Product Safety Considerations for Commercial & Military Aircraft and Military Rescue Boats
Focus on …

- DSRV - Deep Submergence Rescue Vehicle
- C-5 Galaxy
- F-104
- Lockheed L-1011
DSRV - Avalon

- Origins
- Specifications
- Development problems
- Product safety issues
Origins & Needs

• Thresher – early 1960’s
• Rescue from ocean floor
• Quick response worldwide
• Transportable – land, air, sea
Specifications

- Launched: May 1971
- Deactivated: July 2000
- Builder: Lockheed Missiles and Space, Co., Sunnyvale, Calif.
- Propulsion system: Electric motors, silver/zinc batteries
- Propellers: one
- Length: 49 feet (15 meters)
- Beam: 8 feet (2.4 meters)
Specifications - 2

• Displacement: approx. 38 tons
• Speed: 4 knots/8 hours
• Speed: Transit: 2.5 knots/14 hours
• Speed: Search: 1.5 knots/18 hours
• Maximum diving depth: 5,000 feet (1524 meters)
• Life support: 36 hours
• Crew: two pilots, two rescue personnel and the capacity for 24 passengers
Development problems

1. Never done before - no design specifications or standards
2. Keep it Secret and Rush-rush-rush
3. On-board power plant
4. Fit into a cargo plane, but rescue as many as possible with one dive
Product Safety issues

1. Quality control (functionality is a safety issue when diving at 6K feet!)
2. Materials - capable to dive to 6,000 feet
3. Life support - for crew and rescued sailors
4. Stability - steady while under the ocean
5. Universal attachment to all US submarines
C-5 Galaxy

Ready to load – maybe the DSRV?
C-5: Product Safety Issues

Related to the capabilities wanted --
1. Gigantic cargo plane to carry tanks and very heavy equipment
2. Land on all kinds of surfaces
3. Fly low with an open back to drop out weapons
F-104 Starfighter

Not as big – but much faster!
F-104: Product Safety Issues

Related to the capabilities wanted --

1. Speed & maneuverability to take on latest MIG

2. International flavors for US, Canada, Europe and Japan

3. Why did F-104 G (German) keep crashing?
L-1011 TriStar

- Specifications
- Development problems
- Product safety issues
Specifications

- Number of engines: 3
- Max. passenger capacity: 330
- Range in miles: 6,150
- Cruising speed (mph): 580
- Payload capacity (lbs): 90,782
- Wingspan / length: 164 / 164
- Height (ft): 55
- Takeoff weight (lbs): 504,000
Some development problems

1. Create a complete “auto land” plane
2. Fly and land in all conditions
3. Provide an automatic monitoring system (Air Integrated Data System – only TWA)
4. Keep plane as quiet as possible (Whisper Jet)
Product Safety issues

1. Quality control (functionality is a safety issue when flying at 36K feet!)
2. Parts manufactured in many places
3. Many sensitive electronic systems with wires everywhere
4. EMI/RFI - no overall specification (an afterthought!)
5. Newly designed engines (Rolls Royce) – materials issue
My L-1011 systems involvement:

• ATA 2400 – main power (engines)
• ATA 4900 – APU system / engine start
• ATA 3600 – bleed air system
• ATA 3800 – water & toilet flush
• ATA 3500 – oxygen
Q & A?

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