UNIT IV – SAFETY, RESPONSIBILITIES AND RIGHTS

SAFETY AND RISK

Imagine you are a fresh graduate.

You get a job as an engineer in a large atomic power plant.

- Would you take it or not?
- Under what conditions would you take it?
- Under what conditions would you not?
- Why?

People as Consumers:

- *Active Consumers*: directly involve themselves e.g., mowing the lawn, washing clothes or toasting bread.
- *Passive Consumers*: have less choice and less control e.g., Water, Electricity, Petrol,
- *Bystanders*: e.g., exposed to Pollution from unknown sources

.What is safe to Entrepreneurs, may not be so to Engineers. e.g., Pilots: "Indian Airports are not safe; Low Vision in Fog“

What is safe to Engineers, may not be so to Public. e.g., Top loading Washing Machine

Typically several groups of people are involved in safety matters but have their own interests at stake. Each group may differ in what is safe and what is not.

Concept of Safety

1. “A ship in harbor is safe, but that is not what ships are built for” – John A. Shedd

2. ‘A thing is safe if its risks are judged to be acceptable’ - William W. Lawrence

- We buy an ill-designed Iron box in a sale-> Underestimating risk
- We judge fluoride in water can kill lots of people -> Overestimating risk
- We hire a taxi, without thinking about its safety -> Not estimating risk
- How does a judge pass a judgement on safety in these 3 cases?

….*So, this definition won't do in real life.*

Then, what is acceptable also depends upon the individual or group’s value judgment. Hence a better, *working definition* of *concept of safety* could be,

“A thing is safe (to a certain degree) with respect to a given person or group at a given time if, were they fully aware of its risks and expressing their most settled values, they would judge those risks to be acceptable (to that certain degree).” -Mike Martin and Roland Schinzinger

A thing is NOT SAFE if it exposes us to unacceptable danger or hazard

RISK is the potential that something unwanted and harmful may occur.

a. We take a risk when we undertake something or use a product that is not safe.

Risk in technology could include dangers of

b. bodily harm,
c. economic loss, or
d. environmental degradation.

- Some may assume that “safety” is a concrete concept, while “risk” is a vague, hypothetical concept
- In fact, its the other way around
- Risks always exist. But true safety never exists, except in hypothetical situations
- So, risk is *reality*, safety is *fantasy*

What degree of risk is acceptable?

Safety is a matter of how people would find risks acceptable or unacceptable, if they knew the risks, and are basing their judgments on their *most settled value* perspective.
So, to this extent, it is *objective*.

Perspectives differ.
To this extent, it is *subjective*.

So, Safety is *'acceptable risk'*.

Acceptable Risk

'A risk is acceptable when those affected are generally *no longer (or not) apprehensive* about it.'

Apprehension (i.e. anxiety) depends largely on factors such as

- whether the risk is assumed voluntarily.
- how the probabilities of harm (or benefit) is perceived.
- job-related or other pressures that causes people to be aware of or to overlook risks.
- whether the defects of a risky activity or situation are immediately noticeable or close at hand .
- whether the potential victims are identifiable beforehand.

Voluntary risk and Control

A person is said to take *'VOLUNTARY RISK'*
-when he is subjected to risk by either his own actions or action taken by others and
-*volunteers* to take that risk without any apprehension.

-For example, John and Ann Smith enjoy riding motorcycles over rough ground for amusement. They take voluntary risk, part of being engaged in such a potentially dangerous sport.

Connected to this notion of voluntarism is the matter of *Control*. In the example cited, the Smiths are aware of the high probability of accident figures in such a sport, but they display characteristically *unrealistic confidence* of most people when they believe the dangers to be *under their control.* In terms of engineering as social experimentation, people are more *willing to be the subjects of their own experiments* than of someone else's (whether social experiment or not).

Chauncey Starr informs us that individuals are more ready to assume voluntary risks than involuntary risks, even when voluntary risks are 1000 times more likely to produce a fatality than the involuntary ones.

- A DISASTER = A seriously disruptive event + A state of unprepared ness.
- e.g., Titanic collision with an iceberg, at night: Emergency
- Fewer lifeboats, inadequate training and warnings of icebergs unheeded -> Disaster.

Effect of information on risk assessments

The manner in which information necessary for decision making is presented can greatly influence how risks are perceived. Consider this example:

In a particular case of disaster management, the only options available are provided in 2 different ways to the public for one to be chosen (where lives of 600 people are at stake).

Alternate 1

If program A is followed, 200 people will be saved. If Program B is followed, 1/3 probability is 600 people will be saved and 2/3 probability that nobody will be saved.

Response

72% of the target group chose option A and 28% option B

Alternate 2

If program A is followed, 400 people will die. If Program B is followed, 1/3 probability is that nobody will die and 2/3 probability that 600 people will die.

Response

This time only 22% of the target group chose option A and 78% option B

Conclusion:

1. The option perceived as yielding firm gain will tend to be preferred over those from which gains are perceived as risky or only probable.
2. Option emphasizing firm losses will tend to be avoided in favour of those whose chances of success are perceived as probable.

Secondary Costs of Products

Cost of products is High, if designed unsafely

- Returns and Warranty Expenses
- Loss of Customer Goodwill
- Cost of litigation
- Loss of Customers due to injuries in using it
- Cost of rework, lost time in attending to design problems

Manufacturer's understanding of the risk in a product is necessary:

- To help reduce secondary costs
- To know the possible risk for purposes of pricing, disclaimers, legal terms and conditions, etc.
- To know the cost of reducing the risks
- To take a decision before finalizing the design.

Buyer's understanding of the risk in a product is necessary:

- To judge whether he/she wants to take the risks
- To judge whether the 'risk vs. costs' justifies taking the risk.

'JOB RELATED RISKS'

- Many workers *are taking risks in their jobs* in their stride like being exposed to asbestos.

- *Exposure to risks* on a job is in one sense of *voluntary nature* since one can always refuse to submit to the work or may have control over how the job is done.

- But generally workers have *no choice* other than what they are told to do since they *want to stick to the only job* available to them.

- But they are *not* generally *informed* about the exposure to toxic substances and other dangers which are *not readily* seen, smelt, heard or otherwise sensed.

- Occupational health and safety regulations and unions can have a better say in correcting these situations but still things are far below expected safety standards.

- Engineers while designing work stations must take into account the casual attitude of workers on safety (esp. when they are paid on piece rate).

Problems faced by engineers about *public concept of safety*

The optimistic attitude that things that are familiar, that have not caused harm before and over which we have some control *present no risks*.

The serious shock people feel when an accident kills or maims people *in large numbers* or *harms those we know*, even though statistically speaking such accidents might occur infrequently.

'Safety in a commodity comes with a price' – Explain.

Absolute safety is never possible to attain and safety can be improved in an engineering product only with an increase in cost.

On the other hand, *unsafe* products *incur secondary costs* to the producer beyond the primary (production) costs, like warranty costs loss of goodwill, loss of customers, litigation costs, downtime costs in manufacturing, etc.

Figure indicates that P- *Primary costs are high for a highly safe* (low risk) product and S- *Secondary costs are high for a highly risky* (low safe) product.

If we draw a curve T=P+S as shown, there is a *point at which costs are minimum* below which the cost cannot be reduced.

If *the risk* at Minimum Total Cost Point is *not acceptable*, then the producer has to *choose* a *lower acceptable risk* value in which case the *total cost* will be *higher* than M and the product designed accordingly.

It should now be clear that '*safety comes with a price'* only

.

Knowledge of risk for better safety

- Robert Stephenson writes that all the accidents, the harms caused and the means used to repair the damage *should be recorded* for the benefit of the younger Members of Profession.
- A faithful account of those accidents and the damage containment was really *more*

valuable than the description of successful work.

- Hence it is imperative that knowledge of risks will definitely help to attain better safety.
- But it should be borne in mind, that still gaps remain, because

i) there are some industries where information is *not freely shared* and

ii) there are always *new applications of old technology* that render the available information *less useful.*

Uncertainties encountered in design process

- A decision on maximising profit or maximising the return on investment.
- Uncertainties about applications like dynamic loading instead of static loading, vibrations, wind speeds.
- Uncertainties regarding materials and skills required in the manufacturing.
- Changing economic realities.
- Unfamiliar environmental conditions like very low temperature.
- The available standard data on items like steel, resistors, insulators, optical glass, etc are based on statistical averages only.
- Due to the inherent nature of processes, all compts have a tolerance in design leading to the probability statistics by which assemblies' capability is assessed.

Testing strategies for safety

***Some commonly used testing methods*:**

- Using the past experience in checking the design and performance.
- Prototype testing. Here the one product tested may not be representative of the population of products.
- Tests simulated under approximately actual conditions to know the performance flaws on safety.
- Routine quality assurance tests on production runs.

The above testing procedures are not always carried out properly. Hence we cannot trust the testing procedures uncritically. Some tests are also destructive and obviously it is impossible to do destructive testing and improve safety.

In such cases, a simulation that traces hypothetical risky outcomes could be applied.

- Scenario Analysis (Event -> Consequences)
- Failure Modes & Effects Analysis (Failure modes of each component)
- Fault Tree Analysis (System Failure -> Possible Causes at component level)
- What if there is a combination of factors?
    - All Analysis pre-suppose a thorough understanding of the physical system

Failure modes and effect analysis (FMEA) :

This approach systematically examines the failure modes of each component, without however, focusing on relationships among the elements of a complex system.

Fault Tree Analysis (FTA) :

A system failure is proposed and then events are traced back to possible causes at the component level. The reverse of the fault-tree analysis is 'event – tree analysis'. This method most effectively illustrates the disciplined approach required to capture as much as possible of everything that affects proper functioning and safety of a complex system.

Risk Benefit Analysis

Ethical Implications

- When is someone entitled to *impose* a risk on another in view of a supposed benefit to others?
- Consider the worst case scenarios of persons exposed to *maximum risks* while they are reaping only *minimum benefits.* Are their rights *violated*?
- Are they provided *safer* alternatives?
- Engineers should keep in mind that *risks to known persons are perceived differently*

from statistical risks

- Engineers may have *no control* over grievance redressal.

Conceptual difficulties in Risk-Benefit Analysis

Both risks and benefits lie *in future*

- Heavy discounting of future because the very low present values of cost/benefits do not give a true picture of future sufferings.
- Both have related uncertainties but difficult to arrive at expected values
- What if *benefits* accrue to *one party* and *risks to another*?
- Can we *express* risks & benefits in a *common set of units*?
    - e.g. Risks can be expressed in one set of units (*deaths* on the highway) and benefits in another *(speed of travel)*?

Many projects, which are highly beneficial to the public, have to be *safe also*.

Hence these projects can be justified using RISK-BENEFIT analysis. In these studies, one should find out

i) What are the risks involved?
ii) What are the benefits that would accrue?
iii) When would benefits be derived and when risks have to be faced?
iv) Who are the ones to be benefited and who are the ones subjected to risk-are they the same set of people or different.

The issue here is *not*, say, *cost-effective* design but it is only *cost of risk taking Vs benefit* analysis. Engineers should *first recommend* the *project feasibility* based on risk-benefit analysis and once it is justified, *then* they may get into *cost-effectiveness* without increasing the risk visualized.

In all this, engineers should ask themselves this ethical question: 'Under what conditions, is someone in society entitled to *impose a risk on someone* else on behalf of a *supposed benefit*

to others.'

Difficulties in assessing Personal Risks

- Individuals are ready to *assume voluntary* risks than *involuntary* risks.
- The difficulty here is generally in assessing personal risks which are involuntary.
- The problem of quantification of risk raises innumerable problems.
- For example, how to assign a rupee *value to one's life*. There is no over the counter trade in lives.
- Even for a sale, it has to be clear *under what conditions* the sale is to take place.
- If one buys a kg of rice it matters whether it is just one additional purchase one makes *regularly* or it is the first rice purchase *after quite sometime*.
- Even when compensations are made to people exposed to involuntary risk, the basis on which it is made or even the intensity of risk could be *different for different people*.
- As of now, the one suggestion could be to employ an *open procedure*, overseen by trained arbiters, in each case, where *risk to individuals is to be studied and remedied*.

Public Risk and Public Acceptance

- Risks and benefits to public are more easily determined than to individuals
- National Highway Traffic Safety Administration (NHTSA)- proposed a value for life based on:
  - loss of future income
  - other costs associated with the accident
  - estimate of quantifiable losses in social welfare resulting from a fatality
  - NOT a proper basis for determining the optimal expenditure allocated to

saving lives

Accounting publicly for benefits and risks

Engineers should account publicly for benefits and risks in the following manner:

- Engineers must remain as *objective* as humanly possible in their investigations and conclusions.
- They must also *state* openly any *personal biases* that they may have about the project being investigated.
- Engineers, even if they are acknowledged experts, may *not have complete knowledge* of the issues at hand.
- They should, if necessary, *admit* their *lack of knowledge*, in any particular area publicly.
- A willingness to *admit uncertainty* and also to *reveal methodology* and sources particularly when numerical data is presented.
- The way statistical information is presented can create misconceptions in the public mind. Hence it should be *presented in a way to improve realistic interpretations*.
- They must *consider the views of the parties affected* by the project under study *before* coming to conclusions.
- The type of action taken should be morally evaluated regardless of its consequences. If it is wrong to violate certain rights, then figuring out the benefit of the consequences of doing so is irrelevant.

Difficulties in establishing Safeguards

- Incomplete knowledge of the engineering subject
- Refusal to face hard questions caused by lack of knowledge
    - False sense of security
    - e.g. Nuclear waste disposal problem
- Caution in stating probabilities of rare events
- Varying understanding of risk based on presentation of facts

- Risk assessments based on incorrect/unacceptable assumptions/data

- Only a few persons/groups participate in the exercise

Some of the ways by which engineers may try to reduce risks.

- ⇨ In all the areas of works, engineers should give top priority for product safety.
- ⇨ They should believe that accidents are caused by dangerous conditions that can be corrected. Negligence and operator errors are not the principal causes of accidents.
- ⇨ If a product is made safe, the initial costs need not be high if safety is built into a product from the beginning. It is the design changes done at a later date that are costly. Even then life cycle costs can be made lower for the redesigned or retrofitted product (for safety).
- ⇨ If safety is not built into the original design, people can be hurt during testing stage itself.
- ⇨ They should get out of the thinking that warnings about hazards are adequate and that insurance coverage is cheaper than planning for safety.
- ⇨ All it takes to make a product safe is to have different perspective on the design problem with emphasis on safety.

Examples of Improved Safety

- Magnetic door catch introduced on refrigerators
  - Prevent death by asphyxiation of children accidentally trapped inside
  - The catch now permits the door to opened from inside easily
  - Cheaper than older types of latches
- Dead-man Handle for Drivers in trains
- Semaphore signaling
- Volkswagen's car safety belt
  - Attachment on the door so that belt automatically goes in place on entry

Liability

Early logic and social philosophy: (Richard C. Vaughan)

- ‘Caveat Emptor’: buyer beware
- Examine what you want before you buy
- If he is negligent, he suffers the bad bargain.
- Law will not aid those who are negligent
- ‘Privity of Contract’: User, if he is not a party to the contract, has no rights for any claim (user buys from the retailer and not from the manufacturer).

Gradually....

Manufacturer was made liable for injuries resulting from negligence in the design/manufacture

- The new law: concept of Strict Liability was established in the case ‘Green man vs. Yuba Power Products’ in California.
- If the product sold is defective, the manufacturer is liable for any harm that results to users

Implications to Engineers:

- Engineers must weigh chances of *defect causing injury* against *cost of minimizing defects*
- *Minimal compliance is insufficient* – adhering to accepted practices & standards not enough
- Standards are *mere checklists* - use them creatively and judgmentally
- Engineers *can be sued* personally even when *acting according* to guidelines set by *employers*
- e.g. One county highway engineer was sued for failure to repair roads-- had to pay $2 million
- Some Cos. protect their engineers and allow themselves to be sued for such money

damages

- Independent engineers can write liability limits into their contracts

- Good knowledge of liability is necessary for engineers

'SAFE EXIT'

It is almost impossible to build a completely safe product or one that will never fail. When there is a failure of the product *SAFE EXIT* should be provided.

Safe exit is to assure that

i) when a product fails, it will fail safely,
ii) that the product can be abandoned safely and iii) that the user can safely escape the product.

More than the questions of who will build, install, maintain and pay for a safe exit, the most important question is who will recognize the need for a safe exit. This responsibility should be an integral part of the experimental procedure.

Some examples of providing 'SAFE EXIT':

- Ships need lifeboats with sufficient spaces for all passengers and crew members.
- Buildings need usable fire escapes
- Operation of nuclear power plants calls for realistic means of evacuating nearby communities
- Provisions are needed for safe disposal of dangerous materials and products.

Colleagiality & Its Elements

'Collegiality is a kind of connectedness grounded in *respect for professional expertise* and in a *commitment to the goals and values of the profession* and as such, collegiality includes a disposition to *support and co-operate with one's colleagues*'.

- Craig Ihara

The central elements of collegiality are *respect, commitment, connectedness and co-operation.*

Respect: Acknowledge the worth of other engineers engaged in producing socially useful and safe products.
Commitment: Share a devotion to the moral ideals inherent in the practice of engineering.
Connectedness: Aware of being part of a co-operative undertaking created by shared commitments and expertise.
Collegiality, like most virtues, can be misused and distorted.
It should not be reduced to 'group interest' but should be a shared devotion for public good. It is not defaming colleagues, but it does not close the eyes to unethical practices of the co-professionals, either.

Classifications of Loyalty

⇨ *Agency-Loyalty*

- Fulfill one's contractual *duties* to an employer.
- Duties are particular *tasks for which* one is *paid*
- *Co-operating* with colleagues
- *Following* legitimate *authority* within the organization.

⇨ *Identification-Loyalty*:

- It has to do with attitudes, emotions and a sense of *personal identity*.
- Seeks to meet one's moral duties with personal *attachment and affirmation.*
- It is against *detesting* their employers and companies, and do work *reluctantly* and *horribly* (this is construed as *disloyalty*)

This means
- Avoid conflicts of interest,

- Inform employers of any possible conflicts of interest,

- Protect confidential information,
- Be honest in making estimates,
- Admit one's errors, etc.

Loyalty - *Obligation of Engineers*

Agency-Loyalty

- Engineers are *hired* to do their duties.
- Hence *obligated* to employers within proper limits

Identification-Loyalty

Obligatory on two conditions;

1. When some important *goals are met* by and through a group in which the engineers participate
2. When employees are *treated fairly*, receiving the share of benefits and burdens.

But clearly, identification-loyalty is a *virtue* and *not* strictly an *obligation*.

Relationship - Professionalism and Loyalty

1. Acting on professional *commitments* to the public is *more effective* to serve a company *than* just *following* company orders.

2. *Loyalty to employers* may *no*t mean *obeying* one's immediate *supervisor*.

3. Professional obligations to both an employer and to the public might *strengthen rather than contradict* each other.

Need for Authority

Authority is needed since

a) Allowing everyone to exercise *uncontrolled individual discretion creates chaos* (confusion).

b) Clear lines of authority *identifies areas of* personal responsibility and *accountability*.

Institutional Authority and Expert Authority

Institutional authority

'The institutional right given to a person to exercise power based on the resources of the institution'.

- It is acquired, exercised and defined within institutions.
- It is given to individuals to perform their institutional duties assigned within the organisation. There is not always a perfect match between the authority granted and the qualifications needed to exercise it.

Expert authority

'The possession of special knowledge, skill or competence to perform some task or to give sound advice'.

Engineers may have expert authority but their institutional authority, *may only be*, to *provide management* with analysis of possible ways to perform a technical task, after which they are *restricted to following management's directive* about which option to pursue. In large companies, *engineers, advisors and consultants* in staff function carry *expert authority*, while *institutional authority* is vested only with *line managers*.

Authority Vs Power

Ineffective persons, even if vested with authority by their institution, *may not be able to*

summon the power their position allows them to exercise. On the other hand, people who are

effective may be *able to wield greater power* that goes beyond the authority attached to the positions they hold. Highly respected engineers of proven integrity belong to this class.

Authority - Morally justified

Observations on authority.

- An *employer* who has institutional authority may *direct engineers* to do something that is *not morally justified.*
- Engineers may feel that they have an institutional *duty to obey* a directive that is *morally unjustified*, *but* their moral *duty*, all things considered, *is not to obey.*

- To decide whether a specific act of *exercising institutional authority is morally justified*, we need to know whether the institutional *goals are* themselves *morally permissible* or desirable and whether that *act violates* basic moral duties.

'Zone Of Acceptance' of Authority

'A subordinate is said to accept authority whenever he permits his behaviour to be guided by the decision of a superior, without independently examining the merits of that decision'
- Herbert Simon

- Simon notes that all employees tend to have a *'zone of acceptance'* in which they are willing to accept their employer's authority.

- *Within that zone*, an individual, relaxing his own critical faculties, *permits* the decision of the *employer to guide* him.

- Employees generally *do not make an issue* of questionable incidents on morality, *out of a sense of responsibility* to give their employer leeway within which to operate and often *not to risk their jobs.*

- The *problem increases* when employees slowly *expand* the boundaries of *tolerance and rationalize* it.

This only shows that engineers should *never stop* critically *reviewing* the employer's *directives* especially *on moral issues.*

'Faithful Agent Argument'

National Society of Professional Engineers (NSPE) Code states,

"The engineer ……will act in professional matters for client, or employer *as a faithful agent or trustee*……He will *not actively participate* in strikes, picket lines or other *coercive action*"

meaning that when one is a faithful trustee of one's employer he cannot actively participate in any collective forcible action.

Board of Ethical Review argued that engineers *have a higher standard* than self interest and that their ethical duty is to act for their employer as a faithful agent or trustee.

Collective bargaining is *inconsistent with loyalty* to employers because it

- is against the desires of the employer
- uses force or coercion against the employer and
- involves collective and organized opposition.

But *every instance* of such conduct *need not be unethical.*

An example:

Three engineers sincerely feel that they are underpaid. After their representations to their bosses are in vain, they threaten their employer, politely, that they would seek employment elsewhere. Here, even though, they act against the desires of their employer and have acted collectively, they have not acted unethically or violated their duty.

Conclusion: '*Faithful agency*' only *concerns with performing one's duty* but *does not mean* that safety, salary and other economical *benefits cannot be negotiated* from a position of

strength. Employee's duty to employer *does not mean unlimited sacrifice* of self-interest.

'Public Service Argument'- Collective bargaining.

- 'Public Service Argument' is an *argument against* collective bargaining.
- The paramount duty of engineers is *to serve the public.*
- *Unions*, by definition, *promote* the *interests of their members* and whenever there is a clash of interests, the interest of the general public is ignored by them. Though the argument is a valid one, it looks at the worst possible scenarios with unions and *decides that* engineering *unions act* only *irresponsibly*.
- A body of engineers can *promote engineers' interest* within limits set *by professional concern* for the public good.

Benefits of Collective Bargaining.

a) Unions have created *healthy salaries* and *high standard of living* of employees.
b) They give a *sense of participation* in company *decision making*.
c) They are a good *balance to the power* of employers to fire employees at will.
d) They provide an *effective grievance redressal* procedure for employee complaints.

Harms Caused by Collective Bargaining.

a) Unions are *devastating the economy* of a country, being a main *source of inflation*
b) With unions, there is *no congenial (friendly)*, cooperative *decision making*.
c) Unions *does not promote* quality performance by making job *promotion and retention based on seniority*.
d) They *encourage unrest and strained relations* between employees and employers.

'Confidentiality or confidential information'

- Information considered desirable to be kept secret.
- Any information that the employer or client would like to have kept secret in order to compete effectively against business rivals.

- This information includes *how business is run, its products, and suppliers,* which directly affects the ability of the company to compete in the market place
- *Helps* the competitor to *gain advantage* or catch up

Privileged information, Proprietary information and Patents.

- *Privileged information:*
  - ⇨ 'Information available only on the *basis of special privilege*' such as granted to an employee working on a special assignment.

- *Proprietary information:*
  - ⇨ Information that a company *owns or is the proprietor of.*
  - ⇨ This is primarily used in *legal sense*.
  - ⇨ Also called *Trade Secret*. A trade secret can be virtually any type of information that has *not become public* and which an employer has *taken steps to keep secret*.

- *Patents:*
  - ⇨ *Differ* from trade secrets.
  - ⇨ *Legally protect specific products* from being manufactured and sold by competitors *without* the express *permission of the patent holder*.
  - ⇨ They have the *drawback of being public* and competitors may *easily work around them* by creating alternate designs.

Obligation of Confidentiality

1. Based on ordinary moral considerations:

   I. *Respect for autonomy*:
   - *Recognizing the legitimate control* over private information (individuals or corporations).

- This control is required *to maintain their privacy* and protect their self-interest.

II. *Respect for Promise*:

- Respecting promises in terms of *employment contracts* not to divulge certain information considered sensitive by the employer

III. *Regard for public well being*:

- Only when there is a *confidence* that the physician *will not reveal* information, the patient will have the *trust to confide* in him.
- Similarly *only when companies maintain* some degree of *confidentiality* concerning their products, the benefits of *competitiveness* within a free market are *promoted*.

2. Based on Major Ethical Theories:
   - All theories profess that employers have *moral and institutional rights* to decide what information about their organization should be released publicly.
   - They acquire these rights as *part of their responsibility to protect the interest of the organization*.
   - All the *theories*, rights ethics, duty ethics and utilitarianism *justify this confidentiality* but in different ways.

Effect of Change of Job on Confidentiality

- Employees are *obliged* to protect confidential information regarding former employment, *after a change of job*.
- The *confidentiality trust* between employer and employee *continues beyond* the period of employment.
- But, the employee *cannot be forced not to seek* a change of job.
- The *employer's right* to keep the trade secrets confidential by a former employee *should be accepted* at the same time, the *employee's right* to seek career advancement *cannot also be denied*.

Conflict of Interest

Conflict of Interest arises when two conditions are met:

1. The professional is in a relationship or a role that requires exercising good judgment on behalf of the interests of an employer or client and

2. The professional has some additional or side interest that could threaten good judgment in serving the interests of the employee or client. E.g. *When an engineer is paid based on a percentage of the cost of the design and there is no incentive for him to cut costs*- The distrust caused by this situation compromises the engineers' ability to cut costs and calls into question his judgement.

'An act of gift' and 'An act of bribe'

'A *gift* is a *bribe* if you can't *eat, drink or smoke it in a day*'.

'If you think that your offer of acceptance of a particular gift would have *grave* or merely *embarrassing consequences for your company if made public*, then the gift should be considered a bribe'.

'*Bribe* can be said to be a *substantial* amount of money or goods offered beyond a stated business contract with the *aim of winning an advantage* in gaining or keeping the contract'.

Here '*substantial*' means that which is *sufficient to distort the judgment* of a typical person.

Conflict of Interest created by Interest in other companies

- ⇨ When one *works actually for the competitor* or subcontractor as an employee or consultant.
- ⇨ Having *partial ownership or substantial stock holdings* in the competitor's

business.

- ⇨ It may *not arise* by merely having a *spouse working for sub-contractor* to one's company, but it *will arise* if one's *job also includes granting contracts* to that subcontractor.
- ⇨ *Tempting customers away* from their current employer, while still working for them *to form* their own *competing business.*
- ⇨ *Moonlighting* usually creates *conflicts* when working for competitors, suppliers or customers but *does not conflict when working for others without affecting* the present employer's business.

  'Moonlighting' means working in one's spare time for another employer.

Conflicts of Interest created by Insider information

- o *Using inside information* to *set-up a business* opportunity for *oneself or family or friends.*
- o *Buying stock* in the company for which one works is *not objectionable* but it should be based on the *same information* available to the public.
- o The *use* of any company *secrets* by employee to *secure a personal gain* threatens the interest of the company.

Avoiding Conflicts Of Interests

- o Taking guidance from *Company Policy*
- o In the absence of such a policy taking a *second opinion from a coworker or manager*. This gives an impression that there no intension on the part of the engineer to hide anything.
- o In the absence of either of these options, to *examine ones own motives* and *use the ethical* problem solving *techniques*.
- o One can look carefully into the professional codes of ethics *which uniformly forbid conflicts of interest*. Some of these codes have very explicit statements that can help determine whether or not the situation constitutes conflict of interest.

Types Of Crime

- *Domestic crime*

  Non-accidental crime committed *by members* of the family

- *Professional Crime*

  When crime is *pursued as a profession* or day to day occupation

- *Blue collar crime (or) Street crime*

  Crime *against person, property* (theft, assault on a person, rape)

- *Victimless crime*

  Person *who commits* the crime *is the victim* of the crime. E.g. Drug addiction

- *Hate crime*

  Crime done on the banner of *religion, community, linguistics*

Occupational Crime

- ⇨ Occupational crimes are *illegal acts* made possible through one's *lawful employment*.
- ⇨ It is the *secretive violation of laws* regulating work activities.
- ⇨ When committed by office workers or professionals, occupational crime is called '*white collar crime*'.

People Committing Occupational Crimes

- Usually have *high standard of education*
- From a *non-criminal family background*
- Middle class male around *27 years of age* (70% of the time) with *no previous history*
- *No involvement in drug* or alcohol abuse

- Those who had *troublesome life* experience in the childhood (Blum)
- People *without firm principles* (Spencer)
- Firms with *declining profitability* (Coleman, 1994)
- Firms in highly *regulated areas and volatile market* -pharmaceutical, petroleum industry.(Albanese, 1995)

Price Fixing

An act was passed, which *forbade* (prevented) companies from *jointly setting prices* in ways that *restrain free competition* and trade. Unfortunately, many senior people, well respected and positioned were of the opinion that '*price fixing'* was good for their organizations and the public.

Employees Endangering Lives of Employees

Employers indulge in exposing their employees to safety hazards. They *escape criminal action* against them, by paying *nominal compensations* even if their crimes are proved in court. And even this happens *only when the victim sues company* for damages under civil law.

Engineers' Moral Rights

Engineers' moral rights fall into categories of *human, employee, contractual and professional rights.*

Professional rights:

The right to form and *express one's professional judgment freely*

The right to *refuse* to carry out *illegal and unethical activity*

The right to *talk publicly* about one's work *within bounds* set by confidentiality obligation

The right to *engage* in the activities of *professional societies*

The right to *protect* the clients and the public *from the dangers* that might arise from one's work

The right to professional *recognition* of one's services.

Right of Professional Conscience

- There is one *basic* and generic professional right of engineers, the *moral right to exercise responsible professional judgment* in pursuing professional responsibilities.
- Pursuing these responsibilities involves *exercising* both *technical judgment* and *reasoned moral convictions.*
- This basic right can be referred to as *the right of professional conscience.*

Right of Conscientious Refusal

The right of Conscientious refusal is the right to *refuse to engage in unethical behaviour* and to refuse to do so *solely because one views it as unethical.*

Two situations to be considered.

1. Where there is widely shared agreement in profession as to whether an act is unethical
Here, professionals have a moral right to refuse to participate in such activities.

2. Where there is room for disagreement among reasonable people over whether an act is unethical.
Here, it is possible that there could be *different ethical view points* from the professional and the employer.
In such cases the engineers can have a *limited right* to *turn down* assignments that violates their personal conscience *only in matters of great importance* such as threats to human life.

This right also depends on the *ability* of the employer *to reassign* the engineer to alternate projects *without serious economic hardships* to the orgn.

The *right of professional conscience does not extend to the right to be paid for not working.*

Right to Recognition

Right to Recognition involves two parts.

The right to *reasonable remuneration* gives the moral right for fighting against corporations making good profits while engineers are being paid poorly. Also is the case where patents are not being rewarded properly by the corporations benefiting from such patents.

The other *right to recognition* is non-monetary part of recognition to the work of engineers.

But *what is reasonable remuneration or reasonable recognition* is a difficult question and should be resolved by discussions between employees and employers only.

Professional Rights & Ethical Theories

1. Rights Ethics:

- The most basic human right, which needs no justification, as per A.I.Meldon, is to pursue one's legitimate (those that do not violate others' rights) interests.
- The right to pursue legitimate interests gives a person right to pursue professional moral obligations.
- This may be viewed as a human right of conscience directly derived from the basic human right.

2. Duty Ethics:

- I have a right to something only because others have duties or obligations to allow me (and not interfere) to do so.
- If we derive the meaning of 'others' as employers, then the basic professional right is justified by reference to others' duties to support or not interfere with the work related exercise of conscience by professionals.

3. Utilitarianism*:*

- Public good can be served by allowing professionals to meet their obligations to the

public.

- These obligations arise due to the professional's role in promoting public good.
- The basic goal of producing the most good for the greatest number of people is enough to justify the right of professional conscience.

Whistle-blowing and Its Features

Whistle blowing is an *act of conveying information* about a *significant moral problem* by a *present or former employee*, *outside approved channels* (or against strong pressure) to someone, in a position to take action on the problem.

The features of *Whistle blowing* are:

- Act of Disclosure: *Intentionally conveying information outside approved organizational channels when the person is under pressure not to do so from higher-ups.*
- Topic: *The information is believed to concern a significant moral problem for the organization.*
- Agent: *The person disclosing the information is an employee or former employee.*
- Recipient: *The information is conveyed to a person or organization who can act on it.*

Types of Whistle Blowing

External Whistle blowing*:* The act of passing on information outside the organisation.
Internal Whistle blowing: The act of passing on information to someone within the organization but outside the approved channels.
Either type is likely to be considered as disloyalty, but the second one is often seen as less serious than the latter. From corporations' point of view both are serious because it leads to distrust, disharmony, and inability of the employees to work together.

Open Whistle blowing: Individuals openly revealing their identity as they convey the information.
Anonymous Whistle blowing*:* Individual conveying the information conceals his/her identity.

Procedures to be followed before Whistle Blowing

- *Except* for extreme *emergencies*, always try *working through normal* organizational *channels*.
- Be *prompt* in expressing objections.
- Proceed in a tactful manner with *due consideration to the feelings* of others involved.
- As much as possible, *keep supervisors informed* of your actions, both informally and formally.
- Be accurate in observations and claims and *keep all formal records* documenting relevant events.
- *Consult* colleagues for *advice* and also to *avoid isolation*.
- *Consult the ethics committee* of your professional society before going outside the organization.
- *Consult a lawyer* regarding potential legal liabilities.

A great deal of introspection and reflection are required before WB. Motive should neither be for revenge upon fellow employee, supervisor or company nor in the hope of future gains like book contracts or speaking tours etc.

Conditions to be satisfied before Whistle Blowing

Richard T. De George suggests the following:

1. The *harm* that will be done by the product to the public is *serious* and considerable.

2. The individual makes his/her concern *known to his/her superiors*

.

3. If one does not get any proper response from immediate superiors, then one should *exhaust the channels* that are available *within the organization* including the board of directors.

4. One must have *documented evidence* that would *convince* a reasonable and impartial

observer that one's view of the situation is correct and the company policy is wrong.

5. There must be *strong evidence* that making the information public will in fact *prevent the threatened serious harm.*

Prevention of Whistle Blowing

The following *actions* will *prevent/reduce* whistle blowing:

1. Giving *direct access* to higher levels of management by announcing '*open door'* policies with guarantee that *there won't be retaliation.* Instead such employees should be *rewarded for fostering ethical behavior* in the company.
2. This gives greater freedom and promotes open communication within the organization.
3. Creation of an Ethics Review Committee with *freedom to investigate complaints and make independent recommendations* to top management.
4. Top priority should be given to *promote ethical conduct* in the organization *by top management*.
5. Engineers should be *allowed to discuss in confidence*, their moral concerns with the ethics committee of their professional societies.
6. When there are differences on ethical issues between engineers and management, *ethics committee members* of the professional societies *should be allowed* to enter into these discussions.

7. *Changes and updations* in law must be explored by engineers, organizations, professional societies and government organizations on a continuous basis.

Employee Rights

Employee rights are any rights, moral or legal, that involve the status of being an employee.

Employee rights are:

⇨ There should be *no discrimination* against an employee *for criticizing* ethical, moral or legal policies and practices of the organization.

⇨ The organization will *not also discriminate* against an employee for *engaging in outside activities* or for objecting to an organization directive that violates common norms of morality.

⇨ The employee *will not be deprived of* any enjoyment of *reasonable privacy* in his/her workplace.

⇨ *No personal information* about employees *will be collected* or kept other than what is necessary to manage the organization efficiently and to meet the legal requirements.

⇨ *No employee* who alleges that her/his rights have been violated *will be discharged* or penalized *without a fair hearing* by the employer organization.

Some clear examples: falsifying data, avoidance on the safety of a product

Discrimination

- Discrimination generally means *preference* on the grounds of *sex, race, skin colour, age or religious outlook*.
- In everyday speech, it has come to mean *morally unjustified treatment of people on arbitrary or irrelevant grounds.*
- Therefore to call something 'Discrimination" is to condemn it.
- But when the question of justification arises, we will call it *'Preferential Treatment'*.

Intellectual Property Rights

❖ *Intellectual Property* is a product of the *human intellect* that has *commercial value*

❖ Many of the rights of the ownership common to real and *personal property* are also

common to *Intellectual Property*

- ❖ Intellectual Property can be *bought, sold, and licensed*
- ❖ Similarly it can be *protected against theft* and *infringement* by others

Patent, Design & Trademark* together with *Copyright* form *TOTAL INTELLECTUAL PROPERTY

PATENT

1. Derived from the Latin word 'LITTERAE PATENTES' which means 'Open Letters' or 'Open Documents' to confer rights and privileges.
2. A contract between an Inventor and the Government
3. An exclusive privilege monopoly right granted by the Government to the Inventor
4. Invention may be of an Industrial product or process of manufacture
5. Invention should be new, non-obvious, useful and patentable as per Patents Act
6. The right to the inventor is for limited period of time and valid only within the territorial limits of a country of grant.

Examples: *a drug compound, a tool, maybe software effects*

DESIGN

- ➢ Meant for beautifying an industrial product to attract the consumer public
- ➢ Shaping, Configuration or Ornamentation of a vendible Industrial product
- ➢ Exclusive 'Design Rights' to the originator for a limited term
- ➢ Patents & design embrace the production stage of an industrial activity

TRADE MARK

- ➢ Trade Mark is a name or symbol adopted for identifying goods
- ➢ Public can identify from the Trade Mark from whom the product is emanating
- ➢ Trade Marks protection is given for an industrial product by the Government

Examples: Channel No.5's smell, Jacque Villeneuve's face!

COPY RIGHTS

❖ The right to original literary and artistic works

- Literary, written material
- Dramatic, musical or artistic works
- Films and audio-visual materials
- Sound recordings
- Computer Programmes/software
- SOME databases

Example: Picasso's Guernica, Microsoft code, Lord of the Rings

Need For A Patent System

- Encourages an inventor to disclose his invention
- Encourages R & D activities as the industries can make use of the technology, & avoids reduntant research
- Provides reasonable assurance for commercialisation.
- Provides an inducement to invest capital in the new lines of production and thus , help for technical development and upgradation.
- One may get a very good return of income through Patent Right on the investment made in R & D.

Effect of Patent

- A patentee gets the exclusive monopoly right against the public at large to use,sell or manufacture his patented device.
- A patentee can enforce his monopoly right against any infringement in the court of law for suitable damages or profit of account.
- The Government ensures full disclosure of the invention to the public for exchange of exclusive monopoly patent right to the inventor.