

Singapore & COSCAP

Cabin Safety Seminar – 2013

November 19 – 21

Singapore Aviation Academy

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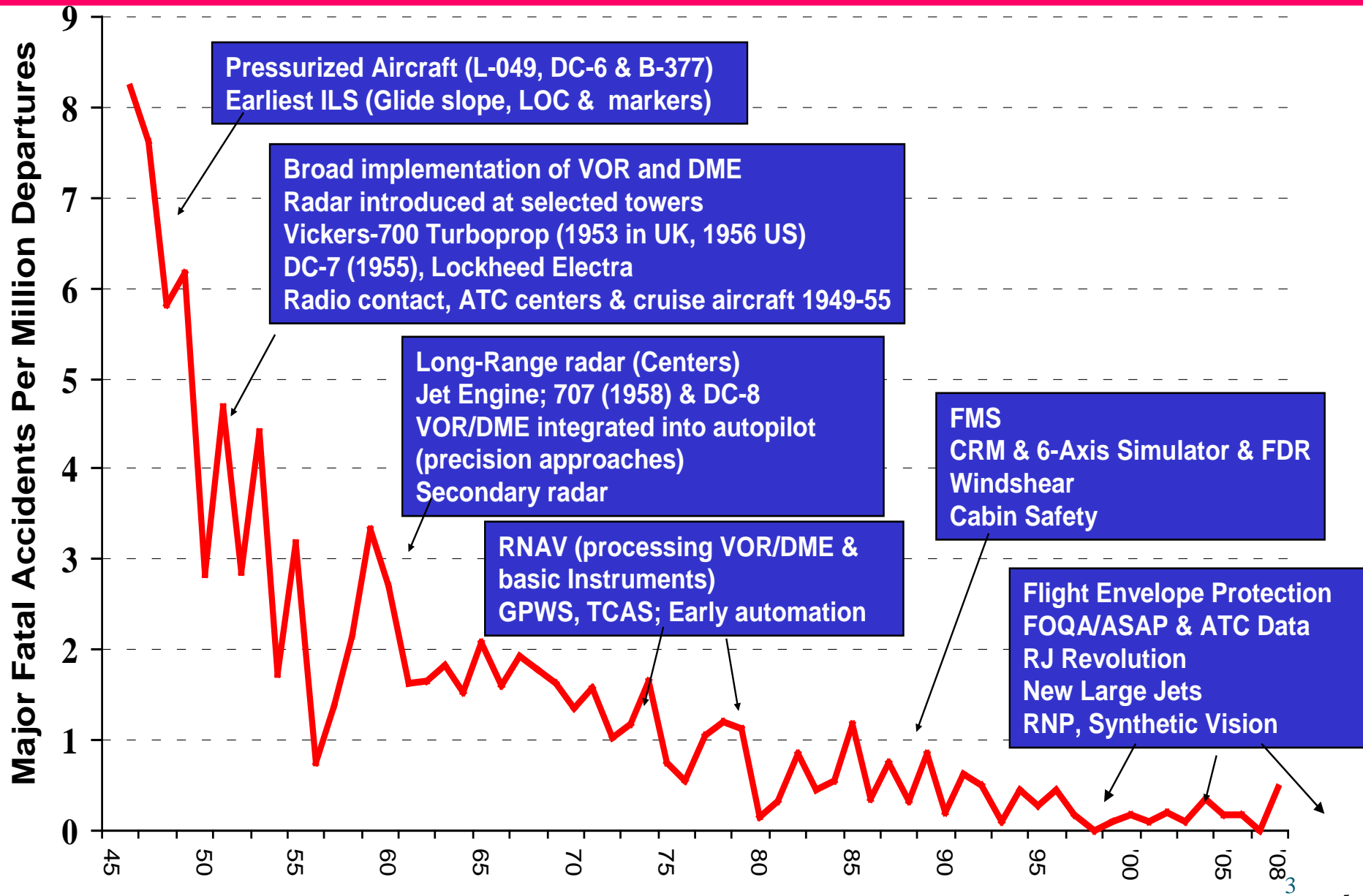
Survivability – Lessons Learned

➤ Past

➤ Current

➤ Future

Major Fatal Accident Rates Since 1946 (Hull Losses or Multiple Fatalities) Part 121-Like Operations



Why Look at Survival Factors?

- Not only are many accidents survivable, but...
- The most recent review (1983-2000) of survivability data in the US indicate that most occupants survive accidents
- Many improvements in occupant protection are a result of survival factors investigations

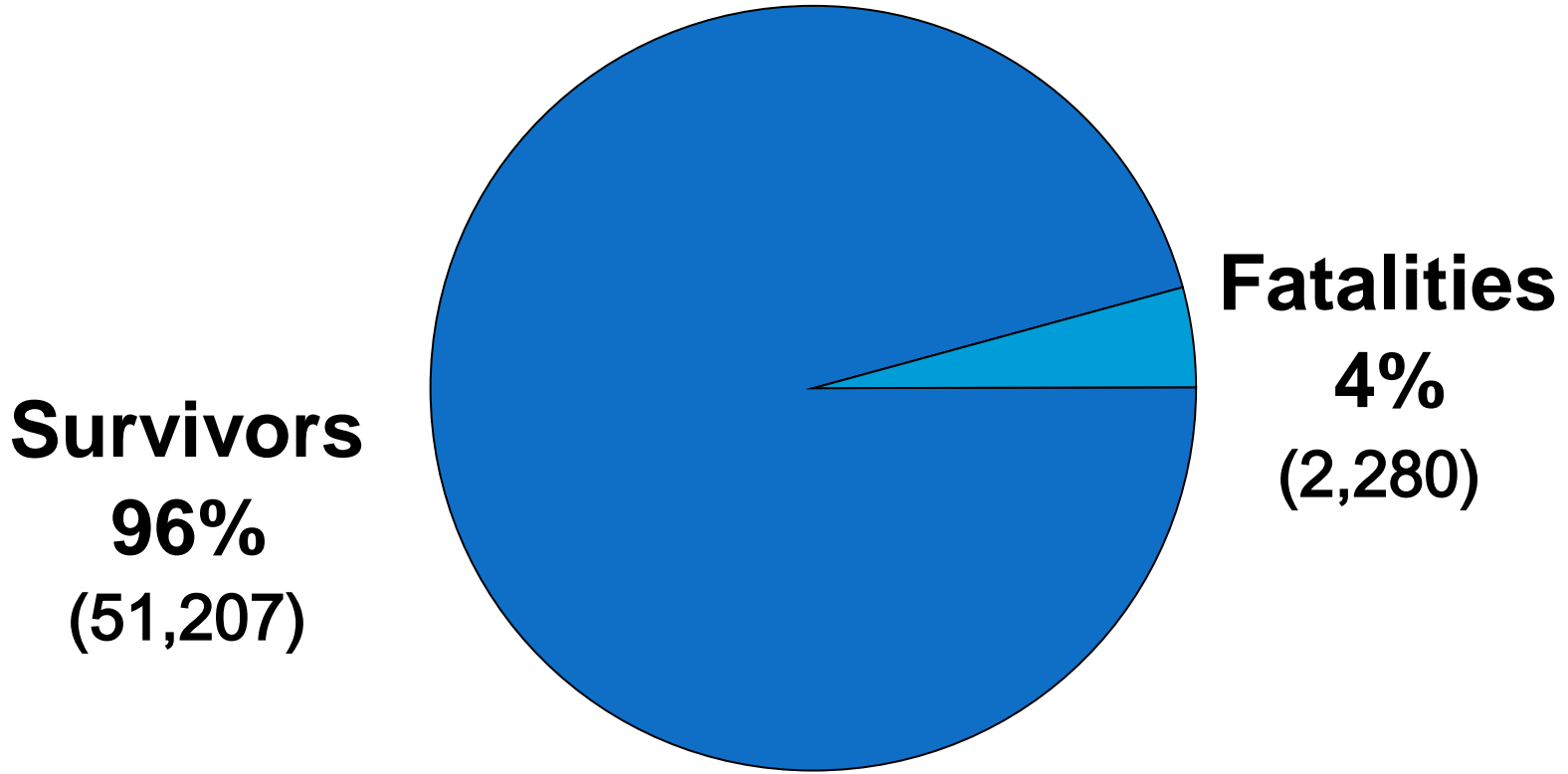


What is a Survivable Accident?

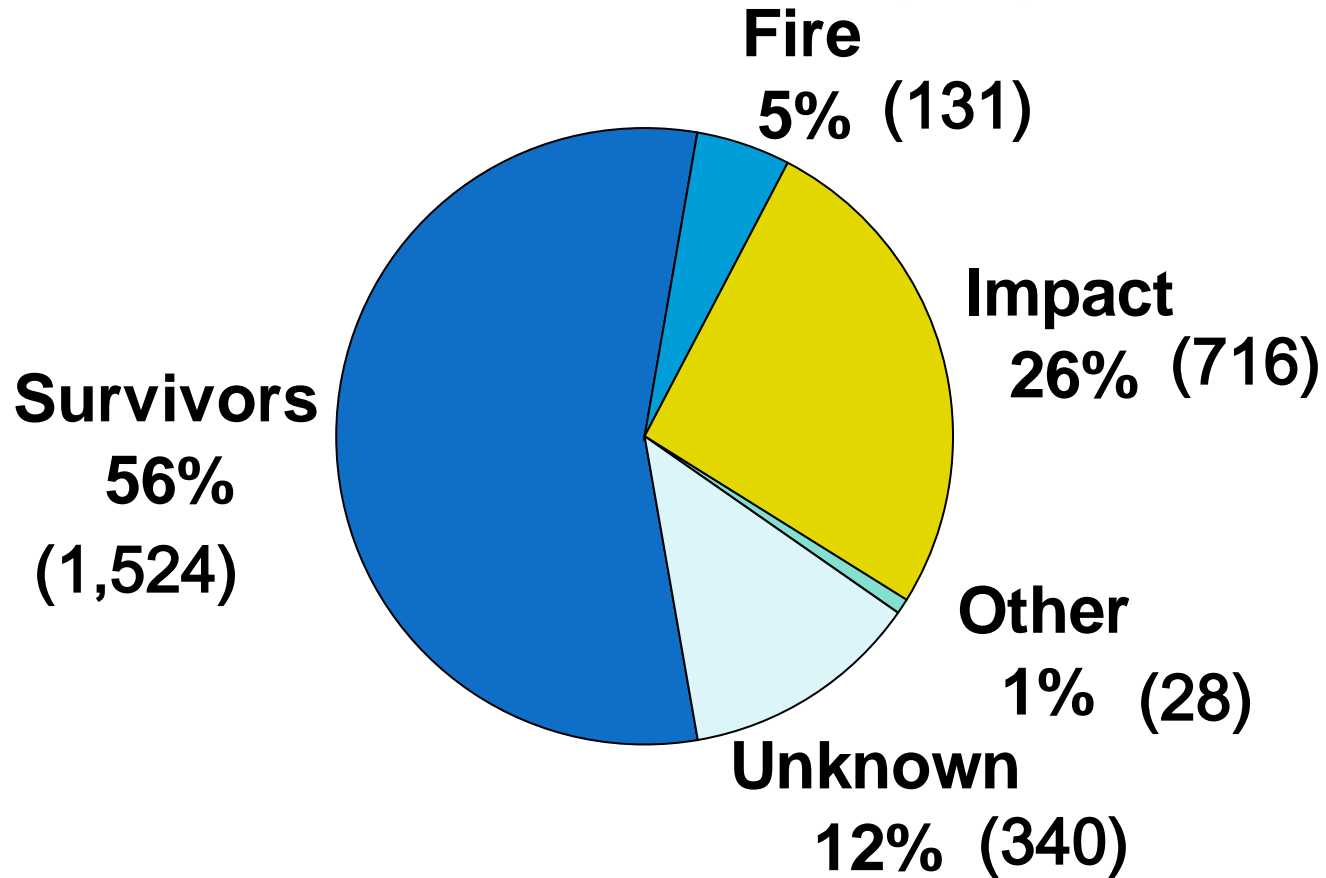
Survivable Accident

- Forces transmitted to occupants through the seat and restraint system cannot exceed the limits of human tolerance
- Structure in the occupants' immediate environment must remain substantially intact to the extent that a livable volume is provided throughout the crash

Occupant Survival for All U.S. Part 121 Accidents - 1983-2000 (568)



Occupant Survival for Serious Part 121 Accidents (26)



Air Canada - Cincinnati

➤ June 2, 1983

➤ DC - 9

➤ 23 fatalities



Air Canada - Cincinnati

- **Seat blocking**
- **Floor level lighting**
- **Fire retardant cabin materials**
- **Automatic washroom fire extinguishers**

Air Canada – Cincinnati

- Halon extinguishers
- Smoke detectors in the lavatories
- Communication issues
- Better training

British Airtours - Manchester

➤ August 25, 1985

➤ B-737

➤ 55 fatalities



British Airtours – Manchester

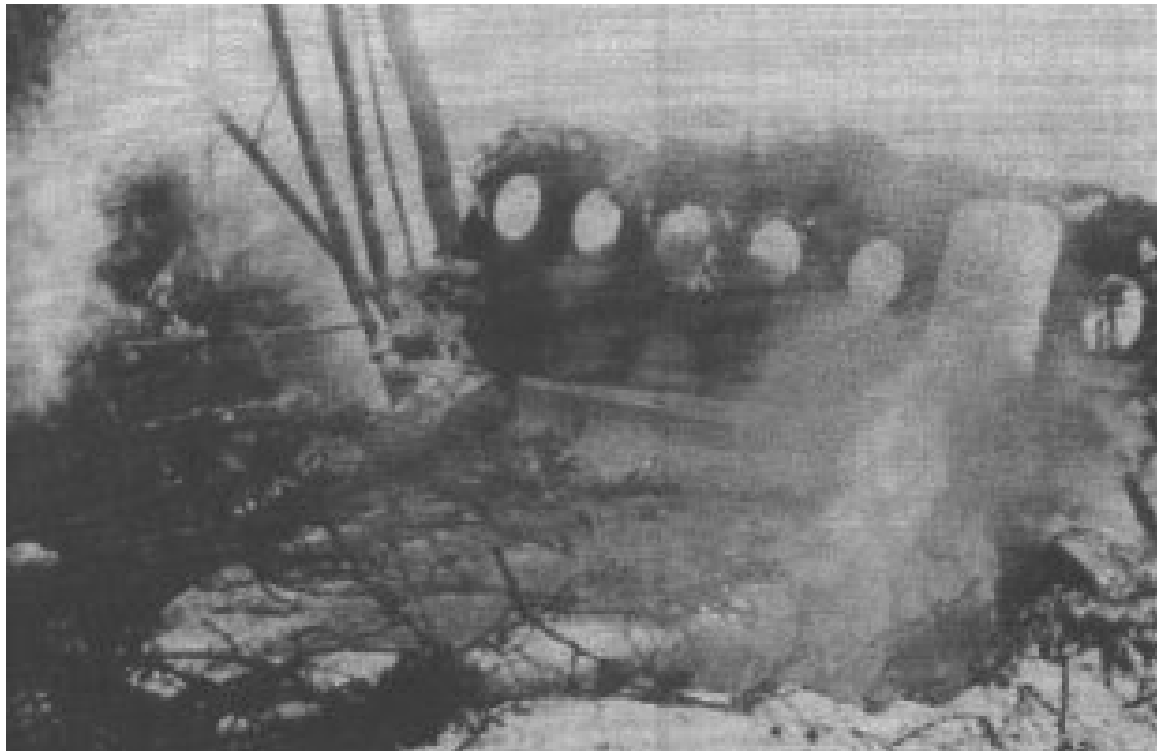
- Congestion in the over wing area
- Toxic fumes in the cabin
- Exit aisle width

Air Ontario - Dryden

➤ March 10, 1989

➤ F-28

➤ 24 fatalities





Air Ontario – Dryden

- Crew communication
- CRM
- Cabin crew training
- Wing contamination

Air France - Toronto

- August 2, 2005
- Airbus A-340
- No fatalities





Air France – Toronto

- Communication issues
- Passenger Awareness
- Cabin baggage
- Public Address System
- Emergency Evac Signal
- Smoke Hoods

US Airways – JFK



US Airways – JFK

➤ Jan 15, 2009

➤ A 320

➤ No fatalities

LIVE
SKYCAM



US Airways – JFK

- Passenger awareness
- Bracing positions
- Cabin baggage



Asiana – SFO

➤ July 6, 2013

➤ Boeing 777

➤ 3 fatalities



Asiana - SFO

- Still under investigation
- Report not out yet

Asiana - SFO

- Cabin baggage
- Slide inflation
- Evacuation initiation
- Seat Strength











I don't believe in miracles!!!

*American Airlines Flight
331, Dec. 23, 2009 -- **All
154 People on Board
Survive***

**Caribbean Airlines Crashes
in Guyana and Splits in
Two, July 30, 2011 -- **All
163 People on Board
Survive****

*'A miracle' no deaths as Air
France flight skids off
runway, burns in Toronto*

**US Airways Flight 1549,
Jan. 15, 2009 -- 'Miracle
on the Hudson' -- **All 155
People on Board Survive****


*Lion Air Jet Crashes Into
Sea in Bali, April 13, 2013
-- **All 108 People on Board
Survive***

State of the Art

- **Design**
- **Manufacture**
- **Operation**
- **Training**
- **Regulation**

We've come a long way!!!



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- Seat blocking
 - Better smoke detection and protection
 - Better training
 - Better fire fighting procedures
 - Joint crew training
 - CRM

- Floor level lighting
- Flashlights at every crew station
- Improved galley restraint systems
- 16g seats
- Improved crew seating and restraint systems

Have we done enough?

- Cabin Crew Uniforms
- Electronic Devices
- Cabin Baggage
- Infant Restraint Systems
- Passenger Awareness
- Flt Time Duty Time
- Seat Strength
- Evacuation Initiation

Training

➤ Accident reports

➤ Survival Factors Reports



A thorough cabin investigation

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Improvements in occupant protection



Thank you
Any questions??