideas to have more welfare rights in general.
- Empowered Engineers to warn public about unsafe technological products and others such development

~~determinant~~

RIGHT OF ENGINEER:-

→ Engineers have several moral rights.

→ Engineer have also fundamental right to live and freely pursue their legitimate interests.

→ Engineers have Special rights including.

institutional rights (salary & other company benefits)

→ Engineer as professional have special rights and that arise from their professional role and the obligations it involved.

→ PROFESSIONAL JUDGEMENT FREELY

→ The right to refuse and carry out illegal and un-Ethical activities.

→ To talk publicity about one's work with in the parameter of confidentiality

BASIC RIGHT OF PROFESSIONAL CONSCIENCE

→ Basic and generic rights of Professional Engineers.

→ Moral rights to Exercise in professional judgement, Lota ~~Fectica~~ Technical judgement and Reasoned moral conviction.

→ right to do what Every one agrees obligatory on professional Engineers.

INSTITUTIONAL RECOGNITION OF RIGHT.

- Having a moral right is one thing, having respected by others and given recognition with organization

→ when Engineer appeal to basic rights of professional Conscience they are arguing.

RECOGNITION BY EMPLOYERS :-

SPECIFIC RECOGNITION OF CONSCIETOUS RIGHT REFUSAL :-

→ Right of professional Conscience is the most basic moral right.

→ It is also Encompasses many other right, known as Specific Professional Right. Eg Engineer have a general obligation to protect the safety and well being.

RIGHT OF CONSCIENCTOUS REFUSAL :.

RIGHT not to Engage in unethical practice and refuse to do so because one's views it unethical.

TWO SITUATION :-

① where there is widely shared agreement in the professional as to whether an act is unethical

② where there is room for disagreement among reasonable people over whether this act is unethical.

→ problem may arise where there is no shared agreement whether a project procedure is Unethical

→ Right of professional Conscience does not extend to right of paid for not working.

RIGHT OF PRIVACY

→ Right of having a private life outside the job.

→ Right to control access and use of information about oneself.

→ This right is limited in certain instances by Employer's right (right of Empolyer right of empolyer may come in conflict)

ENGINEERS RESPONSIBILITY FOR SAFETY:

→ Absolute safety that satisfies all individuals or group under all conditions is neither attainable or affordable.

"Whatever a risk a person judge to be acceptable", i.e a thing is safe if its risks, if its risk are judged to be acceptable"

→ Above statement is not perfect and need to be modified

"

(a) Under-estimating the risk

(b) over-Estimating the risk

(c) No judgement about the risk (i.e) the product is ~~one~~ Either Safe or unsafe

CONCEPTS OF SAFETY:

william lowrance definition.