Review of Incidents and Accident of Aircraft with Inflatable Restraints

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Tom Barth
tbarth@amsafe.com
Agenda

- AAIR Applications
- AAIR Versions in Service
- In Service Metrics
- Incidents
- Accidents
  - Minor
  - Major
Transport Applications (Part 25)

• Over 27 Commercial Airlines Worldwide
• Top Users: Virgin Atlantic; Air Canada; Singapore; Cathay Pacific
• Airbus: A380; A340; A330; A319 / 320 / 321
• Boeing: B747; B777
• Bombardier CRJ 700 / 900
• BAE Systems Jetstream 41
General Aviation and Light Sport

Adam Aircraft A 500 / 700
American Legend Cub
Aviat Husky
Cessna 172 / 182 / 206
Cirrus SR 20 / 22
Cub Crafters Sport Cub
Diamond DA40
Lancair IVP
Mooney GX / Bravo Dx / GX
Piper PA 28 / 32 / 34 / 44
Sport Air
Zenair CH 601 / 2000
AAIR Design Versions in Service

- **V1.0** February 2001 (updated to V23 in 2005)
  - Front Row Econ.
  - TC for J-41 Fleet
  - 6 Airlines Worldwide

- **V1.5** February 2002
  - Front Row Econ.
  - Special Economy
  - Selected Airbus, Boeing, Bombardier

AMSafe Aviation
AAIR Design Versions in Service (continued)

- **V25** October 2003
  - Premium Class (all)
  - Side Facing “Nested” Seats
  - B/C Pod Seats

- **V23** Fall 2004
  - Single Engine GA
  - 3 and 4 point restraints
  - Supplemental (not req. to meet 23.562)
AAIR Field Status (as of June 2007)

- Total Seat Placements Shipped: 17,779
  - Commercial (Part 25): 6,953
  - General Aviation (Part 23): 10,826
- GA Seat Placements Reported in Service: 9,416
- GA Aircraft Reported in Service: 3,568
- Additional Aircraft Enter Service at Rate ~134 / month
  (14 month average, June ’06 to Aug. ’07)
Event Statistics

[Graph showing the relationship between months in service and events.]

- Minor Accidents
- FAA Incidents
- Non Survivable
- Injury/Fatal

[Graph axes:
- Y-axis: Events (0 to 16)
- X-axis: Months in Service (6 to 24)]
Example - Impact Tests with and without AAIR
Event Distribution (from July '07 data)

Incident Rate = 40 incidents / 3568 aircraft in service (1.1 %)

Serious/Fatal Accident Rate = 14 accidents / 3568 aircraft in service (0.39 %)

No Injury Accidents: 50 %

Injurious/Fatal accidents: 18 %

Non Survivable Accidents: 32 %
FAA Incidents and Very Minor Accidents

- **Minor Aircraft Damage**
- **No Injuries**
- **Typical Scenarios:**
  - **Hit Fence**
  - **Strike Propeller**
  - **Veer Off Runway**
- **No AAIR Deployments**
Minor Accidents with Major Damage

- Very Minor Injuries
- Scenarios:
  - Run Through Ditch
  - Strike Trees, Burned
  - Flip Over at Low Speed
- No AAIR Deployments

Inflator Auto-Ignition Functioned Perfectly
Injurious Accidents

- **Flight into Terrain**
  - Seat not Locked in Place
  - Insufficient Elevation
“Occupants Lucky to Survive Plane Crash” by Joel Becker.

“According to Charles’ brother, Rick McGuire, who is a 36-year pilot, licensed instructor, former airline pilot, and attorney, said, “My brother’s doing real well. They put his foot back on. He can wiggle his toes.” Rick said it is fortunate the plane had a number of safety features, adding that the inflatable shoulder harness airbag probably saved his brother’s life.”
Concluding Remarks

- Non-Survivable Accidents are most often caused by Icing. One mid-air collision has occurred. AAIR deploys on these events, but impact is beyond human tolerance or occupant space is compromised.

- NTSB is conducting a Safety Study of airbag performance in survivable accidents. AmSafe is cooperating with this study.

- No performance or benefit conclusions are made regarding injurious accidents as the NTSB study is in progress and the Factual Reports for several accidents are pending.

- Regarding minor incidents, crash sensor threshold appears appropriate. The AAIR has not deployed in minor longitudinal impacts.