

Human Value → Rights & Resp. of Citizens

Responsibilities:

- (1) Observe by the constitution
Protect the integrity and unity of India
Cherish & follow the noble ideas which inspired our freedom struggle
- (2) Defend the country
Value & preserve the cultural heritage
natural environment
- (3) Public property → Mrs. Gandhi
Obey the laws. → VII
- (4) Consider the welfare of all citizens
Safeguarding public property. → 17th/2

Rights:

- Right to equality → Before law → (no discrimination, all considered equal)
→ Social equality (access to all public areas)
→ Equality in public employment

Protection of civil rights (untouchability, entering a temple)

Right to freedom

- to speech
- to form union, associat^{ion}
- to movement
- Reside & settle in any part of country ; except J&K

Right against exploitation

- Poor
- Children
- Wages
- Women

Right to freedom of Religion

- Free to practise any religion, Preach
- Propogate
- All religions have equal status

Cultural and Educational RT

- Rt. of minority group
- (Can set up their own institutions to dep. educational and cultural aspect)

Right to Constitutional Remedies

→ Anyone can seek constitutional remedies

Rt. to property

→ Citizen can acquire, own & dispose his material property.

Right to information

→

* Rt. to education → Children

aged 6-14 have a fundamental rt. of RTE.

→ Pvt school reserve 25% for eco. weak

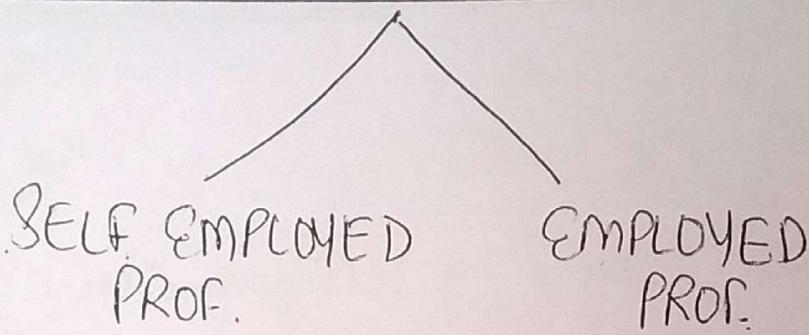
→ Prohibits donations

→ No interview of child or parents for admission

→ Sp trainings for school dropouts.

→ No discrimination

PROFESSIONAL RESPONSIBILITY



SEP

- Responsibilities are more clear
- No contractual agreement
- Independent decision
- Has to remain committed to the profession
- Has to create his/her's norms for prof. conduct .

EP

-
OPP.

Responsibility of Professional :

① Collegiality → No exact meaning

Derived from College

↓
group of ppl with common purpose

- to promote professional group for common cause
- Commitment to prof.
- Shared vision

② Loyalty → qty of being faithful

- Sense of dedication to the prof.
- towards a cause
- dedication towards org./employer

But loyalty to employer
is indirect.

③

Confidentiality

→ Keeping the information
Confidential

④

Respect for Authority

→ In an org. we report to our
supervisors



Power structure → Respect
them

→ Respect to rules & regulations

→ Obey the orders

⑤

Accountability

→ It should be an inherent quality of an

→ Accountable to for the outcome

→ As prof. you must be able to draw
the best from your team.

- Give freedom of working

- encourage participation

- Lead by ex.

- Must be accountable for your actions

HARMONY IN LIFE

★ When needs are satisfied a person has a harmonious life.

FOUR ORDERS OF NATURE

① Padarthawastha [Material state]

→ Things belonging to this state have character of changing their form but do not multiply or grow.

Eg :- Formatⁿ of Coal or petroleum prod.

But disbalance is created due to over exploitation

② Prana awastha

→ Things multiply and grow
[eg:- Seeds; trees etc.]

③ Jeewawastha

Refers to an order within animals, which have the characteristics of interacting with each other
[shelter, security & reproduction]

④ Gyanawastha

Entities having a desire to be happy while interacting with each other.

Indian Philosophical Thoughts

→ Goals of life :-

① Artha - That which seeks

↓
Material wealth to support life
e.g. - job, property, wealth.

② Karma - Pleasure from material wealth.

Food, relationship, property

③ Dharma - to support / to sustain
Set of rules or guidelines to live

④ Moksh - Total freedom
(ultimate goal)
Completely devoid of desires

F. Ratt.

* Rules of Life :- *

- ① Image - Healthy body, good appearance.
- ② Breathing → Proper breathing for mental & physical fitness.
- ③ Elimination → Cleansing of body.
- ④ Nourishment & clothing
- ⑤ Mental control
- ⑥ Relaxation
- ⑦ Exercise

Harmony with Self

* Rules of life :- ↑
* Needs.

Harmony with family

- Communicatⁿ (speak & listen)
- Sharing & Caring
- Respect tradition of family
- Cooperation

Harmony with Society

- Team spirit
- Respect
- Sharing & Caring

Harmony with nature

- Understand the role you play
- Clear goal in life

✓ ETHICAL LIVING

- ① Beneficence
(Always doing good to others)
- ② Least Harm
- ③ Truthfulness
- ④ Justice
- ⑤ Non-violence
- ⑥ Respect for others

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Engineer's Responsibility and Safety

Case Study → Venkat

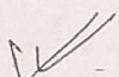
- Q1. Should Venkat have gone ahead with the job of discharging the effluents in river
- Q2. If he had refused → Q. would he be asked someone else--- Is there any pt?
- Q3. Should he have quit the job instead of going ahead with such a danger

Many ethical issues may come up during the career of an engineering prof.

SAFETY

SAFETY

- It should be safe for the consumers.
 - There is always uncertainties in its design and implementations.
 - Hence, there is risk.
- Extremely costly to deal with such situations
- Economical damage
- Damage to reputation and credibility



SAFETY & RISK

Safety → An action is considered safe when the risks associated with it are known and acceptable.

Risk — The probability of getting into a dangerous situation or achieving an unfavourable result.

Concept of Safety :-

Kyff

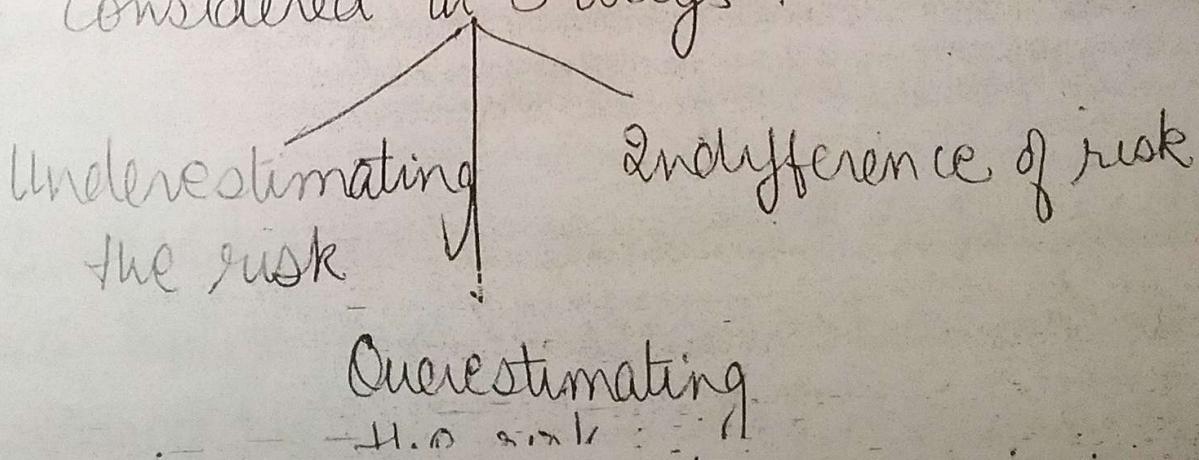
Both safety and risk are probabilistic
i.e. When you invest your money in
stock market, you are taking risk.

Somebody can predict & advise that it
is safe but still you are always taking
risk.

Swine flu → All wore masks, those who
didn't were taking risk. But doc & nurses
who wore mask were also affected.

Hence wearing mask is no guarantee
but doing so reduces risk.

Concept of risk and safety can be
considered in 3 ways :-



① Underestimating the risk

→ Construction sites — Bamboo poles —

Rainy / windy season — dangerous for ppl — workers may fall.

- ★ This is due to the underestimation of danger. Safety is not given prime consideration and great risks are taken.

② Overestimation of risk

→ Man driving — Smoke from bonnet well no longer drives coz a car coz of such incidents, he / she is over

③ Indifference to risk

→ Group of ppl do not think of risk at all.
It does not matter being safe or unsafe
Ppl crossing stream

But ppl's Perception of safety & risk acc to situation. [entering a dark cave for treasure → no risk ; without purpose]

Assessment of Risk

- It is a very difficult task

In India factors affecting Safety are:-

- Insufficient knowledge - 36%
- Underestimation of negligence - 16%
- Ignorance, carelessness - 14%
- Error, forgetfulness - 13%
- Relying upon others without sufficient control - 9%
- Unprecise definition of responsibilities - 7%

→ Basic factors which needs to taken into ac^c :-
(hindrances)

① Any decision about risk ass & mgmt has to depend upon TIME FRAME in which the decision is taken → Decision making)

- In case of unforeseen hazard changes.
- DMS's main objective is to control damage
- DM involves looking back to decisions that

② Uncertainty

→ Study of probability.

③ Costing

→ Eco. consideration → loopholes

~~④~~ Risk ↑ due to following :-

① Designing & detailing of project invalid.

② Natural disasters.

③ Many equipments do not give directions for use, details of dangers.

④ Misuse or Inapp. use by consumers.

Eg:- Tata Nano - Fire - overloading gadget.

Risk assessment Techniques

- ① Projects / prds are designed with many engineering considerations such as strength, stability etc.
- ② Large scale consultatⁿ with ppl having necessary exp. in risk ass. is taken.
- ③ There are likely to be conflicting views about the ass. of risk like cost, stakeholder's concern etc. — Balanced.
- ④ All risks must be recorded & prioritized acc. to frequency of occurrence.
Risk - severe - but low occurrence
or risk - less severe - ↑ "
- ⑤ Eg.: Drum workers dying from Asphyxiation → providing masks & ensuring that they use them would not be costly.

Tsunami - cannot be anticipated

SAFETY IN ENGINEERING PRODS :-

Y

- Engineering prods. can cause harm
- to individuals (shock from ^{electrical} appliance)
 - harm to community (breaching of dam)
 - eco. loss (fire in an automobile)
 - environmental degradatⁿ (dam constⁿ)

ENGINEER'S RESP FOR SAFETY :-

" are responsible for :-
designing, manufacⁿ/constⁿ &
controlling quality of safe prods.

RESP :-

- ① Sure that the prod satisfies minimum std. laid for safety Refer to safety std.
 - ② Product Safety
- * [Only safe prod should be marketed]
- Warning against possible misuse
 - Meeting industry mandatory std.

- Effective comm. strategies to the public
(eg. advertisements in paper)
- Implementing a quality assurance programme.
- Incorporating safety into prod design.
- Responding quickly to safety concerns

RISK COST & MANAG^N:

Costing risk is difficult as it is estimation of likely harm & danger.
[Eg :- Risk involves → harm to human]
How can one cost life ??

RISK MANAG^N:

- Is Identificatⁿ, assessment of prioritizatⁿ of risks.
- Systematic applicatⁿ of all possible measures to monitor & reduce impact

PRINCIPLES OF RISK MANGⁿ:

- Create value
- Part of decision making
- Integral part of org. processes
- Systematic & structured
- Take into acc. human values.
- Transparent & ans
- Dynamic & responsive to Δ
- Explicitly address uncertainty

Case :- AIR ACCIDENT

Concorde flight by Air France
from Paris to NY on 25 July 00

Casualties → 100 passengers
9 crew
4 ppl on ground.

Piece of metal — Continental Airlines

Case Studies :-

I Space Shuttle Challenger

- 1986 (28th Jan) 73 sec

Technical Prob → O-rings

→ Morton Thiokol's Engineers had warned about the performance of O-rings that they can't perform well under low temp.

But Morton's manager's ruled out and asked NASA to proceed.

- President Ronald Reagan appointed Rogers Commission to look into it.
- The parts of the space shuttle were discovered. The exact death timing is uncertain → They could not exit from the space craft as they might've survived before the crew compartment impacted in Atlantic ocean.
- Martin and Christopher had no 'fritious life'

- Some engineers had designed a safe exit route in case of emergency but due to cost consideratⁿt it was nt consider

Roger's Commission ✓ President

Ronald Reagan Set up this comm.
to enquire into the Challenger tragedy

The report suggested some salient features to improve tragedy :-

1. Design
feat
etc.
⑤

II

Three mile Island Accident (28-3-79)

3-mile island nuclear power generation near Harrisburg in Pennsylvania.

It was owned & operated by General Public Utilities & Metropolitan Edison Co.

- No deaths or injuries but still it is the most serious in US commercial nuclear power plant.

• Around 4 a.m. plant exp. failure in the non-nuclear section.

↓
main feed water pump stopped working

↑ heat

↓
turbine stopped → Reactor

↑ The pressure on nuclear portion

BHOPAL GAS TRAGEDY (3-12-84)

- Leak of methyl isocyanate gas from Union Carbide India Limited (UCIL)
 - ↓
India subsidiary ~~for~~ of Union Carb. USA.
- Established in 1969 to produce a pesticide called Sevin using MI as an intermediate
- Water entered the tank containing 42 tons of MI, led to exothermic reaction causing pressure → release of toxic gases.

Engineers came up with the foll. observ. :-

1. Dangerous chemical → Densely populatn.

2. There was a lot of demand for pesticides in early 80's but product was not stopped, hence in storage.

3. Poor maintenance of plant and everything was manual → danger of human error.

4. Alarm in the MI was not functional.

5. No safety devices.

- 85
from
- ⑥ Mangt^h deficiencies - No skilled operators
 - ⑦ No safety mangt^h awareness.
 - ⑧ MI was stored in large amt. beyond recommended level.
 - ⑨ Safety systems were turned off to save expenses. Refridgerath sys was off.
 - ⑩ US std were diff. from Indian.

UPHAAR CINEMA TRAGEDY

(13-6-97)

- Negligence of fire safety norm
- Fire broke out in the basement where heavy duty transformer
- 5 storey building having offices also.
- Fire bid had prob reaching due to heavy traffic (South Delhi)
- It was noticed that ~~there was~~ ^{smoke} pandemonium (chaos) was noticed when the smoke was seen → Stampede

Engines found out :-

① Mangal " was lethargic & took long time to react. Screening was not stopped and ppl were not informed.

② Same day there was a small fire in the basement. Same morning

Same got burst → Parking → Gas
No sufficient space b/w cars & transform

→ Delhi has
violated

~~IRAN~~ E&B
→ Delhi licensing deptⁿ found many safety
violat^h → still cinema continued to work.

Owners managed to get
temp. licences for
running cinema for 17 yrs.

- Fire caused disruption of power supply
 - ↓
exit signs not battery operated
- exhaust vents stuffed with cardboard

③ Yes
but
proced
when
not bu
Analys
impre
the

CHERNOBYL DISASTER

- Nuclear plant in Ukraine
 - A sys test was being performed also reactor no. 5 & 6 were under const. a.
 - Due to sudden surge in output →
agg. due to emergency shutdown.
↓

Rupture of reactor vessel

Series of explosion

↓
exposure of graphite moderator which ignited

Sudden outburst of radioactive fallout

spread to parts of Soviet Union
and European countries

Sabot pt :-

① One test was only approved by the

Plant manager & not chief designer
nor other Sr. officials.

② One of the requirements → water supply
should continue even if no power was
available from the grid.

As even if the reactor was shutdown
it'll continue to make heat
Hence water supply

↓
By ~~boil~~ generators

↓
not found acceptable

as it took long time to start

③ Test conditions were not achieved
but still it was not rescheduled &
proceeded.

④ When shift A, the new operators were
not briefed.

Analysis showed design faults

Improper response sys

The reactor continued to operate for

FUKUSHIMA NUCLEAR DISASTER

(2011 - 11 March)

- Due to this disaster

↓
Protest against Kudankulam Nuclear plant
and decision of German Govt. to
close all nuclear power plants

→ It was result of natural calamity
↓
The Tohoku earthquake

Tsunami → 15m height

- Wall height → 5.7M

→ Designed by General Electric Co. &
maintained by Tokyo Electric Power Co.
- largest nuclear power reactor

Reactor 1, 2, 3 → functional

4 → defuelled

5 & 6 → cold shutdown for maintenance

- Due to Tsunami & earth → connect to
power grid lost & coolant sys → non-f.