What We'll Discuss

TOPIC OUTLINE

Engineering as Experimentation

Learning form past

Informed Consent

CASE STUDY

- As it departed on its maiden voyage in April 1912, the Titanic was proclaimed the greatest engineering achievement ever. Because the worst collision envisaged was at the juncture of two of its sixteen watertight compartments, and as it could float with any four compartments flooded, the Titanic was believed to be virtually unsinkable. Buoyed by such confidence, the captain allowed the ship to sail full speed at night in an area frequented by icebergs, one of which tore a large gap in the ship's side, flooding five compartments. The Titanic remains a haunting image of technological complacency.

Engineering as Experimentation

- Experimentation is commonly recognized as playing an essential role in the design process.
- Preliminary tests or simulations are conducted from the time it is decided to convert a new engineering concept into its first rough design.
- The normal design process is thus iterative, carried out on trial designs with modifications being made on the basis of feedback information acquired from tests.

Learning from past

- Usually engineers learn from their own earlier design and operating results, as well as from those of other engineers, but unfortunately that is not always the case.
- Lack of established channels of communication, misplaced pride in not asking for information, embarrassment at failure or fear of litigation, and plain neglect often impede the flow of such information and lead to many repetitions of past mistakes

Learning from past

1. **The Titanic lacked a sufficient number of lifeboats.**
2. Complete lack of protection against impact by shipping caused Sweden’s worst ever bridge collapse.
3. Valves are notorious for being among the least reliable components of hydraulic systems. It was a pressure relief valve, and a lack of definitive information regarding its open or shut state which contributed to the nuclear reactor accident at Three Mile Island

Informed Consent

- **Informed consent is understood as including two main elements: knowledge and voluntariness.**
- **The public and clients must be given information about the practical risks and benefits of the process or product in terms they can understand.**
- **Engineers cannot succeed in providing essential information about a project or product unless there is cooperation by superiors.**

Informed Consent

Some would call valid consent defined by the following conditions:

1. **The consent was given voluntarily**
2. **The consent was based on the information that a rational person would want, together with any other information requested, presented to them in understandable form.**
3. **The consenter was competent (not too young or mentally ill, for instance) to process the information and make rational decisions.**
4. **Information that a rational person would need, stated in understandable form, has been widely disseminated.**
5. **The subject's consent was offered in proxy by a group that collectively represents many subjects of like interests, concerns, and exposure to risk.**

THANK YOU