

## Module 3

Lecture 4: Sensing requirements is  
Special Structures

- Structures, which are of strategic importance  
(Naval base, monument, oil rigs,  
Nuclear power plants, Refineries etc)

## Offshore Structures

- used for oil & gas exploration
  - 1470 oil rigs located offshore
  - 7000 platforms - oil & gas drilling
- (Statistik, 2015)
- These platforms
    - topside components
    - living quarters
      - helipad
      - drilling equipment
      - techno-neck gear
      - cranes
- eh

- typical size of an offshore platform
  - 90m x 90m (plan)
  - Big is size
  - massive, huge-spaced beams, columns.
- heavy man concentration, spread over a large area
- Conjunction, causes accident is offshore platforms

## offshore platform

- huge capital investment for this installation
- 100-150 people working on board  
(reside on board 24x7)
- special class trained technicians/engineers who manpower is highly valuable (asset)
- Their downtime (any repairs) could stop production
- loss of revenue

Further

(2)

- attracts a variety of loads
  - wave load
  - machine
  - wind load
  - vibratory load
  - current
  - drilling
  - Accidental loads
  - ice
  - earthquakes
  - impact
  - Stocking up on inflammable material (oil/gas)
  - Dead load
  - live load
  - ground accident

Major accidents is offshore platform occur from

- Explosion
- loss of structural integrity
- fire etc

### consequences

- severe danger to the structure
- threat to the environment
- human lives

Other platforms handle

hazardous chemicals like

- petroleum products
- oil & gas

- have the potential to cause major accidents

- Risk is implicit in oil & gas exploration activity

## Major accidents

### - Piper Alpha disaster

- Night 93

- July 1998

- 167 lives

### - Alexander L. Kielland

- A semi-submersible platform

- Capsized

- March 1988

- 123 people died



- Ocean Ranger oil drilling rig

- 15th Feb 1982

- North Atlantic Sea

off coast of Newfoundland, Canada

- 84 crew members died

- Mumbai type Nucleas disaster

29th Jul 2015

India

- 22 people died

- The Bohai-2 oil rig disaster

- Nov 1979

- Gulf of Bohai, China

- 72 people died

Major hazard is

- flameless condensation is leaky

✓ - due to poor / delayed maintenance

- poor planning

- avoidance of preventive maintenance

- A continuous monitoring of certain parameters ( ) must be done

- stn

- wired sensor cannot be employed
  - confusion layer
  - Poor simplified Network
- smart sensors
  - externally required

STM is necessary in special studies

- poor maintenance
- lack of communication b/w maintenance & operation staff
- delay in maintenance schedule
- inadequate maintenance & safety procedures

## Summary

- Necessity of Sensing requirements
- Offshore accidents
  - listed a few of them
- - lack of maintenance
  - inadequate planning
  - no prior warning (Atlat Nimitz)
- lost of lives
- human factors
- E causes & repairs