

## Focus on Others Consider All Stakeholders

- Customers/Users
- Management/Shareholders
- Production/Sales ...
- Society at large
- Government

...

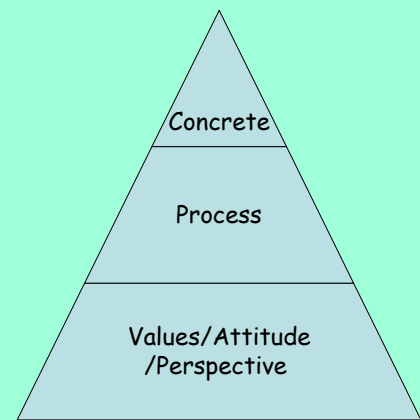
an understanding of others' viewpoints      Needed &      your own judgment

Needs assessment

## Case Studies

- The DC Heart Defibrillator (p. 56) - Improving existing prod.
- The Kwik-Lok Closure (p. 57) - Commercial needs
- The Quick-Release Ski Binding (p. 58) - **Personal Experience**
- 2.2 Credit Cards for the Blind (p. 70, s) - **obvious needs to be recognized**
- 2.1 Kidney Dialysis Treatment (pp. 68-69) - **Service, design evolution, + government impact**
- 2.3 Cleaning Up Oil Spills (pp. 70, 71) - **meeting societal need**
- 2.4 Durable pants for miners (pp. 71,72) - **Levi Straus, meeting a need**

## Safety: Failure Levels



## Failure Case Studies

- 2.5 Garrett Morgan's "Safety Hood" and Traffic Signal (72-74) - design for safety for our selves and our family
- 2.6 Lake Peigneur (pp. 74-76) → Lake into mine -lucky all escaped
  - Communication/Responsibility
  - Knowledge/records
- 2.7 Flixborough Explosion (pp. 76 - 78) → Temporary bypass, seemingly innocuous
  - inadequate design
  - inadequate secondary protection
  - Additional background
    - No HAZOP
    - No Pressure test
    - Start up critical decisions - limited N2 blanket

## Failure Case Studies (cont.)

- 2.8 DC-10 Crash (pp. 79-81)
  - Engine lost, destroyed control and communication
  - Thought small prob - not Multiple failure
- 2.10 Teton Dam (pp. 85-86)
  - Leaks developed, Outlet not finished, Dam failed (slides)
  - Data not passed on.
  - Problems: Monitoring, Communication, No emergency response system
- 2.9 Bhopal (pp. 81-84) (see separate slides ) Methyl Isocyanate, MIC
  - Major: clear simultaneous failure, Water enters tank, runaway reaction, large release
  - Refrigeration deactivated, vent scrubber did not respond fast enough, flair, alarm
  - Problems: location, unnecessary storage of hazardous material, overfill of tank, shut down of protective systems

Some additional info

[Teton Dam Failure](#)

[Bhopal](#)