**Codes Of Conduct**

* Codes of conduct can be:

1. detailed and prescriptive: engineers shall not use supplies and equipment of employers for personal use
2. broad and expressive: an engineer's professional integrity and intellectual honesty is the guarantee of his impartial analysis and decision.

* Classifications:

1. Professional codes (like IEEE)
2. Corporate codes (put by the company)
3. Aspiration
4. Advisory (NSPE code)
5. Disciplinary (AUB code of conduct)

* Focus of professional codes of conduct:

1. Integrity and competence
2. not deceiving others
3. practicing within one's competence
4. not revealing information without employer's consent
5. staying qualified through continuous professional development
6. Obligations to employers and clients: serve best interest of both, and keep secret confidential stuff.
7. Obligation to the public " Hold paramount the safety, health, and welfare of the public".

* Objections:

1. Window dressing: Codes of conduct serve only to convey misleading message to the public.
2. Vagueness and Contradictions: "**faithful** agent to employer and client" (vague). Keeping secret, but reporting violations (contradiction)
3. Can ethical norms be codified? Speaks about applying the codes of conduct. Are codes of conduct morally binding? Engineering is too diverse for one code to cover.
4. Too demanding from POV of one's self-interest: An individual may be worse off following them, but engineers as a group are better off.
5. Not enforced: especially professional ones. Corporate ones are more reinforced.

* Triple bottom line: People, Planet, Profit.

**Many Hands Problem**

* Punishment: Itself is bad, but it is an instrument to create incentives for lawful responsible behavior (consequentialism). On the other hand, Kant's moral law requires the guilty to be punished (retributivism)
* Hierarchical approach: blame the supervisors. Might lead to no responsibility to the lower ones in the hierarchy (utilitarian view). It is unfair if the (bad) outcome was caused from the lower level employees (Kant's view).
* Collective approach:

Advantages: 1) not blaming individuals. 2) Organizations have greatest capacity to provide compensation.

Disadvantages:1) We are eventually blaming individuals when blaming the organization they belong to. 2) Even if orgs are not considered moral agents, there is no reason their activities cannot be fined or their behavior condemned.

A utilitarian argues that collective approach does not generate the required incentive to prevent such future irresponsible acts.

A Kantian argues that punishing an innocent following the collective approach is immoral (mere means).

* Individual approach:

An individual is responsible if he meets two criteria:

1. The casual criterion: the individual are empirically connected to the outcome. (it tells us who w can or can't blame, but doesn't determine the degree of responsibility. (objection: "if I didn't do it, someone else would have")
2. Individuals are responsible if they could have done otherwise. (autonomous decision, i.e. free, knowledge of what he's doing. Ignorance is accepted only if it is not deliberate, and it is not the result of negligence.

Limits of this approach:

1. No one can compensate the damage by himself as an individual.

* Design responsibility:

When disaster occurs, assign a team of individuals who are knowledgeable and free to investigate the problem, and make them responsible to fix the problems for future projects. if in the future project same kind of problem occurs, hold the team above responsible. (Objection that a disaster has to occur if we are to use this approach).

* Active responsibility is responsibility before something has happened.
* Passive responsibility is responsibility after something has happened.
* Role responsibility: responsibility when u are a parent, an employee, a colleague...
* Blame-worthiness means that it is proper to blame someone for his/her actions or the consequences of those actions.
* four conditions need to apply (to blame someone): wrong-doing, causal contribution, foreseeability, and freedom.
* Ideals have 2 characteristics: 1) ideas or strivings which are particularly motivating and inspiring for the person having them.2) it is typical for ideals that they aim at achieving an optimum or maximum.
* Three professional ideals:

1. Tech enthusiasm: however it rises moral questions
2. Effectiveness and efficiency:
3. Human wellfare

* Engineers vs. Managers

1. separatism: “the notion that scientists and engineers should apply the technical inputs, but appropriate management and political organs should make the value decisions”.
   1. In the tripartite model three separate segments are distinguished:
      1. the segment of politicians
      2. the segment of engineers
      3. the segment of users
2. technocracy: engineers should take over the role of managers in the governance of companies and that of politicians in the governance of society.
   1. Objections 1: When it comes to goals of a technology, engineers don't know more than non-engineers.
   2. Objections 2: undemocratic, and paternalistic. Taking decisions in the place of others.
3. Whistle-blowing:
   1. there is serious harm causing by the organization.
   2. the whistle-blower has reported the harm to the supervisor, but the supervisor had taken no action.
   3. the whistle-blower has exhausted other internal procedures.
   4. the whistle-blower has convincing evidence.
   5. revealing the threat will prevent the harm.

**Design**

1. Problem analysis and formulation, including the formulation of design requirements;
2. Conceptual design, including the creation of alternative conceptual solutions to the design problem and possible reformulation of the problem;
3. Simulation of one or more concept design to test how well they meet the design requirements;
4. Decision: choice of one conceptual solution from a set of possible solutions;
   1. One important lesson is that adequately organizing decision making during the design process is essential to good design. David Collingridge has suggested four criteria for such decision-making:
      1. corrigibility of decisions;
      2. choose systems that are easy to control;
      3. flexibility of the decision;
      4. insensitivity of the decision to error.
5. Detail design: the design is further detailed;
6. Prototype development and testing, in which a prototype is developed and tested. This testing may lead to adaptations in the design. (Test are fallible. They are not usually done in the same situations as the design is eventually intended to be used)
7. Manufacturing and construction:

Tradeoffs:

Cost-benefit analysis: Objection: not everything is quantifiable.

Multiple criteria analysis: assigning thresholds. Putting weight to each criteria (safety is more important than cost) depends on the scale!

**Risk**

Acceptable risk A risk that is morally acceptable. The following considerations are relevant for deciding

whether a risk is morally acceptable:

1. the degree of informed consent with the risk;
2. the degree to which the benefits of a risky activity weigh up against the disadvantages and risks;
3. the availability of alternatives with a lower risk;
4. the degree to which risks and advantages are justly distributed.
5. **Inherently safe design**: avoid hazards instead of coping with them for example by replacing substances, mechanisms, and reactions that are hazardous by less hazardous ones.
6. **Safety factors**: constructions are usually made stronger than the load they probably have to bear. Adding a safety factor to the expected load or maximum load is an explicit way of doing this.
7. Negative feedback: For cases that a device fails or an operator loses control, a **negative feedback mechanism** can be built in that causes the device to shutdown. An example is the dead man’s handle that stops the train when the driver falls asleep or looses consciousness.
8. **Multiple independent safety barriers**: A chain of safety barriers can be designed that operate independently so that if the first fails the others still help to prevent or minimize the effects. This can, for example, be achieved through redundancy in design (see box). Also emergency escapes can be quite useful

Risk assessment

1. Release assessment: physical effects that can cause harm, such as shockwaves, radiations, etc.
2. Exposure assessment: the venerable subject (human, environment, etc)
3. Consequence assessment: relation between exposure and harm.
4. Risk estimation.