AIR LINE PILOTS ASSOCIATION, INTERNATIONAL
535 HERNDON PARKWAY □ P.O. BOX 1169 □ HERNDON, VIRGINIA 20172-1169 □ 703-689-2270
FAX 703-689-4370

April 15, 2003

Docket Management System
U.S. Department of Transportation
Room Plaza 4011
400 Seventh Street, SW
Washington, DC 20590-0001

Subject: Docket Number FAA-2003-14193, Design Standards for Fuselage Doors on Transport Category Airplanes

Dear Sir or Madam:

The Air Line Pilots Association, International (ALPA) would like to submit comments to the subject document on behalf of its more than 66,000 pilots in the U.S. and Canada. We conditionally support the proposed rule as it is written. However, we have the following recommendations for additional improvement.

Door status display on the flight deck

We specifically concur that there is a strong need for the flight deck crew to be provided indication of the status of every door, to ensure that they are fully closed, latched and locked, as written in proposed paragraph 25.783(e)(3) and (4).

The NTSB Recommendation A-98-023 stated that the NTSB recommends the FAA:

> *"Require that all newly manufactured airplanes be equipped with cockpit indicators showing open exits, including overwing exit hatches, & that these cockpit indicators be connected to emergency power circuits."*

This recommendation resulted from the investigation of an aborted takeoff of an MD-88. In that accident, the flight deck crew was unaware that the personnel in the aft section of the airplane were evacuating. The proposed change to § 25.783(e)(3) and (4) should be effective in resolving this problem.

Doors should be able to be closed after they are opened

Emergency exit doors and hatches need to be rapidly opened in an emergency. There may also be times when they need to be rapidly closed as well. Past accidents have highlighted this, and ALPA has adopted the position that all emergency exits should be capable of being rapidly closed in majority, if inadvertently opened into a fire area. The intent of this is to protect the cabin interior from the direct radiant heat of a post-crash fire. The position goes on to state that when this is not possible, a fire-

resistant, radiant-heat-reflective curtain should be available for use to protect the interior from fire entry. [1]

List of relevant accidents:

- British Airtours B-737 at Manchester, England
- TWA L-1011 at JFK on 7/30/92
- USAir B-737 at LAX on 2/1/91
- Delta B-727 at DFW on 8/31/88
- DHc-8 at SEA on 4/15/88
- CASA-212 at DTW on 3/4/87
- Delta L-1011 at DFW on 8/2/85

Therefore, we recommend that the FAA draft an additional paragraph stating this intent; that the doors designated for use in emergency evacuation must be provided with means to close the door after the door is opened in emergency mode. In the event that the door is unable to be closed, then the door may be provided with an effective heat-barrier curtain to delay heat transmission into the airplane.

Reliability demonstrations

The proposed regulation does not specify any standard for door reliability in functioning at the level of being integrated with the emergency evacuation slide system. Door reliability in this sense is intended to address the door and its related hardware, most significantly, the emergency evacuation slide. It may be argued that slides need to be considered separately from doors. However, the fact is that the door is incomplete without the slide attached and functioning correctly. The NTSB Safety Study on Emergency Evacuation of Commercial Airplanes[2] addresses emergency evacuation slide reliability. Mechanical interference with components is a main cause of faults. Reliability testing should be done to ensure that mechanical interferences that could be expected in service are identified and resolved before the door is approved for service.

In line with this thought, the proposed paragraph 25.783(c)(1) provides a definitive criterion for the reliability level of the pressurization prevention system, which states that:

> *"The provision must be designed to function after any single failure, or after any combination of failures not shown to be extremely improbable."*

The preamble to the proposed rule states in this regard that:

> *"This criterion is consistent with:*
>
> - *The interpretation of the general text of the existing rule, and*
> - *The current industry practice for new designs."*

[1] Position 2.3.4.3.11, ALPA Guide to Accident Survival Factors, 1999 Edition
[2] Page 46, Safety Study: Emergency Evacuation of Commercial Airplanes, NTSB Report Number: SS-00-01, adopted on 6/27/00.

This paragraph (25.783(c)(1)) should be extended to also apply to the door and emergency evacuation slide system. We recommend the FAA draft an additional paragraph stating specifically this intent for the each integrated door and slide system.

Doors should function after minor fuselage deformation

The proposed change to § 25.783(c) would eliminate the current reference to door operation with minor fuselage deformation. We acknowledge that there is an existing paragraph 25.809 on Emergency Exit Arrangement, subparagraph (g) which states: "There must be provisions to minimize the probability of jamming of the emergency exits resulting from fuselage deformation in a minor crash landing." This provision is essential and we assume that it will be retained. However, it appears more appropriate for being retained in the revised paragraph 25.783. We have great concern that the intent of either paragraph is not being met. There is no clear guidance to ensure that the doors are operable after an accident involving a minor crash landing. It is unclear what is meant by fuselage deformation in a minor crash landing. To say that this means no deformation, or that it is the deformation associated to that occurring in the static loading of FAR § 25.561 is illogical. There are numerous accidents (or hard landings) where fuselage deformation occurred and caused a door to jam.

It should be made clearer that the doors should function with the amount of fuselage deformation typically present after a survivable crash landing, where the fuselage stays intact. This should be described in clear and definite terms that can be objectively applied. Since this is clearly pertinent to the design of the door and its structural framework, this criterion appears more appropriate for inclusion in paragraph 25.783 than in 25.809. We recommend that it be renumbered to be part of § 25.783 and that more definitive methods for compliance with this rule be established.

NTSB Safety Recommendation A-97-103, dated September 12, 1997 recommended that the FAA:

> *"Evaluate the propensity of Beech 1900C door/frame system to jam when it sustains minimal permanent door deformation and, based on the results of that evaluation, require appropriate design changes."*

This recommendation was closed by the NTSB with a status of "Closed – Acceptable Action". The FAA response indicated that their structural tests as part of the airplane certification did not result in any deformation of the door, or jamming of the door. The regulatory language calls for the door to function after a minor crash landing. The tests done for the airplane certification did not stress the door and fuselage in a manner associated to a minor crash landing. Thus we find fault with the FAA response and the NTSB having closed this recommendation.

A search of the FAA Service Difficulty Reports (SDR) database shows that door jamming has been reported during normal flight operations. Causes and corrective actions included:

- Cable routing, interference between door and structure
- Door actuator striker jammed, dirty and needing lubrication
- Corrosion, about 15 years in service (26,550 hours)
- Guide arms jamming, needing lubrication
- Flange bent, straightened flange

- Bearings tight, replaced bearings
- Upper hinge lower pivot pin recessed, properly installed pin
- Door guide arm clevis pin missing snap ring, installed snap ring
- Door stop jammed between lower door leaf and threshold plate, removed stop pad

While these causes of jamming may or may not have occurred in events related to hard landings, these failure modes could occur due to a hard landing and minor fuselage deformation. These failures indicate a need to test for door operation with minor deformation. The FAA must establish objective criteria for this test.

Door Slide Status should be displayed on exterior of door

Fire fighters opening doors from outside of the aircraft can be injured if they open the door when the slide is still armed. A slide status indicator should be visible from outside the door. Many aircraft already have this feature. It should be mandatory.

Conclusion

Therefore, ALPA would like to recommend that the FAR § 25.783:

- Include a requirement that doors can be closed after being opened in an emergency,
- Include a requirement for reliability tests,
- Include a requirement for function with minor fuselage deformation, and
- Include a requirement for displaying slide arming status on the fuselage exterior.

The Air Line Pilots Association welcomes the opportunity to further discuss these issues.

Thank you,

Pierre Huggins
Staff Engineer
Air Line Pilots Association, Int'l

PH/njc