UNIT V GLOBAL ISSUES

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

5.GLOBALIZATION

- Globalization means integration of countries through commerce, transfer of technology, and exchange of information and culture.

- In a way, it includes acting together and interacting economies through trade, investment, loan, development schemes and capital across countries.

- In a different sense, these flows include knowledge, science, technology, skills, culture, information, and entertainment, besides direct human resource, tele-work, and outsourcing.

- This interdependence has increased the complex tensions and ruptures among the nations.

- For the engineers, the issues such as multinational organizations, computer, internet functions, military development and environmental ethics have assumed greater importance for their very sustenance and

5.1 MULTINATIONAL CORPORATIONS

- Organizations, who have established business in more than one country, are called Multinational Corporation. The headquarters are in the home country and the business is extended in many host countries.

- The Western organizations doing business in the less-economically developed (developing, and overpopulated) countries gain the advantage of inexpensive labor, availability of natural resources, conducive-tax atmosphere, and virgin market for the products.

- At the same time, the developing countries are also benefited by fresh job opportunities, jobs with higher remuneration and challenges, transfer of technology, and several social benefits by the wealth developed.

- But this happens invariably with some social and cultural disturbance. Loss of jobs for the home country, and loss or exploitation of natural resources, political instability for the host countries are some of the threats of globalization.

5.1.1 International Human Rights

- To know what are the moral responsibilities and obligations of the multinational corporations operating in the host countries, let us discuss with the framework of rights ethics.

- Common minimal rights are to be followed to smoothen the transactions when the engineers and employers of MNCs have to interact at official, social, economic and sometimes political levels.

- At international level, the organizations are expected to adopt the minimum levels of

(a) Values, such as mutual support, loyalty, and reciprocity,

(b) the negative duty of refraining from harmful actions such as violence and fraud, and

(c) basic fairness and practical justice in case of conflicts.

5.1.1 International Human Rights…

The ten international rights to be taken care of, in this context are:

- 1. Right of freedom of physical movement of people

- 2. Right of ownership of properties

- 3. Freedom from torture

- 4. Right to fair trial on the products

- 5. Freedom from discrimination on the basis of race or sex. If such discrimination against women or minorities is prevalent in the host country, the MNC will be compelled to accept. MNCs may opt to quit that country if

The human rights violations are severe

5.1.1 International Human Rights…

- 6. Physical security. Use of safety gadgets have to be supplied to the workers even if the laws of the host country do not suggest such measures.

- 7. Freedom of speech and forming association

- 8. Right to have a minimum education

- 9. Right to political participation

- 10. Right to live and exist (i.e., coexistence).
- The individual liberty and sanctity of the human life are to be respected by all societies.

5.1.2 Technology Transfer

☐ It is a process of moving technology to a new setting and implementing it there.

☐ Technology includes hardware (machines and installations) and the techniques (technical, organizational, and managerial skills and procedures).

☐ It may mean moving the technology applications from laboratory to the field/factory or from one country to another.

☐ This transfer is effected by governments, organizations, universities, and MNCs.

5.1.3 Appropriate Technology

- Identification, transfer, and implementation of most suitable technology for a set of new situations, is called appropriate technology.

- Technology includes both hardware (machines and installations) and software (technical, organizational and managerial skills and procedures).

- Factors such as economic, social, and engineering constraints are the causes for the modification of technology.

- Depending on the availability of resources, physical conditions (such as temperature, humidity, salinity, geographical location, isolated land area, and availability of water), capital opportunity costs, and the human value system (social acceptability) which includes their traditions, beliefs, and religion, the appropriateness is to be determined.

- 1. A case against the technology transfer is that the impact of borrowed or transferred technology has been threatening the environment beyond its capacity and sustainable development of the host countries. Large plantations that orient their efforts to exports leave the small farmers out of jobs and at the mercy of the foreign country. For example, genetically modified cotton have shown sufficient disturbance in Europe and Africa. This has made the European Union to oppose the entry of G.M. cotton into Europe.

- 2. The high technology has contributed to large-scale migration from villages to the cities where corporations are located, leading to the undesirable side-effects of overcrowding of cities, such as the scarcity of water, insanitation, poverty, and the increase in crimes.

3. The term 'appropriate' should emphasize the social acceptability and environmental protection of the host countries, and this need to be addressed while transferring technology. Thus, we confirm the view that engineering is a continual social experimentation with nature.

5.1.5 MNCs and Morality

- The economic and environmental conditions of the home and host countries may vary. But the multinational institutions have to adopt appropriate measures not to disturb or dislocate the social and living conditions and cultures of the home countries. A few principles are enlisted here:

- 1. MNC should respect the basic human rights of the people of the host countries.

- 2. The activities of the MNC should give economic and transfer technical benefits, and implement welfare measures of the workers of the host countries.

- 3. The business practices of the multinational organisations should improve and promote morally justified institutions in the host countries.

- 4. The multinationals must respect the laws and political set up, besides cultures and promote the cultures of the host countries.

- 5. The multinational organisations should provide a fair remuneration to the employees of the host countries. If the remuneration is high as that of home country, this may create tensions and if it is too low it will lead to exploitation.

- 6. Multinational institutions should provide necessary safety for the workers when they are engaged in hazardous activities and 'informed consent' should be obtained from them. Adequate compensation should be paid to them for the additional risks undertaken.

5.1.5 Case Study: Bhopal Gas Tragedy Tragedy

Continued

- In 1969, a US company called union carbide set up a plant, Union carbide india limited(UCIL), 3-4 miles outside Bhopal to manufacture pesticides.
- The pesticides were considered necessary for agricultural self sufficiency.
- In 1979, the Bhopal plant was chosen to produce SEVIN, a common pesticide.
- One of the reagents used to make SEVIN was methyl isocynate(MIC, isocyanic acid, methyl ester and methyl carbylamine) a particularly dangerous and poorly understood chemical.
- Late on Sunday evening Dec 2,1984 the union carbide plant was going through routine maintenance of the MIC tanks when a large quantity of water entered one of the 60 ton storage tanks. None of the safety systems were operating, and this triggered a reaction resulting in a tremendous increase of temperature and pressure.
- Just before midnight, a deadly mix of MIC, hydrogen cyanide, monomethyl-amine and other chemicals were carried by a northerly wind to the neighboring communities.
- Over the next couple of hours, close to 37,000 kg of chemicals spread over the city of about one million people.

5.2 ENVIRONMENTAL ETHICS

 Environmental ethics is the study of

(a) moral issues concerning the environment, and

(b) moral perspectives, beliefs, or attitudes concerning those issues.

 Engineers in the past are known for their negligence of environment, in their activities. It has become important now that engineers design eco-friendly tools, machines, sustainable products, processes, and projects.

 These are essential now to

(a) ensure protection (safety) of environment

(b) prevent the degradation of environment, and

(c) slow down the exploitation of the natural resources, so that the future generation can survive.

5.2 ENVIRONMENTAL ETHICS…

- The American Society of Civil Engineers (ASCE) code of ethics, has specifically requires that "engineers shall hold paramount the safety, health, and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of professional duties"

- The term sustainable development emphasizes on the investment, orientation of technology, development and functioning of organizations to meet the present needs of people and at the same time ensuring the future generations to meet their needs.

- Compaq Computer Corporation (now merged with HP) was the leader, who exhibited their commitment to environmental health, through implementation of the concept of 'Design for environment' on their products, unified standards all over the world units, and giving priority to vendors with a record often environmental concern.

5.2 ENVIRONMENTAL ETHICS…

- Engineers as experimenters have certain duties towards environmental ethics, namely:

1. Environmental impact assessment: One major but sure and unintended effect of technology is wastage and the resulting pollution of land, water, air and even space. Study how the industry and technology affects the environment.

2. Establish standards: Study and to fix the tolerable and actual pollution levels.

3. Counter measures: Study what the protective or eliminating measures are available for immediate implementation

4. **Environmental awareness:** Study and possible educate the people on

5.2.1 Disasters

- 1. Plastic Waste Disposal

- 2. e-Waste Disposal

- 3. Industrial Waste Disposal

- 4. Depletion of Ozone Layer

- 5. Global Warming

- 6. Acid Rain

1. Plastic Waste Disposal

- In our country, several crores of plastic bottles are used as containers for water and oil, and plastic bags are used to pack different materials ranging from vegetables to gold ornaments. Hardly any of these are recycled.

- They end up in gutters, roadsides, and agricultural fields. In all these destinations, they created havoc.

- The worse still is the burning of plastic materials in streets and camphor along with plastic cover in temples, since they release toxic fumes and threaten seriously the air quality.

- Cities and local administration have to act on this, collect and arrange for recycling through industries.

2. e-Waste Disposal

- The parts of computers and electronic devices which have served its useful life present a major environmental issue for all the developing countries including India. This scrap contains highly toxic elements such as lead, cadmium, and mercury.

- Even the radioactive waste will lose 89% of its toxicity after 200 years, by which time it will be no more toxic than some natural minerals in the ground.

- It will lose 99% of its remaining toxicity over the next 30,000 years. The toxic chemical agents such as mercury, arsenic, and cadmium retain toxicity undiminished forever. But these scraps are illegally imported by unscrupulous agencies to salvage some commercially valuable inputs.

- Instead of spending and managing on the scrap, unethical organizations sell them to countries such as India. This is strictly in violation of the Basel Convention of the United Nations Environment Program, which has banned the movement of hazardous waste.

2. e-Waste Disposal…

- A recent report of the British Environment Agency has revealed that the discarded computers, television sets, refrigerators, mobile phones, and electrical equipments have been dispatched to India and Pakistan in large quantity, for ultimate disposal in environmentally-unacceptable ways and at great risk to the health of the labour.

- Even in the West, the electronic junk has been posing problems. Strong regulation including,

- (a) pressure on industries to set up disassembling facilities,

- (b) ban on disposal in landfill sites,

- (c) legislation for recycling requirements for these junk and

- (d) policy incentives for eco-friendly design are essential for every country.

- Every country needs regulations to define waste, measures to stop illegal Import and institutional structures to handle safe disposal of domestic industrial scrap.

3. Industrial Waste Disposal

- There has been a lot of complaints through the media, on

- (a) against the Sterlite Copper Smelting Plant in Thuthukkudi (1997) against its pollution, and

- (b) when Indian companies imported the discarded French Warship Clemenceau for disposal, the poisonous asbestos compounds were expected to pollute the atmosphere besides exposing the labor to a great risk, during the disposal.

- The government did not act immediately.

- Fortunately for Indians, the French Government intervened and withdrew the ship, and the serious threat was averted!

4. Depletion of Ozone Layer

- The ozone layer protects the entire planet from the ill-effects of ultraviolet radiation and is vital for all living organisms in this world.

- But it is eaten away by the Chloro-fluro-carbons (CFC) such as Freon emanating from the refrigerators, air conditioners, and aerosol can spray.

- This has caused also skin cancer to sun-bathers in the Western countries. Further NO and NO2 gases were also found to react with the ozone.

- Apart from engineers, the organizations, laws of the country and local administration and market mechanisms are required to take up concerted efforts to protect the environment.

5. Global Warming

- Over the past 30 years, the Earth has warmed by 0.6 °C. Over the last 100 years, it has warmed by 0.8 °C. It is likely to push up temperature by 3°c by 2100, according to NASA's studies.

- The U.S. administration has accepted the reality of global climate change, which has been associated with stronger hurricanes, severe droughts, intense heat waves and the melting of polar ice.

- Greenhouse gases, notably carbon dioxide emitted by motor vehicles and coal-fired power plants, trap heat like the glass walls of a greenhouse, cause the Earth to warm up.

6. Acid Rain

- Large emissions of sulphur oxides and nitrous oxides are being released in to the air from the thermal power stations using the fossil fuels, and several processing industries.

- These gases form compounds with water in the air and precipitates as rain or snow on to the earth.

- The acid rain in some parts of the world has caused sufficient damage to the fertility of the land and to the human beings.

5.2.2 Human-centered Environmental Ethics

- This approach assumes that only human beings have inherent moral worth duly to be taken care of.

- Other living being and ecosystems are only instrumental in nature. Utilitarianism aims to maximize good consequences for human beings. Most of the goods are engineered products made out of natural resources.

- Human beings have also (a) recreational interests (enjoy leisure through mountaineering, sports, and pastimes), (b) aesthetic interests (enjoy nature as from seeing waterfalls and snow-clad mountains), (c) scientific interests to explore into nature or processes, and (d) a basic interest to survive, by preservation as well as conservation of nature and natural resources.

- Rights ethicists favor the basic rights to live and right to liberty, to realise the right to a live in a supportive environment.

5.3 COMPUTER ETHICS

- Computer ethics is defined as

(a) study and analysis of nature and social impact of computer technology,

(b) formulation and justification of policies, for ethical use of computers.

- This subject has become relevant to the professionals such as designers of computers, programmers, system analysts, system managers, and operators.

- The use of computers have raised a host of moral concerns such as free speech, privacy, intellectual property right, and physical as well as mental harm.

- There appears to be no conceptual framework available on ethics, to study and understand and resolve the problems in computer technology.

5.3.1 Types of Issues

Different types of problems are found in computer ethics.

1. Computer as the Instrument of Unethical Acts

2. Computer as the Object of Unethical Act

3. Problems Related to the Autonomous Nature of Computer

1. Computer as the Instrument of Unethical Act

(a) The usage of computer replaces the job positions. This has been overcome to a large extent by readjusting work assignments, and training everyone on computer applications such as word processing, editing, and graphics.

(b) Breaking privacy. Information or data of the individuals accessed or erased or the ownership changed.

(c) Defraud a bank or a client, by accessing and withdrawing money from other's bank account.

2. Computer as the Object of Unethical Act

☐ The data are accessed and deleted or changed.

☐ (a) Hacking: The software is stolen or information is accessed from other computers. This may cause financial loss to the business or violation of privacy rights of the individuals or business. In case of defense information being hacked, this may endanger the security of the nation.

☐ (b) Spreading virus: Through mail or otherwise, other computers are accessed and the files are erased or contents changed altogether. 'Trojan horses' are implanted to distort the messages and files beyond recovery. This again causes financial loss or mental torture to the individuals. Some hackers feel that they have justified their right of free information or they do it for fun. However, these acts are certainly unethical.

☐ (c) Health hazard: The computers pose threat during their use as well as during disposal.

3. Problems Related to the Autonomous Nature of Computer

a) Security risk: Recently the Tokyo stock exchange faced a major embarrassment. A seemingly casual mistake by a junior trader of a large security house led to huge losses including that of reputation. The order through the exchange's trading system was to sell one share for 600,000 Yen. Instead the trader keyed in a sale order for 600,000 shares at the rate of one Yen each. Naturally the shares on offer at the ridiculously low price were lapped up. And only a few buyers agreed to reverse the deal! The loss to the securities firm was said to be huge, running into several hundred thousands. More important to note, such an obvious mistake could not be corrected by some of the advanced technology available. For advanced countries like Japan who have imbibed the latest technology, this would be a new kind of learning experience.

(b) Loss of human lives: Risk and loss of human lives lost by computer, in the operational control of military weapons. There is a dangerous instability in automated defense system. An unexpected error in the software or hardware or a conflict during interfacing between the two, may trigger a serious attack and cause irreparable human loss before the error is traced. The Chinese embassy was bombed by U.S. military in Iraq a few years back, but enquiries revealed that the building was shown in a previous map as the building where insurgents stayed.

(c) In flexible manufacturing systems, the autonomous computer is beneficial in obtaining continuous monitoring and automatic control.

5.3.2 Computers In Workplace

The ethical problems initiated by computers in the workplace are:

- 1. Elimination of routine and manual jobs. This leads to unemployment, but the creation of skilled and IT-enabled service jobs are more advantageous for the people.

- 2. Health and safety: The ill-effects due to electromagnetic radiation, especially on women and pregnant employees, mental stress, wrist problem known as Carpel Tunnel Syndrome, and back pain due to poor ergonomic seating designs, and eye strain due to poor lighting and flickers in the display and long exposure, have been reported worldwide.

- 3. Computer failure: Failure in computers may be due to errors in the hardware or software. Hardware errors are rare and they can be solved easily and quickly. But software errors are very serious.

5.3.3 Property Issues

The property issues concerned with the computers are:

1. Computers have been used to extort money through anonymous telephone calls.

2. Computers are used to cheat and steal by current as well as previous employees.

3. Cheating of and stealing from the customers and clients.

4. Violation of contracts on computer sales and services.

5. Conspiracy as a group, especially with the internet, to defraud the gullible, stealing the identity and to forge documents.

6. Violation of property rights: Is the software a property? The software could be either a Program (an algorithm, indicating the steps in solving a problem) or a Source code (the algorithm in a general computer language such as FORTAN, C and COBOL or an Object code (to translate the source code into the machine language). How do we apply the concept of property here? This demands a framewo rk for ethical judgments.

5.3.4 Computer Crime

The ethical features involved in computer crime are:

1. Physical Security

The computers are to be protected against theft, fire, and physical damage. This can be achieved by proper insurance on the assets.

2. Logical security

The aspects related are (a) the privacy of the individuals or organizations, (b) confidentiality, (c) integrity, to ensure that the modification of data or program are done only by the authorized persons, (d) uninterrupted service. This is achieved by installing appropriate uninterrupted power supply or back-up provisions, and (e) protection against hacking that causes dislocation or distortion.

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5.3.4 Computer Crime….

Major weaknesses in this direction are:

(a)   the difficulty in tracing the evidence involved and

(b)   absence of stringent punishment against the crime.

- The origin of a threat to the Central Government posted from an obscure browsing center, remained unsolved for quite a long time.

- Many times, such crimes have been traced, but there are no clear cyber laws to punish and deter the criminals.

5.3.5 Privacy and Anonymity

The data transmission and accessibility have improved tremendously by using the computers, but the right to privacy has been threatened to a great extent. Some issues concerned with the privacy are listed hereunder:

1. Records of Evidence

Service records or criminal records and the details of people can be stored and accessed to prove the innocence or guilty. Records on psychiatric treatment by medical practitioners or hospital, or records of membership of organizations may sometime embarrass the persons in later years.

2. Hacking

There are computer enthusiasts who willfully or for fun, plant virus or "Trojan horses" that may fill the disc space, falsify information, erase files, and even harm the hardware. They breakdown the functioning of computers and can be treated as violation of property rights.

Anonymity…..

3. Legal Response

In the Indian scene, the Right to Information Act 2005 14 provides the right to the citizens to secure access to information under the control of public authorities, including the departments of the central government, state governments, government bodies, public sector companies and public sector banks, to promote transparency and accountability of public authorities.

Right to information: Under the Act, section 2 (j), the right to information includes the right to (1) Inspect works, documents, records, (2) take notes, extracts or certified copies of documents or records, (3) take certified samples of material, and (4) obtain information in the form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode.

4. Anonymity Anonymity…..

Anonymity in the computer communication has some merits as well as demerits. While seeking medical or psychological counseling or discussion (chat) on topics, such as AIDS, abortion, gay rights, the anonymity offers protection (against revealing their identity). But frequently, anonymity is misused by some people for money laundering, drug trafficking and preying upon the vulnerable.

5.3.6 Professional Responsibility

- The computer professionals should be aware of different conflicts of interests as they transact with other at different levels.
- The IEEE and Association for Computing Machinery (ACM) have established the codes of ethics to manage such responsibilities.

5.3.7 The Big Net

- Almost all the countries are now connected by the internet. But there are no international laws to regulate the issues of freedom of speech, intellectual property rights, privacy rights etc.

- Another development in this direction is, the universities offering degrees-on-line. Third World is certainly gaining knowledge and education.

- Even Google.com has announced plans to publish research papers through the World Wide Web. Knowledge is power.

- Knowledge is internationalised! Will this lead to empowerment of the Third World and promotion of World peace? Only the future can answer this question.

5.4 WEAPONS DEVELOPMENT

- Military activities including the world wars have stimulated the growth of technology. The growth of Internet amply illustrates this fact.

- Engineers involve in weapons development because of the following reasons:

1. It gives one job with high salary.

2. One takes pride and honor in participating in the activities towards the defense of the nation (patriotic fervor).

3. One believes that he fights a war on terrorism and thereby contribute to peace and stability of the country. Ironically, the wars have never won peace, only peace can win peace!

4. By research and development, the engineer is reducing or eliminating the risk from enemy weapons, and saving one's country from disaster.

5. By building-up arsenals and show of force, a country can force the rogue

5.5 ENGINEERS AS MANAGERS

5.5.1 Characteristics

 The characteristics of engineers as managers are:

 1. Promote an ethical climate, through framing organization policies, responsibilities and by personal attitudes and obligations.

 2. Resolving conflicts, by evolving priority, developing mutual understanding, generating various alternative solutions to problems.

 3. Social responsibility to stakeholders, customers and employers. They act to develop wealth as well as the welfare of the society.

5.5.2 Managing Conflicts

In solving conflicts, force should not be resorted. In fact, the conflict situations should be tolerated, understood, and resolved by participation by all the concerned. The conflicts in case of project managers arise in the following manners:

(a) Conflicts based on schedules: This happens because of various levels of execution, priority and limitations of each level.

(b) Conflicts arising out of fixing the priority to different projects or departments. This is to be arrived at from the end requirements and it may change from time to time.

(c) Conflict based on the availability of personnel.

(d) Conflict over technical, economic, and time factors such as cost, time, and performance level.

(e) Conflict arising in administration such as authority, responsibility, accountability, and logistics required.

(f) Conflicts of personality, human psychology and ego problems.

(g) Conflict over expenditure and its deviations.

Most of the conflicts can be resolved by following the principles listed here:

5.5.2 Managing Conflicts......

1. People:Separate people from the problem. It implies that the views of all concerned should be obtained. The questions such as what, why, and when the error was committed is more important than to know who committed it. This impersonal approach will lead to not only early solution but also others will be prevented from committing errors.

2. Interests:

Focus must be only on interest i.e., the ethical attitudes or motives and not on the positions (i.e., stated views). A supplier may require commission larger than usual prevailing rate for an agricultural product. But the past analysis may tell us that the material is not cultivated regularly and the monsoon poses some additional risk towards the Supply . Mutual interests must be respected to a maximum level. What is right is more important than who is right!

5.5.2 Managing Conflicts......

3. Options

Generate various options as solutions to the problem. This helps a manager to try the next best solution should the first one fails. Decision on alternate solutions can be taken more easily and without loss of time.

4. Evaluation

The evaluation of the results should be based on some specified objectives such as efficiency, quality, and customer satisfaction. More important is that the means, not only the goals, should be ethical.

5.6 CONSULTING ENGINEERS

The consulting engineers work in private. There is no salary from the employers. But they charge fees from the sponsor and they have more freedom to decide on their projects. Still they have no absolute freedom, because they need to earn for their living. The consulting engineers have ethical responsibilities different from the salaried engineers, as follows:

1. Advertising

The consulting engineers are directly responsible for advertising their services, even if they employ other consultants to assist them. But in many organisations, this responsibility is with the advertising executives and the personnel department. They are allowed to advertise but to avoid deceptive ones. Deceptive advertising such as the following are prohibited:

(a) By white lies.

(b) Half-truth, e.g., a product has actually been tested as prototype, but it was claimed to have been already introduced in the market. An architect shows the photograph of the completed building with flowering trees around but actually the foundation of the building has been completed and there is no real garden.

(c) Exaggerated claims. The consultant might have played a small role in a well-known project. But they could claim to have played a major role.

(d) Making false suggestions. The reduction in cost might have been achieved along with the reduction in strength, but the strength details are hidden.

(e) Though vague wordings or slogans

5.6 CONSULTING ENGINEERS....

2. Competitive Bidding

It means offering a price, and get something in return for the service offered. The organizations have a pool of engineers. The expertise can be shared and the bidding is made more realistic. But the individual consultants have to develop creative designs and build their reputation steadily and carefully, over a period of time. The clients will have to choose between the reputed organizations and proven qualifications of the company and the expertise of the consultants. Although competent, the younger consultants are thus slightly at a disadvantage.

5.6 CONSULTING ENGINEERS....

3. Contingency Fee

This is the fee or commission paid to the consultant, when one is successful in saving the expenses for the client. A sense of honesty and fairness is required in fixing this fee. The NSPE Code III 6 (a) says that the engineers shall not propose or accept a commission on a contingent basis where their judgment may be compromised.

The fee may be either as an agreed amount or a fixed percentage of the savings realized. But in the contingency fee-agreements, the judgment of the consultant may be biased. The consultant may be tempted to specify inferior materials or design methods to cut the construction cost. This fee may motivate the consultants to effect saving in the costs to the clients, through reasonably moral and technological means.

5.6 CONSULTING ENGINEERS....

4. Safety and Client's Needs

The greater freedom for the consulting engineers in decision making on safety aspects, and difficulties concerning truthfulness are the matters to be given attention. For example, in design-only projects, the consulting engineers may design something and have no role in the construction. Sometimes, difficulties may crop-up during construction due to non-availability of suitable materials, some shortcuts in construction, and lack of necessary and adequate supervision and inspection. Properly-trained supervision is needed, but may not happen, unless it is provided. Further, the contractor may not understand and/or be willing to modify the original design to serve the clients best. A few on-site inspections by the consulting engineers will expose the deficiency in execution and save the workers, the public, and the environment that may be exposed to risk upon completion of the project.

5.7 ENGINEERS AS EXPERT WITNESS

☐Frequently engineers are required to act as consultants and provide expert opinion and views in many legal cases of the past events.

☐They are required to explain the causes of accidents, malfunctions and other technological behavior of structures, machines, and instruments, e.g., personal injury while using an instrument, defective product, traffic accident, structure or building collapse, and damage to the property, are some of the cases where testimonies are needed.

☐The engineers, who act as expert-witnesses, are likely to abuse their positions in the following manners:

5.7 ENGINEERS AS EXPERT WITNESS….

1. Hired Guns

☐Mostly lawyers hire engineers to serve the interest of their clients. Lawyers are permitted and required to project the case in a way favorable to their clients. But the engineers have obligations to thoroughly examine the events and demonstrate their professional integrity to testify only the truth in the court. They do not serve the clients of the lawyers directly. The hired guns forward white lies and distortions, as demanded by the lawyers. They even withhold the information or shade the fact, to favor their clients.

2. Money Bias

☐Consultants may be influenced or prejudiced for monitory considerations, gain reputation and make a fortune.

5.7 ENGINEERS AS EXPERT WITNESS….

3. Ego Bias

The assumption that the own side is innocent and the other side is guilty, is responsible for this behavior. An inordinate desire to serve one's client and get name and fame is another reason for this bias.

4. Sympathy Bias

Sympathy for the victim on the opposite side may upset the testimony. The integrity of the consultants will keep these biases away from the justice. The court also must obtain the balanced view of both sides, by examining the expert witnesses of lawyers on both sides, to remove a probable bias.

5.7 ENGINEERS AS EXPERT WITNESS....

5.7.1 Duties

1. The expert-witness is required to exhibit the responsibility of confidentiality just as they do in the consulting roles. They can not divulge the findings of the investigation to the opposite side, unless it is required by the court of law.

2. More important is that as witness they are not required to volunteer evidence favorable to the opponent. They must answer questions truthfully, need not elaborate, and remain neutral until the details are asked for further.

3. They should be objective to discover the truth and communicate them

4.The stand of the experts depends on the shared understanding created within the society. The legal system should be respected and at the same time, they should act in conformance with the professional standards as obtained from the code of ethics.

5.The experts should earnestly be impartial in identifying and interpreting the do served data recorded data, and the industrial standards. They should not distort the truth, even under pressure.

5.9 MORAL LEADERSHIP

Moral leadership is essentially required for the engineers, for the reasons listed as follows:

1. It is leading a group of people towards the achievement of global and objectives. The goals as well as the means are to be moral. For example, Hitler and Stalin were leaders, but only in an instrumental sense and certainly not on moral sense.

2. The leadership shall direct and motivate the group to move through morally desirable ways.

3.They lead by thinking ahead in time, and morally creative towards new applications, extension and putting values into practice. 'Morally creative' means the identification of the most important values as applicable to the situation, bringing clarity within the groups through proper communication, and putting those values into practice.

4.They sustain professional interest, among social diversity and cross-disciplinary complexity. They contribute to the professional societies, their professions, and to their communities.

5.9 MORAL LEADERSHIP….

5. Voluntarism: Another important avenue for providing moral leadership within communities, by the engineers is to promote services without fee or at reduced fees (pro bono) to the needy groups. The professional societies can also promote such activities among the engineers. This type of voluntarism (or philanthropy) has been in practice in the fields of medicine, law and education. But many of the engineers are not self-employed as in the case of physicians and lawyers. The business institutions are encouraged to contribute a percentage of their services as free or at concessional rates for charitable purposes.

6. Community service: This is another platform for the engineers to exhibit their moral leadership. The engineers can help in guiding, organizing, and stimulating the community towards morally- and environmentally-desirable goals. The corporate organizations have come forward to adopt villages and execute many social welfare schemes, towards this objective.

Code of Conduct

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the higher standards of honesty and integrity.

Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of then public health, safety, and welfare.

Engineer must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

Code of Conduct…

I Fundamental Canons

Engineers in the fulfillment of their professional duties shall

1. hold paramount the safety, health, and welfare of the public.

2. perform services only in areas of their competence.

3. issue public statements only in objective and truthful manner.

4. act for each employer or client as faithful agents or trustees.

5. avoid deceptive acts.

6. conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

Code of Conduct...

II Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.

2. Engineers shall perform services only in the areas of their competence.

3. Engineers shall issue public statements only in an objective and truthful manner.

4. Engineers shall at for each employer or client as faithful agents or trustees

5. Engineers shall avoid deceptive acts

Code of Conduct...

III Professional Obligations

1. Engineers shall be guided in all their relation by the highest standards of honesty and integrity.

2. Engineers shall at all times strive to serve the public interest.

3. Engineers shall avoid all conduct or practice that deceives the public.

4.Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve.

5 . Engineers shall not be influenced in their professional duties by conflicting interests.

Code of Conduct…

III Professional Obligations

6.   Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper methods.

7.   Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall resent such information to the proper authority for action.

8. Engineers shall accept personal responsibility for their professional activities, provided, however, the engineers may seek indemnification for services arising out of their practice for other
than gross negligence, where the engineer's interests can not otherwise be protected.

9.   Engineers shall give credit for engineering work to those credit is due, and will recognize the proprietary interests of others

Corporate Social Responsibility

A company has an economic responsibility: it must earn a return for its stockholders within the confines of the law.

However, corporate social responsibility means that organizations have also ethical and societal responsibilities that go beyond their economic responsibilities.

CSR requires organizations to expand their understandings of their responsibilities to include other stakeholders such as employees, customers, suppliers, local communities, state governments, international organizations, etc.

Ethics could be seen as a crucial component of individual and group behaviors at the heart of organizations' responsibilities.