

## UNIT-1

### **MORALS**

Morals are the welfare principles enunciated by the wise people, based on their experience and wisdom. They were edited, changed or modified or evolved to suit the geography of the region, rulers (dynasty), and in accordance with development of knowledge in science and technology and with time.

Morality is concerned with principles and practices of morals such as: (a) What ought or ought not to be done in a given situation? (b) What is right or wrong about the handling of a situation? and

(c) What is good or bad about the people, policies, and ideals

involved? Morality is different from Ethics in the following ways:

<b>Morality</b>	<b>Ethics</b>
1. More general and prescriptive based on customs and traditions.	1. Specific and descriptive. It is a critical reflection on morals.
2. More concerned with the results of wrong action, when done.	2. More concerned with the results of a right action, when not done.
3. Thrust is on judgment and punishment, in the name of God or by laws.	3. Thrust is on influence, education, training through codes, guidelines, and correction.
4. In case of conflict between the two, morality is given top priority, because the damage is more. It is more common and basic.	4. Less serious, hence second priority only. Less common. But relevant today, because of complex interactions in the modern society.
5. Example: Character flaw, corruption, extortion, and crime.	5. Example: Notions or beliefs about manners, tastes, customs, and towards laws.

As against morals and ethics, laws are norms, formally approved by state, power or national or international political bodies. Breaking the norms is called crime, and invite specific punishment.

## **VALUES**

### **Definition**

Humans have the unique ability to define their identity, choose their values and establish their beliefs. All three of these directly influence a person's behavior. People have gone to great lengths to demonstrate the validity of their beliefs, including war and sacrificing their own life! Conversely, people are not motivated to support or validate the beliefs of another, when those beliefs are contrary to their own.

People will act congruent with their personal values or what they deem to be important.

A value is defined as a principle that promotes well-being or prevents harm.” Another definition is: Values are our guidelines for our success—our paradigm about what is acceptable.” Personal values are defined as: “Emotional beliefs in principles regarded as particularly favorable or important for the individual.” Our values associate emotions to our experiences and guide our choices, decisions and actions.

### **Human Values**

A person's observations on its environment are filtered through his values to determine whether or not he should expend energy to do something about his experiences. A person who values gold and sees a large bag of gold (a positive value) in his path as he walks, will be motivated to reach down and pick it up. A person who values his life and knows about venomous snakes will retreat from the sound of a rattlesnake (a negative value) from nearby, when he is walking in the desert. Said in another way, “Values are the scales we use to weigh our choices for our actions, whether to move towards or away from something.”

Not all values have the same weight or priority. Some are more important than others and must be satisfied before others can be addressed. **Dr. Abraham Maslow** illustrated this with his hierarchy of human needs. Survival has a higher priority than security, which has a higher priority than social acceptance. Self-esteem can only be addressed to the degree that social acceptance is fulfilled. Similarly, self-actualization can only be pursued to the degree that self-esteem has been satisfied.

A person's beliefs, values and identity are usually acquired unconsciously based on his personal experience or observations of others' experiences as to what produces desirable or undesirable results in the environment. A baby's learning to walk and talk is a clear example of identifying with human adults, valuing the act of being able to have the mobility and communication ability of an adult and the belief, based on unconscious observation, that humans can do walk and do talk with each other.

Physiologists have identified the parts of the human brain that are involved in producing behavior in accordance with beliefs and values. All information collected by human senses is passed through a net-like group of cells, known as the Reticular Activating System (RAS), located near the top of the brain stem. The RAS compares the data received with accepted values, positive and negative (threats), and beliefs stored in memory and determines whether or not immediate action is required. The results of the RAS's comparison are communicated to the 'amygdala' near the mid-brain.

The 'amygdala' produces neuro-chemicals that cause emotions consistent with the nature of and proportional to the match between environment and values and beliefs. The neuro-chemicals initiate the chemical processes needed for the action to be taken. If the emotions produced are strong enough, the perceived information is blocked from reaching the logical, rational and conscious executive center of the brain, the pre-frontal lobes. In which case, the resulting behavior will be automatic, not necessarily logical or rational, and completely in accordance with the person's strongest held beliefs, values and/or identity.

By positive affirmations, one can modify or create new beliefs about a person's identity and/or what is important to him (values). Verbal repetition of statements intended to become new beliefs, and values will result in these being stored for use by the RAS for comparison with the environment being experienced. This is the mechanism how the beliefs or values are modified.

### **Types of Values**

The five core human values are: (1) Right conduct, (2) Peace, (3) Truth, (4) Love, and (5) Non-violence.

1. Values related to RIGHT CONDUCT are:

- (a) SELF-HELP SKILLS: Care of possessions, diet, hygiene, modesty, posture, self reliance, and tidy appearance
- (b) SOCIAL SKILLS: Good behavior, good manners, good relationships, helpfulness, No wastage, and good environment, and
- (c) ETHICAL SKILLS: Code of conduct, courage, dependability, duty, efficiency, ingenuity, initiative, perseverance, punctuality, resourcefulness, respect for all, and responsibility

2. Values related to PEACE are: Attention, calmness, concentration, contentment, dignity, discipline, equality, equanimity, faithfulness, focus, gratitude, happiness, harmony, humility, inner silence, optimism, patience, reflection, satisfaction, self-acceptance, self-confidence, self-control, self-discipline, self-esteem, self-respect, sense control, tolerance, and understanding

3. Values related to TRUTH are: Accuracy, curiosity, discernment, fairness, fearlessness, honesty, integrity (unity of thought, word, and deed), intuition, justice, optimism, purity, quest for knowledge, reason, self-analysis, sincerity, spirit of enquiry, synthesis, trust, truthfulness, and determination.

4. Values related to LOVE are: Acceptance, affection, care, compassion, consideration, dedication, devotion, empathy, forbearance, forgiveness, friendship, generosity, gentleness, humanness, interdependence, kindness, patience, patriotism, reverence, sacrifice, selflessness, service, sharing, sympathy, thoughtfulness, tolerance and trust
5. Values related to NON-VIOLENCE are:
  - (a) PSYCHOLOGICAL: Benevolence, compassion, concern for others, consideration, forbearance, forgiveness, manners, happiness, loyalty, morality, and universal love
  - (b) SOCIAL: Appreciation of other cultures and religions, brotherhood, care of environment, citizenship, equality, harmlessness, national awareness, perseverance, respect for property, and social justice.

PERSEVERANCE is defined as persistence, determination, resolution, tenacity, dedication, commitment, constancy, steadfastness, stamina, endurance and indefatigability. To persevere is described as to continue, carry on, stick at it (informal), keep going, persist, plug away, (informal), remain, stand firm, stand fast, hold on and hang on. Perseverance builds character.

ACCURACY means freedom from mistake or error; conformity to truth or to a standard or model and exactness. Accuracy is defined as correctness, exactness, authenticity, truth, veracity, closeness to truth (true value) and carefulness. The value of accuracy embraces a large area and has many implications. Engineers are encouraged to demonstrate accuracy in their behavior through the medium of praise and other incentives. Accuracy includes telling the truth, not exaggerating, and taking care over one's work.

DISCERNMENT means discrimination, perception, penetration, and insight. Discernment means the power to see what is not obvious to the average mind. It stresses accuracy, especially in reading character or motives.

Discrimination stresses the power to distinguish or select what is true or genuinely excellent. Perception implies quick and often sympathetic discernment, as of shades of feelings. Penetration implies a searching mind that goes beyond what is obvious or superficial. Insight suggests depth of discernment.

6.Developed or modified by one's own awareness, choice, and judgment in fulfilling the needs.

7.By the teachings and practice of Preceptors (Gurus) or Saviors or religious leaders.

8.Fostered or modified by social leaders, rulers of kingdom, and by law (government).

## **ETHICS**

Ethics is the word that refers to morals, values, and beliefs of the individuals, family or the society. The word has several meanings. Basically it is an activity and process of inquiry. Secondly, it is different from non-moral problems, when dealing with issues and controversies. Thirdly, ethics refers to a particular set of beliefs, attitudes, and habits of individuals or family or groups concerned with morals. Fourth, it is used to mean 'morally correct'.

The study on ethics helps to know the people's beliefs, values, and morals, learn the good and bad of them, and practice them to maximize their well-being and happiness. It involves the inquiry on the existing situations, form judgments and resolve the issues. In addition, ethics tells us how to live, to respond to issues, through the duties, rights, responsibilities, and obligations. In religion, similar principles are included, but the reasoning on procedures is limited. The principles and practices of religions have varied from time to time (history), region (geography, climatic conditions), religion, society, language, caste and creed. But ethics has grown to a large extent beyond the barriers listed above. In ethics, the

focus is to study and apply the principles and practices, universally.

## **INTEGRITY**

Integrity is defined as the unity of thought, word and deed (honesty) and open mindedness. It includes the capacity to communicate the factual information so that others can make well-informed decisions. It yields the person's 'peace of mind', and hence adds strength and consistency in character, decisions, and actions. This paves way to one's success. It is one of the self-direction virtues. It enthuse people not only to execute a job well but to achieve excellence in performance. It helps them to own the responsibility and earn self-respect and recognition by doing the job.

Moral integrity is defined as a virtue, which reflects a consistency of one's attitudes, emotions, and conduct in relation to justified moral values. Further discussion on this is available in Chapter 2.

## **WORK ETHICS**

Industry and Society are the two systems which interact with each other and are interdependent. Society requires industry/business system which provides manufacturing, distribution and consumption activities. It needs investment (capital input), labor (input), supply (raw materials), production (industries, business organizations), marketing and distribution (transport), and consumption (public, customer). A lot of transactions (and interactions) between these sub-systems involving people are needed for the welfare of the society. It is here, the work ethics plays an essential role.

Work ethics is defined as a set of attitudes concerned with the value of work, which forms the motivational orientation. The 'work ethics' is aimed at ensuring the economy (get job, create wealth, earn salary), productivity (wealth, profit), safety (in workplace), health and hygiene (working conditions), privacy (raise family), security (permanence against contractual, pension, and retirement benefits), cultural and social development (leisure, hobby, and happiness), welfare (social work), environment (anti-pollution activities), and offer opportunities for all, according to their abilities, but without discrimination.



## **Unit-2**

- **Customs:** Practice or rule of conduct established in a particular community, locality, or trade, by long usage and obligatory on those within its scope. A valid custom must be certain, reasonable, not contrary to statute law and of immemorial antiquity (see time immemorial). Also called custom and usage. Not to be confused with customs.
- **Tradition:** a way of thinking, behaving, or doing something that has been used by the people in a particular group, family, society, etc., for a long time
- : the stories, beliefs, etc., that have been part of the culture of a group of people for a long time
- —used to say that someone has qualities

### **IMPORTANCE OF CUSTOMES AND TRADITIONS**

Culture, tradition and customs plays an important role for a civilization and character of its citizens and society. It helps in striking the balance with mother nature, conservation of natural resources and respecting each other.

Geographical spread, seasons, weather and type of agriculture produce are the basic pillars for any culture.

So the way we integrate our resources for food, clothing and shelter becomes our culture.

To teach our generations, How we have to do it and how we can conserve it, respect it, becomes tradition.

When we live in a clan, tribe, group or a society we have to follow some set of rules, principles, policies or laws which becomes customs.

Therefore without our culture, traditions and customs we are a complete disconnect with our soul.

I am not saying to be rigid with them, we have to be flexible and adaptive in that because of this fast changing world. Today we are living in mixed society where in different cultures amalgamate and we should respect and accommodate all.

Lets say if you are from a farmers family of a village and currently having a job in a MNC and staying in a metro city.

Now culturally if in a season the tradition is to grow some kind of lentil, grain, fruit or vegetable and as per custom the very first harvest is to be offered to the local deity. So that by their blessings we can have enough quantity & quality of produce for our own use and for selling also which will provide money for our livelihood.

Now to come upon a conclusion that which agricultural product to grow in this particular region and season to get the best growth and output would have taken years for our ancestors and finally when they would have come on a conclusion it became a traditional crop.

It's good to know about your culture, tradition and customs but you cannot follow them fully everywhere.

As per the above mentioned scenario there is no point buying some particular lentil, grain, fruit or vegetable from market and offering it to the deity and worshipping on that particular day, because the whole purpose of that tradition of a partial culture is defeated.

First of all people leave their native places for their own good mainly financial. Then they try to find out people from their same culture in the city they are living in to perform their traditional festivals as per their local customs. Why???

You should try to adapt culture of that new place because its you who has relocated.

Every culture's traditions & customs are made keeping lot many things in mind, there is a reason & logic behind that and seriously there is no point in following it blindly.

No culture their tradition or custom can ever harm nature, environment or eco system but if it is doing so then its time to change.

Teach your generations about your roots, culture, traditions and customs however make them understand to follow only those which are practically feasible.

### **Customs vs Traditions**

All cultures and societies of the world have their unique customs and traditions that have evolved over a long period of time. Every society devises ways to maintain peace and order among its people and also to serve as a guide for interaction between the members of the society. Many people talk about customs and traditions as if they are one and the same thing. This is because of the fact that the two terms are used in the same breath and also because dictionaries treat them as similar meaning words. However, there are subtle differences between traditions and customs that will be highlighted in this article.

### **Customs**

Practices that are followed by many people in a society or culture are termed as customs. Welcoming tourists from other countries by garlanding them and applying Tilaka or Tika on their foreheads is an Indian custom known all over the world. Similarly, folding both hands and holding them close to one's chest while greeting a friend or acquaintance is also an Indian custom that is famous worldwide. Marriage is a social institution that is common all over the world but, in different societies and cultures, there are specific practices that are unique to those cultures only and are performed during marriage ceremonies.

Customs are social practices that are common and are followed by most people in a society. There are customs that are individual and family based. Once a practice that a father indulges in is practiced by his son, it qualifies to become a custom. Then there are also local customs that are followed over a particular area only.

The most common and universal custom is that of shaking hands with people when a person is meeting them for the first time.

## **Traditions**

The word tradition comes from a Latin word that means to deliver. This meaning is a clue as to what a tradition means. It is a custom that is handed over by a generation to the coming generation and one that has been passed down over successive generations. A religious or social custom that has been passed down over generations becomes a tradition. It seems that customs slowly and gradually take the shape of traditions as they continue to be handed down the generations.

### **What is the difference between Customs and Traditions?**

- Traditions and customs are beliefs and practices that have evolved over a period of time and the only difference between a custom and a tradition seems to be the length of time and observance by a larger section of the society.
- A tradition is a practice that has been passed down over generations and observed by most people of a society or culture while custom could be short lived and even observed at a family or individual level.
- Also, while all traditions could qualify as customs, not all customs can be referred to as traditions. There is no clear cut definition of the word custom though tradition is certainly a belief or practice that has been passed over generations.

## **VALUE EDUCATION:**

### ***Meaning of Value-Education:***

The very purpose and main function of education is the development of an all round and well-balanced personality of the students, and also to develop all dimensions of the human intellect so that our children can help make our nation more democratic, cohesive, socially responsible, culturally rich and intellectually competitive nation.

But, nowadays, more emphasis is unduly laid on knowledge-based and information-oriented education which takes care of only the intellectual development of the child.

Aging with Dignity was founded “to affirm and safeguard the human dignity of individuals as they age, and to promote better care for those near the end of life.” The term “human dignity” has become a commonplace in our culture, which is a great achievement, but sometimes it’s important to step back and reflect on the meaning of words we can sometimes take for granted.

The English word dignity comes from the Latin word, *dignitas*, which means “worthiness.” Dignity implies that each person is worthy of honor and respect for who they are, not just for what they can do. In other words, human dignity cannot be earned and cannot be taken away. It’s an inalienable gift given to us by God, and every other good thing in life depends on the safeguarding of our fundamental dignity. As the Universal Declaration of Human Rights puts it, “recognition of the inherent dignity...of all members of the human family is the foundation of freedom, justice and peace in the world.”

When we are sick, disabled or at the end of life, we especially can feel our own worth is threatened as we lose certain freedoms we once enjoyed; lose a sense of bodily control; suffer the paralysis of pain; or face the fear of death. Aging with Dignity’s mission, which is profoundly shaped by the Judeo-Christian faith traditions, operates out of the conviction that

not only does each person possess a unique dignity, but that we are also “our brother’s (and sister’s) keeper.” That’s precisely why we created *Five Wishes*, to ensure not only that every person has a rightful voice in determining their own medical care, but also to help build up around each person a community of love, faith and compassionate support that honors their dignity at the time they find themselves most vulnerable.

Our hope at Aging with Dignity is to contribute to the building up of a culture of compassionate community in which the dignity of every life threatened by a sense of isolation or powerlessness in the face of old age or terminal illness is safeguarded. Join us in our work of building.

### **Human rights**

Those are moral principles or norms that describe certain standards of human behavior and are regularly protected as natural and legal rights in municipal and international law. They are commonly understood as inalienable fundamental rights "to which a person is inherently entitled simply because she or he is a human being"<sup>1</sup>and which are "inherent in all human beings", regardless of their nation, location, language, religion, ethnic origin or any other status. They are applicable everywhere and at every time in the sense of being universal, and they are egalitarian in the sense of being the same for everyone. They are regarded as requiring empathy and the rule of law<sup>1</sup>and imposing an obligation on persons to respect the human rights of others, and it is generally considered that they should not be taken away except as a result of due process based on specific circumstances; for example, human rights may include freedom from unlawful imprisonment, torture and execution.

The doctrine of human rights has been highly influential within international law, global and regional institutions. Actions by states and non-governmental organisations form a basis of public policy worldwide. The idea of human rights suggests that "if the public discourse of peacetime global society can be said to have a common moral language, it is that of human rights". The strong claims made by the doctrine of human rights continue to provoke considerable scepticism and debates about the content, nature and justifications of human rights to this day. The precise meaning of the term *rights* is controversial and is the subject of

continued philosophical debate; while there is consensus that human rights encompasses a wide variety of rights such as the right to a fair trial, protection against enslavement, prohibition of genocide, free speech<sup>[1]</sup> or a right to education (including the right to comprehensive sexuality education, among others), there is disagreement about which of these particular rights should be included within the general framework of human rights; some thinkers suggest that human rights should be a minimum requirement to avoid the worst-case abuses, while others see it as a higher standard. In the light of emerging neurotechnologies, four new rights were identified: the right to cognitive liberty, the right to mental privacy, the right to mental integrity, and the right to psychological continuity.

Many of the basic ideas that animated the human rights movement developed in the aftermath of the Second World War and the events of the Holocaust, culminating in the adoption of the Universal Declaration of Human Rights in Paris by the United Nations General Assembly in 1948. Ancient peoples did not have the same modern-day conception of universal human rights. The true forerunner of human rights discourse was the concept of natural rights which appeared as part of the medieval natural law tradition that became prominent during the European Enlightenment with such philosophers as John Locke, Francis Hutcheson and Jean-Jacques Burlamaqui and which featured prominently in the political discourse of the American Revolution and the French Revolution. From this foundation, the modern human rights arguments emerged over the latter half of the 20th century,<sup>[1]</sup> possibly as a reaction to slavery, torture, genocide and war crimes,<sup>[6]</sup> as a realisation of inherent human vulnerability and as being a precondition for the possibility of a just society.<sup>[5]</sup>

## FUNDAMENTAL DUTIES

Those are included in the Indian Constitution by the 42nd Amendment Act , 1976. It is based on the Japanese model. 10 duties of the citizens towards the State have been enumerated by inserting Article 51-A in part IVA of our Constitution. Rights and duties are correlative. These serve as a constant reminder to every citizen that , while the constitution specially confers on

them certain FUNDAMENTAL RIGHTS, it also requires them to observe certain basic norms of democratic conduct and behavior.

**ENFORCEMENT OF DUTIES:** The DUTIES incorporated in the constitution by the 42nd Amendment Act , are statutory duties and shall be enforceable by law. Parliament , by law, will provide penalties to be imposed for failure to fulfill those DUTIES and obligations. The success of this provision would however depend much upon the manner in which the person against whom these duties would be enforced.

#### **ELEVEN FUNDAMENTAL DUTIES FOR CITIZENS :**

1. TO ABIDE BY AND RESPECT THE CONSTITUTION, THE NATIONAL FLAG AND NATIONAL ANTHEM.
2. TO CHERISH AND FOLLOW THE NOBLE IDEAS OF THE FREEDOM STRUGGLE.
3. TO UPHOLD AND PROTECT THE SOVEREIGNTY, UNITY AND INTEGRITY OF INDIA.
4. TO DEFEND THE COUNTRY AND RENDER NATIONAL SERVICE WHEN REQUIRED.
5. TO PROMOTE COMMON BROTHERHOOD AND ESTABLISH DIGNITY OF WOMEN.
6. TO PRESERVE THE RICH HERITAGE OF NATION'S COMPOSITE CULTURE.
7. TO PROTECT AND IMPROVE NATURAL ENVIRONMENT.
8. TO DEVELOP SCIENTIFIC TEMPER, HUMANISM AND SPIRIT OF INQUIRY.
9. TO SAFEGUARD PUBLIC PROPERTY AND ABJURE VIOLENCE.
10. TO STRIVE FOR EXCELLENCE IN ALL SPHERE OF INDIVIDUAL AND COLLECTIVE ACTIVITY.
11. IT SHALL BE DUTY OF EVERY CITIZEN OF INDIA WHO IS A PARENT OR GUARDIAN TO PROVIDE OPPORTUNITY FOR EDUCATION TO HIS CHILD OR AS THE CASE MAY BE , WARD BETWEEN THE AGE OF 6 AND 14 (ADDED BY 86th AMENDMENT ACT , 2002).

tines to frame the problem as a deficit in women. In contrast, their central argument states that infrastructure studies in feminist techno science allows the gender analysis to be taken to a further level. It looks at three issues within the infrastructure: content policies, software and the legalistic framework of operation. It suggests that progress can be made through altering that culture of production through encouraging alternate knowledge, reducing the technical barriers to editing, and addressing the complexity of Wikipedia policies.

### **Gender bias**

Second-generation gender bias is a form of discrimination against women because their practices reflect the values of the men who created the setting, which is often the workplace. Gender bias is one of the most regularly appearing biases shown in the workplace, as opposed to racist bias or personal bias. Few people in workplaces with gender diversity recognize it as a problem, and many people, including those who work in single-gender workplaces, are not aware it is happening at all. An example of second-generation gender bias is that in some workplaces, women are not being hired because the company is a male-dominated workplace.<sup>1</sup> Work cultures may be created to appear to be neutral and unbiased, but they are not. Faye Crosby argues that second-generation gender bias goes unnoticed in the workplace, not only by men but also by women.<sup>1</sup> Many women experience second-generation gender bias in the workplace, but fail to notice that such discrimination is happening. Women who do recognize second-generation gender bias may feel more power-driven, rather than taken advantage of, when thinking of the discriminatory acts that they have experienced in the past. According to Herminie Ibarra, women who recognize these discriminatory acts feel empowered to take action to counter those effects by pushing themselves to achieve leadership opportunities they are qualified for, seeking out sponsors and supporters, and negotiating their work arrangements. Masculine traits, such as strength, confidence, and definitive, are typically preferred in the workplace because they make the company appear to be more driven and confident in its success.<sup>1</sup> However, when a woman shows these "masculine traits", she is often thought of as bossy, rude, and full of herself. Experts say that men are more of the natural-born leaders because of their biological preferences. Women could be strong leaders as well because

they can be compassionate towards those under them, which in turn could result in better relationships and stronger teams.

Another specific example of second-generation bias is how in some places, companies are having trouble keeping women engineers as employees. These women are not staying in their field because of their low self-esteem in regards to failing in front of their mostly male counterparts. These women may feel intimidated and outnumbered by the males in the workplace, causing them to fear failing while being watched by an audience that is majority male-dominant. If there wasn't such discrimination in the workplace regarding women in charge and working in a place full of men, studies show that women would not have such low self-esteem, and they would possibly continue to try their best to succeed in their field. This behavior of women is sometimes unconscious and is caused because of this second-generation gender bias.

While women are attending college and earning degrees now more than ever,<sup>1</sup> statistics show that women are not advancing in school like men are. There has been an increase in the number of women who are receiving their doctorates, but the increase does not correspond with the number of women that are becoming professors and taking high level positions, such as president. Many people believe discrimination ended in the mid '60s, when campaigns for ending discrimination still existed. Sandra Bem (1981) made known the gender schema theory, which explains how an individual's sex identity is essential to the culture in which one is brought up. These ideas are still interfering with women advancing in society. Meyerson and Fletcher (2000) propose that gender discrimination will never go away, it has just "gone underground."

The main difference between first-generation gender bias and second-generation gender bias is whether or not it is intentional. In first-generation gender bias, one intentionally discriminates against another, whereas in second-generation gender bias, the discrimination is not intentional.<sup>1</sup>

## **UNIT-3**

### **ENGINEERING ETHICS**

Engineering Ethics is the activity and discipline aimed at

- (a) understanding the moral values that ought to guide engineering profession or practice,
- (b) resolving moral issues in engineering, and
- (c) justifying the moral judgments in engineering. It deals with set of moral problems and issues connected with engineering.

Engineering ethics is defined by the codes and standards of conduct endorsed by engineering (professional) societies with respect to the particular set of beliefs, attitudes and habits displayed by the individual or group.

Another important goal of engineering ethics is the discovery of the set of justified moral principles of obligation, rights and ideals that ought to be endorsed by the engineers and apply them to concrete situations. Engineering is the largest profession and the decisions and actions of engineers affect all of us in almost all areas of our lives, namely public safety, health, and welfare.

#### **Scope**

The scope of engineering ethics is twofold:

- 1. Ethics of the workplace which involves the co-workers and employees in an organization.
- 2. Ethics related to the product or work which involves the transportation, warehousing, and use, besides the safety of the end product and the environment outside the factory.

#### **Approach**

There are conventionally two approaches in the study of ethics:

- 1. Micro-ethics which deals with decisions and problems of individuals, professionals, and companies.
- 2. Macro-ethics which deals with the societal problems on a regional/national level. For example, global issues, collective responsibilities of groups such as professional societies and consumer groups.

### **SENSES OF ENGINEERING ETHICS**

There are two different senses (meanings) of engineering ethics, namely the Normative and the Descriptive senses. The normative sense include:

- (a) Knowing moral values, finding accurate solutions to moral problems and justifying moral judgments in engineering practices,
- (b) Study of decisions, policies, and values that are morally desirable in the engineering practice and research, and
- (c) Using codes of ethics and standards and applying them in their transactions by

engineers. The descriptive sense refers to what specific individual or group of engineers believe and act, without justifying their beliefs or actions.

## 2.7 CONSENSUS AND CONTROVERSY

In the study of moral autonomy, consensus and controversy are relevant factors to discuss on. Consensus means agreement and controversy means conflict or disagreement.

In exercising moral autonomy, one is not likely to obtain the same results as by others. This situation is likely to end in a controversy. In this case, good amount of tolerance among the individuals who are autonomous, reasonable and responsible is necessary. This does not mean forcing the engineers to reach unique moral solutions. Many reasonable solutions are possible to a given ethical problem. The ethics make the engineers realize the importance of tolerance among them, in case of disagreement while applying moral autonomy.

## 2.8 PROFESSION

### 2.8.1 Definitions

- A. PROFESSION is defined as any occupation/job/vocation that requires advanced expertise (skills and knowledge), self-regulation, and concerted service to the public good. It brings a high status, socially and economically. The characteristics of a profession are:
  1. *Advanced expertise*: Many professions require sophisticated skills (do-how) and theoretical knowledge (know-how and why). Formal education, training, continuing education, updating are needed.
  2. *Self regulation*: Professional societies play important role in setting standards for admission to profession, drafting codes of ethics, enforcing standards of conduct, and representing the profession before the public and the government.
  3. *Public good*: The occupation provides some important public good, by concerted efforts to maintain ethical standards. For example, a physician promotes health, a lawyer protects the legal rights, an engineer provides a product or a project for use by the public towards their health, welfare, and safety. Teaching is also claimed as a profession as it helps shaping and training the minds of the students, young as well as old.

Some argue that jobs such as carpenter, barbers, porters, and drivers are to be recognized as professions. It is open for discussion. Such things can not be decided by referring to dictionary alone. A thorough analysis of the activities expected of these jobs is to be made and checked with explanation of the requirements of a profession before deciding it as profession. For example, having been engaged for driving one's vehicle is not a profession. But an ace driver who is engaged by a travel agency to drive different types of cars for tourists extends courtesy to the customers, requires education, expertise (a valid driving license), and respect to the public. His job may be termed as a profession. A mercenary is not a professional as he acts against public good

- B. PROFESSIONAL relates to a person or any work that a person does on profession, and which requires expertise (skills and knowledge), self-regulation and results in public good. The term professional means a 'person' as well as a 'status'.
- C. PROFESSIONALISM: It is the status of a professional which implies certain attitudes or typical qualities that are expected of a professional. According to Macintyre, professionalism is defines as the *services related to achieving the public good, in addition to the practices of the knowledge of moral ideals*.

## **SELF-INTEREST**

Self-interest is being good and acceptable to oneself. It is pursuing what is good for oneself. It is very ethical to possess self-interest. As per utilitarian theory, this interest should provide for the respect of others also. Duty ethics recognizes this aspect as duties to ourselves. Then only one can help others. Right ethicist stresses our rights to pursue our own good. Virtue ethics also accepts the importance of self-respect as link to social practices.

In Ethical Egoism, the self is conceived in a highly individualistic manner. It says that every one of us should always and only promote one's own interest. The ethical egoists do not accept the well-being of the community or caring for others. However this self-interest should not degenerate into egoism or selfishness, i.e., maximizing only own good in the pursuit of self-interest. The ethical egoists hold that the society benefits to maximum when (a) the individuals pursue their personal good and (b) the individual organizations pursue maximum profit in a competitive enterprise. This is claimed to improve the economy of the country as a whole, besides the individuals. In such pursuits, both individuals and organizations should realize that independence is not the only important value. We are also interdependent, as much as independent. Each of us is vulnerable in the society. Self-respect includes recognition of our vulnerabilities and interdependencies. Hence, it is compatible with caring for ourselves as well as others. Self-interest is necessary initially to begin with. But it should be one of the prime motives for action; the other motive is to show concern for others, in the family as well as society. One's self-interest should not harm others. The principles of 'Live and let (others) live', and 'reasonably fair competition' are recommended to professionals by the ethicists.

## **MORAL AUTONOMY**

Moral autonomy is defined as, decisions and actions exercised on the basis of moral concern for other people and recognition of good moral reasons. Alternatively, moral autonomy means 'self-determinant or independent'. The autonomous people hold moral beliefs and attitudes based on their critical reflection rather than on passive adoption of the conventions of the society or profession. Moral autonomy may also be defined as a skill and habit of thinking rationally about the ethical issues, on the basis of moral concern.

Viewing engineering as social experimentation will promote autonomous participation and retain one's professional identity. Periodical performance appraisals, tight-time schedules and fear of foreign competition threatens this autonomy. The attitude of the management should allow latitude in the judgments of their engineers on moral issues. If management views *profitability* is more important than *consistent quality and retention of the customers* that discourage the moral autonomy, engineers are compelled to seek the support from their professional societies and outside organizations for moral support. It appears that the blue-collar workers with the support of the union can adopt better autonomy than the employed professionals. Only recently the legal support has been obtained by the professional societies in exhibiting moral autonomy by professionals in this country as well as in the West.

The engineering skills related to moral autonomy are listed as follows:

1. Proficiency in recognizing moral problems in engineering and ability to distinguish as well as relate them to problems in law, economics, and religion,
2. Skill in comprehending, clarifying, and critically-assessing arguments on different aspects of moral issues,
3. Ability to form consistent and comprehensive view points based on facts,
4. Awareness of alternate responses to the issues and creative solutions for practical difficulties,
5. Sensitivity to genuine difficulties and subtleties, including willingness to undergo and tolerate some uncertainty while making decisions,
6. Using rational dialogue in resolving moral conflicts and developing tolerance of different perspectives among morally reasonable people, and
7. Maintaining moral integrity.

## Utilitarian Theory

The term Utilitarianism was conceived in the 19th century by **Jeremy Bentham** and **John Stuart Mill** to help legislators determine which laws were morally best. They suggested that the standard of right conduct is maximization of good consequences. Good consequences mean either ‘utilities’ or the ‘balance of good over evil’. This approach weighs the costs and benefits. Right actions are the ones that produce the greatest satisfaction of the preferences of the affected persons. In analyzing an issue in this approach, we have to:

- Identify the various courses of action available to us.
- Ask who will be affected by each action and what benefits or harms will be derived from each.
- Choose the action that will produce the greatest benefits and the least harm. The ethical action is the one that provides the greatest good for the greatest number.

The ACT UTILITARIAN theory proposed by **J.S. Mill** (1806-73) focuses on actions, rather than on general rules. An action is right, if it generates the most overall good for the most people involved. The RULE UTILITARIAN theory, developed by **Richard Brandt** (1910-97), stressed on the rules, such as ‘do not steal’, ‘do no harm others’, ‘do not bribe’, as of primary importance. He suggested that individual actions are right when they are required by set of rules which maximizes the public good.

The act utilitarian theory permitted a few immoral actions. Hence, there was need to develop rule utilitarian theory to establish morality and justice, in the transactions. For example, stealing an old computer from the employer will benefit the employee more than the loss to the employer. As per Act, utilitarian this action is right. But rule utilitarian observes this as wrong, because the employee should act as ‘faithful agent or

trustee of the employees'. In another example, some undisciplined engineers are terminated with the blame for the mistakes they have not committed.

The process is unfair although this results in promotion of overall good.

### Virtue Theory

This emphasizes on the character rather than the rights or duties. The character is the pattern of virtues (morally-desirable features). The theory advocated by Aristotle, stressed on the tendency to act at proper balance between extremes of conduct, emotion, desire, attitudes to find the golden mean between the extremes of 'excess' or 'deficiency'. The examples shown below illustrate the theory:

<i>Virtue</i>	<i>Excess</i>	<i>Golden mean</i>	<i>Deficient</i>
Truthfulness (governs communication)	Revealing all in violation of tact and confidentiality	Necessary and sufficient, to proper person	Secretive
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Green environment Work and earn	Exploitation Tiresome work (strained)	Protection Balance of work and leisure	Neglect Lazy (no work) and more pay

On the other hand, the Virtue Theory proposed by **Mac Intyre**, highlighted on the actions aimed at achieving common good and social (internal) good such as social justice, promotion of health, creation of useful and safe technological products and services. Five types of virtues that constitute responsible professionalism, namely public-spirited virtues, proficiency virtues, team-work virtues, self-governance virtues, and cardinal virtues are discussed.

## **TYPES OF INQUIRIES**

The three types of inquiries, in solving ethical problems are: normative inquiry, conceptual inquiry, and factual or descriptive inquiry.

The three types of inquiries are discussed below to illustrate the differences and preference.

### **1. Normative Inquiry**

It seeks to identify and justify the morally-desirable norms or standards that should guide individuals and groups. It also has the theoretical goal of justifying particular moral judgments. Normative questions are about what ought to be and what is good, based on moral values. For example,

1. How far does the obligation of engineers to protect public safety extend in any given situation?
2. When, if ever, should engineers be expected to blow whistle on dangerous practices of their employers?
3. Whose values ought to be primary in making judgment about acceptable risks in design for a public transport system or a nuclear plant? Is it of management, senior engineers, government, voters or all of them?
4. When and why is the government justified in interfering with the organisations?
5. What are the reasons on which the engineers show their obligations to their employees or clients or the public?

### **2. Conceptual Inquiry**

It is directed to clarify the meaning of concepts or ideas or principles that are expressed by words or by questions and statements. For example,

- (a) What is meant by safety?
- (b) How is it related to risk?
- (c) What is a bribe?
- (d) What is a profession?

When moral concepts are discussed, normative and conceptual issues are closely interconnected.

### **3. Factual or Descriptive Inquiry**

It is aimed to obtain facts needed for understanding and resolving value issues. Researchers conduct factual inquiries using mathematical or statistical techniques. The inquiry provide important information on business realities, engineering practice, and the effectiveness of professional societies in fostering moral conduct, the procedures used in risk assessment, and psychological profiles of engineers. The facts provide not only the reasons for moral problems but also enable us to develop alternative ways of resolving moral problems. For example,

1. How were the benefits assessed?
2. What are procedures followed in risk assessment?
3. What are short-term and long-term effects of drinking water being polluted? and
4. Who conducted the tests on materials?

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## **MORAL DEVELOPMENT (THEORIES)**

### **1. Kohlberg Theory**

Moral development in human being occurs over time and experience. Kohlberg suggested there are three levels of moral development, namely pre-conventional, conventional, and post-conventional, based on the type of reasoning and motivation of the individuals in response to moral questions.

In the pre-conventional level, right conduct for an individual is regarded as whatever directly benefits oneself. At this level, individuals are motivated by obedience or the desire to avoid punishment or to satisfy their own needs or by the influence of power over them. All young children exhibit this tendency. At the conventional level, people respect the law and authority. Rules and norms of one's family or group or society are accepted, as the standard of morality. Individuals in this level want to please or satisfy, and get approval by others and to meet the expectations of the society, rather than their self interest (e.g., good boy, good girl). Loyalty is regarded as most important. Many adults do not go beyond this level.

At the post-conventional level, people are called *autonomous*. They think originally and want to live by universally good principles and welfare of others. They have no self-interest. They live by principled conscience. They follow the golden rule, 'Do unto others as you would have them do unto you'. They maintain moral integrity, self-respect and respect for others.

Kohlberg believed that individuals could only progress through these stages, one stage at a time.

He believed that most of the moral development occurs through social interactions.

## **2. Gilligan's Theory**

Carol Gilligan found that Kohlberg's theory had a strong male bias. According to Gilligan's studies, men had a tendency to solve problems by applying abstract moral principles. Men were found to resolve moral dilemma by choosing the most important moral rule, overriding other rules. In contrast, women gave importance to preserve personal relationships with all the people involved. The context oriented emphasis on maintaining personal relationships was called the *ethics of care*, in contrast with the *ethics of rules and rights* adopted by men.

Gilligan revised the three levels of moral development of Kohlberg, as stages of growth towards ethics of caring. The pre-conventional level, which is same as that of Kohlberg's first one, right conduct, is viewed in a selfish manner solely as what is good for oneself. The second level called *conventional level*, the importance is on not hurting others, and willing to sacrifice one's own interest and help others. This is the characteristic feature of women. At the post-conventional level, a reasoned balance is found between caring about others and pursuing the self-interest. The balance one's own need and the needs of others, is aimed while maintaining relationship based on mutual caring. This is achieved by context-oriented reasoning, rather than by hierarchy of rules.

# **THEORIES ABOUT RIGHT ACTION (ETHICAL THEORIES)**

## **Uses and Criteria**

The ethical theories are useful in many respects.

1. In understanding moral dilemma. They provide clarity, consistency, systematic and comprehensive understanding.
2. It provides helpful practical guidance in moral issues towards the solution.
3. Justifying professional obligations and decisions, and
3. In relating ordinary and professional morality.

Different *criteria* may be applied for evaluating various ethical theories and deciding upon the best.

1. The theory must be clear and (coherent) formulated with concepts that are logically connected.
2. It must be internally consistent, i.e., none of its principles conflicts with any other
3. The theory and its defense must depend, only upon facts.
4. It must organize basic moral values in systematic and comprehensive manner. It is to fix priority of values and provide guidance in all situations
5. It must provide guidance compatible with our moral convictions (judgments) about concrete

situations. For example, if an ethical theory says that it is all right for engineers to make explosive devices without the informed consent of the public, we can conclude that the theory is inadequate.

Theories and judgments are continually adjusted to each other until we reach a reflective

equilibrium. Most of the theories converge towards the welfare of the humanity. The duty ethics and right ethics differ in great extent on their emphasis. But they remain complementary always.

### **Ethical Theories/Approaches**

Several ethical theories have been developed over different times, each of them stressing certain ethical principles or features. Each stresses a view and many a times, we find that these theories converge and reinforce the ethics, in deciding upon the actions and justifying the results.

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### **1. Utilitarian Theory**

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## **2. Duty Ethics**

- A. The duty ethics theory, proposed by **Immanuel Kant** (1724-1804) states, that actions are consequences of performance of one's duties such as, 'being honest', 'not cause suffering of others', 'being fair to others including the meek and week', 'being grateful', 'keeping promises' etc. The stress is on the universal principle of respect for autonomy i.e., respect and rationality of persons. As per Kant we have duties to ourselves, as we are rational and autonomous beings. We have a duty not to commit suicide; a duty to develop our talents and a duty to avoid harmful drugs. Kant insisted that moral duties are categorical imperatives. They are commands that we impose on ourselves as well as other rational beings. For example, we should be honest because honesty is required by duty. A businessman is to be honest because honesty pays — in terms of profits from customers and from avoiding jail for dishonesty.
- B. On the other hand, the DUTY ethics theory, as enunciated by **John Rawl**, gave importance to the actions that would be voluntarily agreed upon by all persons concerned, assuming impartiality. His view emphasized the autonomy each person exercises in forming agreements

with other rational people. Rawl proposed two basic moral principles; (1) each person is entitled to the most extensive amount of liberty compatible with an equal amount for others, and (2) differences in social power and economic benefits are justified only when they are likely to benefit every one, including members of the most disadvantaged groups. The first principle is of prime importance and should be satisfied first. Without basic liberties other economic or social benefits can not be sustained for long. The second principle insists that to allow some people with great wealth and power is justified only when all other groups are benefited. In the business scenario, for example, the free enterprise is permissible so far it provides the capital needed to invest and prosper, thereby making job opportunities to the public and taxes to fund the government spending on the welfare schemes on the poor people.

**C.W.D. Ross**, the British philosopher introduced the term *prima facie duties*, which means duties might have justified exceptions. In fact, most duties are *prima facie* ones; some may have obligatory or permissible exceptions. Ross assumed that the *prima facie* duties are intuitively obvious (self-evident), while fixing priorities among duties. He noted that the principles such as ‘Do not kill’ and ‘protect innocent life’ involve high respect for persons than other principles such as, ‘Do not lie’ (less harmful). This theory is criticized on the fact, that the intuitions do not provide sufficient guideline for moral duty. He has listed various aspects of Duty Ethics that reflect our moral convictions, namely:

1. Fidelity : duty to keep promises.
2. Reparation : duty to compensate others when we harm them.
3. Gratitude : duty to thank those who help us.
4. Justice : duty to recognize merit.
5. Beneficence : duty to recognize inequality and improve the condition of others.
6. Self-improvement : duty to improve virtue and intelligence.
7. Non-malfeasance : duty not to injure others.

### **3. Rights Theory**

Rights are entitlement to act or to have another individual act in a certain way. Minimally, rights serve as a protective barrier, shielding individuals from unjustified infringement of their moral agency by others. For every right, we have a corresponding duty of noninterference.

- A. The RIGHTS approach to ethics has its roots in the 18th century philosopher **Immanuel Kant**, who focused on the individual’s right to choose for oneself. According him, what makes human beings different from mere things is, that people have dignity based on their ability to choose freely what they will do with their lives, and they have a fundamental moral right to have these choices respected. People are not objects to be manipulated; it is a violation of human

dignity to use people in ways they do not freely choose. Other rights he advocated are:

1. *The right to access the truth*: We have a right to be told the truth and to be informed about matters that significantly affect our choices.
2. *The right of privacy*: We have the right to do, believe, and say whatever we choose in our personal lives so long as we do not violate the rights of others.

3. *The right not to be injured:* We have the right not to be harmed or injured unless we freely and knowingly do something to deserve punishment or we freely and knowingly choose to risk such injuries.
  4. *The right to what is agreed:* We have a right to what has been promised by those with whom we have freely entered into a contract or agreement.
- B. In deciding whether an action is moral or immoral, we must ask, does the action respect the moral rights of everyone? Actions are wrong to the extent that they violate the rights of individuals; the more serious is the violation, the more wrongful is the action. The RIGHTS theory as promoted by **John Locke** states that the actions are right, if they respect human rights of every one affected. He proposed the three basic human rights, namely *life, liberty, and property*. His views were reflected in the modern American society, when Jefferson declared the basic rights as life, liberty, and pursuit of happiness.
- C. As per **A.I. Melden's** theory based on rights, nature mandates that we should not harm others' life, health, liberty or property. Melden allowed welfare rights also for living a decent human life. He highlighted that the rights should be based on the social welfare system.
- D. *Human rights:* Human rights are explained in two forms, namely liberty rights and welfare rights. Liberty rights are rights to exercise one's liberty and stresses duties on other people not to interfere with one's freedom. The four features of liberty rights (also called *moral rights*), which lay the base for Government Administration, are:
1. Rights are natural in so far as they are not invented or created by government.
  2. They are universal, as they do not change from country to country.
  3. They are equal since the rights are the same for all people, irrespective of caste, race, creed or sex.
  4. They are inalienable i.e., one cannot hand over his rights to another person such as selling oneself to slavery.

The Welfare Rights are the rights to benefit the needy for a decent human life, when one can not earn those benefits and when those benefits are available in the society.

- E. *Economic rights:* In the free-market economy, the very purpose of the existence of the manufacturer, the sellers and the service providers is to serve the consumer. The consumer is eligible to exercise some rights<sup>9</sup>. The consumers' six basic rights are: Right to Information, Right to Safety, Right to Choice, Right to be Heard, Right to Redressal, and Right to Consumer Education.

A few rights are absolute, i.e., unlimited and have no justifiable exceptions. For example, rights ethicists view that the rights have not been violated if the people purchase a (technological product) hang glider and they get injured by flying them carelessly or under bad weather conditions. But human rights imply that one not to be poisoned or killed by technological products, whose dangers are not obvious or wantonly hidden. They imply a right to be informed, when the purchase was made, of the possible dangers during use or service (obtaining informed consent).

Rights ethics is distinctive in that it makes human rights the ultimate appeal — the moral bottom line. Human rights constitute a moral authority to make legitimate moral demands on others to respect

our choices, recognizing that others can make similar claims on us. Thus, we see that the rights ethics provides a powerful foundation for the special ethical requirements in engineering and other professions.

#### **4. The Virtue Theory**

This emphasizes on the character rather than the rights or duties. The character is the pattern of virtues (morally-desirable features). The theory advocated by Aristotle, stressed on the tendency to act at proper balance between extremes of conduct, emotion, desire, attitudes to find the golden mean between the extremes of 'excess' or 'deficiency'. The examples shown below illustrate the theory:

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### ***Self-realisation Ethics***

Right action consists in seeking self-fulfillment. In one version of this theory, the self to be realized is defined by caring relationships with other individuals and society. In another version called *ethical egoism*, the right action consists in always promoting what is good for oneself. No caring and society relationships are assumed.

### ***5. Justice (Fairness) Theory***

The justice or fairness approach to ethics has its roots in the teachings of the ancient Greek philosopher Aristotle, who said that “equals should be treated equally and unequals unequally.” The basic moral question in this approach is: How fair is an action? Does it treat everyone in the same way, or does it show favoritism and discrimination

## UNIT-4

### SAFETY AND RISK

Safety was defined as *the risk that is known and judged as acceptable*. But, risk is a potential that something unwanted and harmful may occur. It is the result of an unsafe situation, sometimes unanticipated, during its use.

$$\text{Probability of safety} = 1 - \text{Probability of risk}$$

$$\text{Risk} = \text{Probability of occurrence} \times \text{Consequence in magnitude}$$

Different methods are available to determine the risk (testing for safety)

1. Testing on the functions of the safety-system components.
2. *Destructive testing*: In this approach, testing is done till the component fails. It is too expensive, but very realistic and useful.
3. *Prototype testing*: In this approach, the testing is done on a proportional scale model with all vital components fixed in the system. Dimensional analysis could be used to project the results at the actual conditions.
4. *Simulation testing*: With the help of computer, the simulations are done. The safe boundary may be obtained. The effects of some controlled input variables on the outcomes can be predicted in a better way.

### RISK ANALYSIS

#### 4.2.1 Analytical Methods

Several analytical methods are adopted in testing for safety of a product/project.

##### 1. *Scenario Analysis*

This is the most common method of analysis. Starting from an event, different consequences are studied. This is more a qualitative method.

For example, a disaster recovery plan, for an organization is discussed. When the probability and size of loss (indicating possibility and financial significance, respectively) are both high, risk exists. On the other hand, risk is not associated with very low probability of occurrence, or with losses that under any other circumstances would be considered "affordable". But there is a gray area between probability/loss combinations that are truly risky, and those that are not. This reflects the fact that the boundary between risky and non-risky events is fuzzy, not exact.

To assess the risk faced by the organization, the planner matches the probability and loss characteristics of various exposures to one's intuition of risk. This exposure analysis can be most effectively carried out using 'loss scenarios'. A scenario is a synopsis of events or conditions leading to an accident and subsequent loss. Scenarios may be specified informally, in the form of narrative, or formally using diagrams and flow charts.

## **Steps for Risk Assessment**

1. What can go wrong that could lead to an outcome of hazard exposure? (identification and characterization of risk)
2. How likely is this to happen? (quantification of risk, likelihood, and magnitude)
  
3. If it happens, what are the consequences? Scenarios are constructed and the ways and means of facing the consequences are designed.

Consider three loss scenarios facing the company which is transporting various cargoes, some hazardous. The three scenarios involve the legal liability arising from use of company vehicles on public roads. The probability/loss combinations associated with these scenarios are 0.1, 1, and 10.4%. Scenario A represents an upset or overturn of a truck carrying dangerous cargoes in a populated area. It is further assumed that the spill leads to an explosion or release of toxic chemicals. Scenario B represents the company's liability for an accident involving bodily injury and property damage from relatively "ordinary" road hazards. No spill or disruption of cargoes is involved. Finally, Scenario C identifies a situation involving multiple simultaneous catastrophes to the company fleet.

Scenario A has a probability of occurrence of 0.001 and a loss potential of Rs. 50 million. It is deemed sufficiently "possible" and significant so as to be unequivocally classified as "risky". Scenario B, on the other hand, while more probable than A, involves losses that this firm considers "affordable". As such, it is rated not risky with confidence. Not so easy to classify is Scenario C. While the probability of multiple catastrophes is not strictly zero, it is rare ( $10^{-6}$ , or one chance in a million). So, while the loss potential is great, the chance of occurrence is "virtually impossible". Scenario C, nonetheless, resides in that gray area of risk that results in considerable anxiety over its classification.

The steps for Scenario building may alternatively be detailed as follows:

1. Identify the hazard of interest
2. State the question to be investigated
3. Develop a planned scenario
4. Develop a scenario tree
5. Collect evidence to evaluate the nodes of the scenario tree
6. Quantify the number of scenario tree, and
7. Link the information generated by scenario analysis with empirical evidence.

## **Using the Scenario**

The uses of scenario-based risk analysis are many and varied. The explicit analysis of scenarios may suggest ways of reducing or eliminating exposures through risk or loss-control activities. Risk or loss control actions have the effect of reducing probability and amount of risk or loss or both. Often, scenarios are posited on the basis that risk potential is as low as reasonably achievable (ALARA). This type of analysis recognizes that even under the best of risk control programs, accidents will happen.

As the cornerstone of planning, scenario-based risk analysis allows identification and prioritization of disaster potential. Knowing what can happen, and the risk involved, allows the analyst to make effective plans for safety in the event of disaster. By concentrating on risky scenarios, the disaster planner can tailor actions to exposures. This ensures the best allocation of resources at the time of crisis.

## **2. Failure Mode and Effect Analysis**

In this method, various parts or components of the system and their modes (patterns, propagation and nature) of failure are studied. The causes of failure or the interrelationships between the components

In the study of safety, the ‘safe exit’ principles are recommended. The conditions referred to as ‘safe exit’ are:

- 1 The product, when it fails, should fail safely
- 2 The product, when it fails, can be abandoned safely (it does not harm others by explosion or radiation)
- 3 The user can safely escape the product (e.g., ships need sufficient number of life boats for all passengers and crew; multi-storeyed buildings need usable fire escapes)

## RISK-BENEFIT ANALYSIS

The major reasons for the analysis of the risk benefit are:

- 1 To know risks and benefits and weigh them each
- 2 To decide on designs, advisability of product/project
- 3 To suggest and modify the design so that the risks are eliminated or reduced

There are some limitations that exist in the risk-benefit analysis. The economic and ethical limitations are presented as follows:

1. Primarily the benefits may go to one group and risks may go to another group. Is it ethically correct?
2. Is an individual or government empowered to impose a risk on some one else on behalf of supposed benefit to some body else? Sometimes, people who are exposed to maximum risks may get only the minimum benefits. In such cases, there is even violation of rights.
3. The units for comparison are not the same, e.g., commissioning the express highways may add a few highway deaths versus faster and comfortable travel for several commuters. The benefits may be in terms of fuel, money and time saved, but lives of human being sacrificed. How do we then compare properly?
4. Both risks and benefits lie in the future. The quantitative estimation of the future benefits, using the discounted present value (which may fluctuate), may not be correct and sometime misleading.

#### **4.5.1 Personal Risk**

Assessing the involuntary personal risk is not an easy task. For example, a group residing near the cement plant is exposed to a lot of risk. If suppose a cement plant or refinery was to come up in the area where this group already reside, they will object the proposal. The adequacy of compensation amount payable can not be fixed reasonably. How to estimate the rupee value of an individual human being? For example, a person may be a father to his young ones, husband to his beloved wife, son to his aged parents, friend to the needy, and as well a guardian for his pet dogs.

There are persons who dared to serve people in dire straits, in spite of the risky situations where their lives were in stakes. For example, Mahathma Gandhi served people during Navakali yatra, when dangers were present all over. For such saviors, there was no personal risk.

However, any of the following methodologies may be adopted to assess quantitatively, the personal risk:

1. Assess the voluntary activities (e.g., life insurance policy taken)
2. Assess the degree of occupational hazard (e.g., dust, radiation, and asbestos) and its effect on health.
3. Loss of senses such as sight (eyes), hearing (ears) and loss of limbs (immobility by the loss/damage to organs or disfigurement of the limbs or body).
4. Loss of earning capability, especially due to physical disability, and
5. Get assistance by trained arbiters.

#### **4.5.2 Public Risk**

Assessing the public risk is relatively easy, as in the societal value system the cost of disability can be averaged out. For example, the U.S. National Safety Council 1 adopts an equivalent of 6000 days (16.42 years), for death, as per the personal value system for social costs of disability.

To assess the public risk, the loss on the assets and the correction costs are estimated. For example,

- 1 Loss of or reduction in future income or earning capacity due to loss of limbs or their capability
- 2 Costs associated with accident , which includes the transplantation or reinforcement of body parts/limbs, and medical treatment and
- 3 Cost of welfare, which includes rehabilitation, provision of less-demanding alternate jobs, and other disability benefits.

#### **4.5.3 Reducing Risk (Improving Safety)**

Several techniques adopted to reduce the risks (or improve safety) in a product or process are listed as follows:

1. Application of inherent safety concepts in design, e.g., LPG cylinder is provided with frame to protect the valve while handling and facilitate cryogenic storage. A magnetic door catch provides an easy escape for children caught inside the 'fridge' accidentally.
2. Use of redundancy principle in the instrument protection/design. For example, use of stand-by device, and back-up for computer storage.

3. Periodical monitoring (inspection) and testing of safety system to ensure reliability, e.g., fire extinguishers, 'earth' system in electric circuits are checked periodically.
4. Issue of operation manuals, training of the operating personnel and regular audits are adopted to ensure that the procedures are understood, followed and the systems are kept in working condition.
5. Development of well-designed emergency evacuation plan and regular rehearsal/drills to ensure preparedness, in case of emergency.

### **Voluntary Risk**

Voluntary risk is the involvement of people in risky actions, although they know that these actions are unsafe. The people take these actions for thrill, amusement or fun. They also believe that they have full control over their actions (including the outcomes!) and equipments or animals handled, e.g., people participate in car racing and risky stunts.

Testing becomes inappropriate when the products are

- 1 Tested destructively
- 2 When the test duration is long, and
- 3 When the components failing by tests are very costly. Alternate methods such as design of experiments, accelerated testing and computer-simulated tests are adopted in these circumstances.

### **Accountability**

The term Accountability means:

1. The capacity to understand and act on moral reasons
2. Willingness to submit one's actions to moral scrutiny and be responsive to the assessment of others. It includes being answerable for meeting specific obligations, i.e., liable to justify (or give reasonable excuses) the decisions, actions or means, and outcomes (sometimes unexpected), when required by the stakeholders or by law.

The tug-of-war between of causal influence by the employer and moral responsibility of the employee is quite common in professions. In the engineering practice, the problems are:

- (a) The fragmentation of work in a project inevitably makes the final products lie away from the immediate work place, and lessens the personal responsibility of the employee.
- (b) Further the responsibilities diffuse into various hierarchies and to various people. Nobody gets the real feel of personal responsibility.
- (c) Often projects are executed one after another. An employee is more interested in adherence of tight schedules rather than giving personal care for the current project.
- (d) More litigation is to be faced by the engineers (as in the case of medical practitioners). This makes them wary of showing moral concerns beyond what is prescribed by the institutions. In spite of all these shortcomings, engineers are expected to face the risk and show up personal responsibility as the profession demands.

## **4.3 ASSESSMENT OF SAFETY AND RISK**

### **4.3.1 Uncertainties in Assessment**

There are many positive uncertainties in determining the risk of a product/service.

1. Restricted access to knowledge on risk: Some organizations do not disclose the data, citing legal restrictions.
2. Uncertain behavior of materials: Test data supplied by the suppliers are only statistical. The individual parts may behave considerably ( $13\sigma$ ) different from the statistical mean obtained from the tests on random samples.
3. Uncertain and varying behavior of user environments such as physical shock, thermal shock, fatigue, creep, impulse and self-excited vibrations in components or structures due to winds, snow fall, and rains cause sudden failure of the whole structure. An error or wrong procedure during assembly or joining the components may cause additional stress leading to early failure.
4. The use or misuse of materials/products, remaining untracked, e.g., exposure to rain or snow or damp weather is likely to change the properties.
5. Newer applications of obsolete technologies, remaining unpublished.
6. Substitution of newer materials whose behavior are not disclosed, and
7. The unexpected and unintended outcomes of the product/project.

All these aspects make the estimation of risk complex and unreliable. Hence, the data are to be monitored continuously and risk estimation updated periodically.

For example, a few friends live very near the cement plant, as they are unable to choose a better location for their house. The group work as motor mechanics in an automobile service station nearby.

## **UNIT-5**

### **CONCEPT OF DUTY**

**Honour** (or **honor** in American English; either spelling in Canadian English)<sup>[1]</sup> is the idea of a bond between an individual and a society as a quality of a person that is both of social teaching and of personal ethos, that manifests itself as a code of conduct, and has various elements such as valor, chivalry, honesty, and compassion. It is an abstract concept entailing a perceived quality of worthiness and respectability that affects both the social standing and the self-evaluation of an individual or institution such as a family, school, regiment or nation. Accordingly, individuals (or institutions) are assigned worth and stature based on the harmony of their actions with a specific code of honour, and the moral code of the society at large.

### **PROFESSIONAL DUTIES**

Professional duties encompass the personal, and corporate standards of behavior expected by professionals. The word professionalism originally applied to vows of a religious order. By at least the year 1675, the term had seen secular application and was applied to the three learned professions: Divinity, Law, and Medicine.<sup>[1]</sup> The term professionalism was also used for the military profession around this same time.

Professionals and those working in acknowledged professions exercise specialist knowledge and skill. How the use of this knowledge should be governed when providing a service to the public can be considered a moral issue and is termed professional ethics.<sup>[3]</sup>

It is capable of making judgments, applying their skills, and reaching informed decisions in situations that the general public cannot because they have not attained the necessary knowledge and skills.<sup>[4]</sup> One of the earliest examples of professional ethics is the Hippocratic oath to which medical doctors still adhere to this day.

### **Collegiality**

**Collegiality** is the relationship between *colleagues*. Colleague is taken to mean a fellow member of the same profession, a group of colleagues united in a common purpose, and used in proper names, such as Electoral College, College of Cardinals, and College of Pontiffs.

Colleagues are those explicitly united in a common purpose and respecting each other's abilities to work toward that purpose. A colleague is an associate in a profession or in a civil or ecclesiastical office. Collegiality can connote respect for another's commitment to the common purpose and ability to work toward it. In a narrower sense, members of the faculty of a university or college are each other's colleagues.

Sociologists of organizations use the word collegiality in a technical sense, to create a contrast with the concept of bureaucracy. Classical authors such as Max Weber consider collegiality as an organizational device used by autocrats to prevent experts and professionals from

challenging monocratic and sometimes arbitrary powers. More recently, authors such as Eliot Freedom (USA), Malcolm Waters (Australia) and Emmanuel Lazega (France) have shown that collegiality can now be understood as a full-fledged organizational form. This is especially useful to account for coordination in knowledge intensive organizations in which interdependent members jointly perform non routine tasks – an increasingly frequent form of coordination in knowledge economies. A specific, social discipline comes attached to this organizational form, a discipline described in terms of niche seeking, status competition, lateral control, and power among peers in corporate law partnerships, in dioceses, in scientific laboratories, etc. This view of collegiality is obviously very different from the ideology of collegiality stressing mainly trust and sharing in the collegiums.

### **Loyalty**

**Loyalty**, in general use, is a devotion and faithfulness to a nation, cause, philosophy, country, group, or person.<sup>[1]</sup> Philosophers disagree on what can be an object of loyalty, as some argue that loyalty is strictly interpersonal and only another human being can be the object of loyalty. The definition of loyalty in law and political science is the fidelity of an individual to a nation, either one's nation of birth, or one's declared home nation by oath (naturalization).

## **Models of professional roles (Professional roles to be played by an engineer)**

It is understood that an engineer has to play many roles while exercising his professional obligations. Some of the professional roles or models are given below:

### **1. Engineers as Saviors**

It is believed that engineers hold the key for any improvements in society through technological developments.

Thus some people consider engineer as a savior because they redeem society from poverty, inefficiency, waste and the hardships drudgery of manual labor.

### **2. Engineers as Guardians**

Engineers know the direction in which technology should develop and the speed at which it should move. Thus many people agree the role of engineers as guardians, as engineers guard the best interests of society.

### **3. Engineers as Bureaucratic Servants**

The engineers' role in the management is to be the servant who receives and translates the directives of management into solid accomplishments.

Thus the engineers act as a bureaucratic servants i.e., loyal organizations set by the management.

### **4. Engineers as Social Servants**

As we know, engineers have to play the role of social servants to receive society's directives and to satisfy society's desires.

### **5. Engineers as Social Enablers and Catalysts**

Besides merely practising the management's directives, the engineers have to play a role of creating a better society. Also they should act as catalysts for making social changes.

Sometimes engineers have to help the management and the society to understand their needs and to make decisions about desirable technological development.

### **6. Engineers as Game Players**

In actual practice, engineers are neither servants nor masters of anyone. In fact, they play the economic game rules, which may be effective at a given time.

Like managers, the engineers' aim is also to play successfully within the organization and moving ahead in a competitive world.

## **Consensus and Controversy**

Literally, consensus means 'agreement', and controversy means 'disagreement'.

When an individual exercises moral autonomy, he may not be able to attain the same results as other people obtain in practicing their moral autonomy. Here there might be some differences in the practical application of moral autonomy. This kind of controversies i.e., disagreements are inevitable.

<sup>ü</sup>Since exercising moral autonomy is not as precise and clear-cut as arithmetic, therefore the moral disagreements are natural and common. So in order to allow scope for disagreement, the tolerance is required among individuals with autonomous, reasonable and responsible thinking.

According to the principle of tolerance, the objective of teaching and studying engineering ethics is to discover ways of promoting tolerance in the exercise of moral autonomy by engineers.

Thus the goal of teaching engineering ethics is not merely producing always a unanimous moral conformity; it is about finding the proper ways and means for promoting tolerance in the practical applications of moral autonomy by engineers.

In a way, the goal of courses on engineering ethics and goals of responsible engineering have some similarities. Both situations require the need for some consensus regarding the role of authority.

### **Relationship between autonomy and authority**

1. Moral autonomy and respect for authority are compatible with each other. Exercising moral autonomy is based on the moral concern for other people and recognition of good moral reasons. Also moral autonomy emphasizes the capabilities and responsibilities of people. Authority provides the framework through which learning attitudes are encouraged.
2. Sometimes, conflicts will arise between individuals' need for autonomy and the need for consensus about authority. This situation can be rescued by having open and frank discussion regarding a moral issue with the help of authority.

**Illustration:** Consider the relationship between autonomy and authority, with reference to a classroom. In the classroom, the teachers have authority over students. Authority of the teachers helps in maintaining the dignity and decorum of academic climate in a institution; also in restoring the confidence and respect between teachers and students.

As per the first point, there should be the acceptance of authority of authority by both the teachers and students, in order to conduct the classes in orderly ways.

When the authority is misused, conflicts may arise between autonomy and authority. As per the second point, allowing open discussions between teachers and students can reduce the unhealthy academic atmosphere.

### **Confidential and Proprietary Information**

**Confidential and Proprietary Information** means any information that is classified as confidential in the Firms Global Policy on Confidential Information or that may have intrinsic value to the Firm, the Firms clients or other parties with which the Firm has a relationship, or that may provide the Firm with a competitive advantage, including, without limitation, any trade secrets; inventions (whether or not patentable); formulas; flow charts; computer programs; access codes or other systems information; algorithms; technology and business processes; business, product or marketing plans; sales and other forecasts; financial information; client lists or other intellectual property; information relating to compensation and benefits; and public information that becomes proprietary as a result of the Firms compilation of that information for use in its business, provided that such Confidential and Proprietary Information does not include any information which is available for use by the general public or is generally available for use within the relevant business or industry other than as a result of your action. Confidential and Proprietary Information may be in any medium or form, including, without limitation, physical documents, computer files or discs, electronic communications, videotapes, audiotapes, and oral communications.

### **Collective bargaining**

**Collective bargaining** is a process of negotiation between employers and a group of employees aimed at agreements to regulate working salaries, working conditions, benefits, and other aspects of workers' compensation and rights for workers. The interests of the employees are commonly presented by representatives of a trade union to which the employees belong. The collective agreements reached by these negotiations usually set out wage scales, working hours, training, health and safety, overtime, grievance mechanisms, and rights to participate in workplace or company affairs.<sup>[1]</sup>

The union may negotiate with a single employer (who is typically representing a company's shareholders) or may negotiate with a group of businesses, depending on the country, to reach an industry-wide agreement. A collective agreement functions as a labour contract between an employer and one or more unions. Collective bargaining consists of the process of negotiation between representatives of a union and employers (generally represented by management, or, in some countries such as Austria, Sweden and the Netherlands, by an employers' organization) in respect of the terms and conditions of employment of employees, such as wages, hours of work, working conditions, grievance procedures, and about the rights and responsibilities of trade unions. The parties often refer to the result of the negotiation as a *collective bargaining agreement* (CBA) or as a *collective employment agreement* (CEA).

### Problem Solving Techniques: A 5-Step Approach

Some problems are small and can be resolved quickly. Other problems are large and may require significant time and effort to solve. These larger problems are often tackled by turning them into formal projects.

Whether the problem you are focusing on is small or large, using a systematic approach for solving it will help you be a more effective project manager.

This approach defines five **problem solving steps** you can use for most problems...

- Define the Problem
- Determine the Causes
- Generate Ideas
- Select the Best Solution
- Take Action

#### Define the Problem

The most important of the *problem solving steps* is to define the problem correctly. The way you define the problem will determine how you attempt to solve it.

For example, if you receive a complaint about one of your project team members from a client, the solutions you come up with will be different based on the way you define the problem.

If you define the problem as poor performance by the team member you will develop different solutions than if you define the problem as poor expectation setting with the client.

#### Determine the Causes

Once you have defined the problem, you are ready to dig deeper and start to determine what is causing it. You can use a **fishbone diagram** to help you perform a cause and effect analysis.

If you consider the problem as a gap between where you are now and where you want to be, the causes of the problem are the obstacles that are preventing you from closing that gap immediately.

This level of analysis is important to make sure your solutions address the actual causes of the problem instead of the symptoms of the problem. If your solution fixes a symptom instead of an actual cause, the problem is likely to reoccur since it was never truly solved.

#### Generate Ideas

Once the hard work of defining the problem and determining its causes has been completed, it's time to get creative and develop possible solutions to the problem.

Two great *problem solving methods* you can use for coming up with solutions are **brainstorming** and **mind mapping**.

#### Select the Best Solution

After you come up with several ideas that can solve the problem, one *problem solving technique* you can use to decide which one is the best solution to your problem is a simple **trade-off analysis**.

To perform the trade-off analysis, define the critical criteria for the problem that you can use to evaluate how each solution compares to each other. The evaluation can be done using a simple matrix. The highest ranking solution will be your best solution for this problem.

#### Take Action

Once you've determined which solution you will implement, it's time to take action. If the solution involves several actions or requires action from others, it is a good idea to create an **action plan** and treat it as a mini-project.

Using this simple five-step approach can increase the effectiveness of your **problem solving skills**.

For more *problem solving strategies* and techniques, subscribe to my newsletter below.

**Occupational crime** is crime that is committed through opportunity created in the course of legal occupation. Thefts of company property, vandalism, the misuse of information and many other activities come under the rubric of occupational crime. The concept of occupational crime - as one of the principal forms of white collar crime - has been quite familiar and widely invoked

since the publication of Clinard and Quinney's influential Criminal Behavior Systems: A Typology. More recently, however, the term occupational crime has been applied to activities quite removed from the original meaning of white collar crime, and it has been used interchangeably with such terms as occupational deviance and workplace crime. In the interest of greater conceptual clarity within the field of white collar crime the argument is made here for restricting the term 'occupational crime' to illegal and unethical activities committed for individual financial gain - or to avoid financial loss - in the context of a legitimate occupation. The term 'occupational deviance' is better reserved for deviation from occupational norms (e.g. drinking on the job; sexual harassment), and the term 'workplace crime' is better reserved for conventional forms of crime committed in the workplace (e.g. rape; assault). The conceptual conflation of fundamentally dissimilar activities hinders theoretical, empirical, and policy-related progress in the field of white collar crime studies.

**Price fixing** is an agreement between participants on the same side in a market to buy or sell a product, service, or commodity only at a fixed price, or maintain the market conditions such that the price is maintained at a given level by controlling supply and demand.

The intent of price fixing may be to push the price of a product as high as possible, generally leading to profits for all sellers but may also have the goal to fix, peg, discount, or stabilize prices. The defining characteristic of price fixing is any agreement regarding price, whether expressed or implied.

Price fixing requires a conspiracy between sellers or buyers. The purpose is to coordinate pricing for mutual benefit of the traders. For example, manufacturers and retailers may conspire to sell at a common "retail" price; set a common minimum sales price, where sellers agree not to discount the sales price below the agreed-to minimum price; buy the product from a supplier at a specified maximum price; adhere to a price book or list price; engage in cooperative price advertising; standardize financial credit terms offered to purchasers; use uniform trade-in allowances; limit discounts; discontinue a free service or fix the price of one component of an overall service; adhere uniformly to previously-announced prices and terms of sale; establish uniform costs and markups; impose mandatory surcharges; purposefully reduce output or sales in order to charge higher prices; or purposefully share or pool markets, territories, or customers.

Price fixing is permitted in some markets but not others; where allowed, it is often known as *resale price maintenance* or *retail price maintenance*.

In neo-classical economics, price fixing is inefficient. The anti-competitive agreement by producers to fix prices above the market price transfers some of the consumer surplus to those producers and also results in a deadweight loss.

International price fixing by private entities can be prosecuted under the antitrust laws of many countries. Examples of prosecuted international cartels are those that controlled the prices and output of lysine, citric acid, graphite electrodes, and bulk vitamins.<sup>[1]</sup>

## **UNIT-6**

### **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 progress.

### **MULTINATIONAL CORPORATIONS**

Organisations 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.

#### **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,

- (a) the negative duty of refraining from harmful actions such as violence and fraud, and
- (c) basic fairness and practical justice in case of conflicts.

The ten international rights to be taken care of, in this context are:<sup>1</sup>

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.
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.

### **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.

## **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.

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 of environmental concern.

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 on how to educate the people on environmental practices, issues, and possible remedies.

## **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.

### **Types of Issues**

Different types of problems are found in computer ethics.

#### **1. *Computer as the Instrument of Unethical Acts***

- (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. These are discussed in # 5.3.2 and # 5.2.1, respectively, in detail.

### **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.

### **CROSS CULTURE ISSUES**

In a global village, human resource management and organisational behaviour are expected to play crucial role in the process of internationalisation of business. Globalisation has its impact on people management. The management is required to cope with problems of alien cultures, unfamiliar laws, languages, attitudes, practices, competitors, managerial styles, work ethics, and so on. Human resource function such as hiring, maintaining and remunerating must acquire global perspective. To face this challenge, the management must be flexible and proactive. By helping the best qualified people execute the company's strategy on a global scale, the management can become a source of competitive advantage for the company.

### **CULTURAL DIFFERENCES AND SIMILARITIES**

For understanding cultural issues in organizational setting against international

perspective, it is essential to understand employee behaviour. Five basic conclusions can be drawn about cross-cultural impact on employee behaviour:

First, individual behaviour in organisational setting varies across cultures. Thus, employees based in India, Japan, U.S. and Germany are likely to have different attitudes and patterns of behaviour. The behaviour patterns are likely to be widespread and pervasive within an organization.

Second, culture itself is an important variable for this variation. There are also other factors like differing standards of living and varied geographical conditions which cause variations in behaviour. However, culture is a significant factor.

Third, although behaviour within organisational setting remains quite diverse across cultures, organisations themselves appear to be increasingly similar. Hence, managerial practices at a general level may be alike, but the people who work within organisations differ markedly.

Fourth, the same manager behaves differently in different cultural settings. A manager may adopt one set of behaviours when working in one culture, but may change those behaviours when moved into a different culture.

Lastly, cultural diversity can be an important source of energy in enhancing organisational effectiveness. More and more organisations are realising the virtues of cultural diversity, but surprisingly, little do they know how to manage it.

Cross-cultural management literature is replete with studies examining cross-national differences in individual behaviour, managerial attitudes, values and beliefs. Behaviour variations can be studied in terms of individual differences, managerial responses, motivation, and rewards across cultures.

### **Media ethics**

It is the subdivision of applied ethics dealing with the specific ethical principles and standards of media, including broadcast media, film, theatre, the arts, print media and the internet. The field covers many varied and highly controversial topics, ranging from war journalism to Benetton ad campaigns.

Media ethics involves promoting and defending values such as a universal respect for life and the rule of law and legality.

Literature regarding the ways in which specifically the Internet impacts media ethics in journalism online is scarce, thereby complicating the idea for a universal code of media ethics.