

Proposed Equivalent Safety Finding on CS 25.783[a(1)] at Amendment 18

Applicable to Boeing 777-9

Introductory Note:

The hereby presented Equivalent Safety Finding has been classified as an important Equivalent Safety Finding and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue:

The Boeing 777-9 Forward Access Door (FAD) and Electronic Equipment Access Door (EEAD) have a single latch pin and associated mechanism that engages the fuselage frame to latch the door in the closed position during flight.

The regulation CS 25.783[a(1)] at Amendment 18 states:

"Each door must have means to safeguard against opening in flight as a result of mechanical failure, or failure of any single structural element."

The proposed Boeing 777-9 design for the FAD and EEAD requires an Equivalent Safety Finding for 25.783[a(1)] due to the potential for a single failure of the latch pin to allow the door to open in unpressurized flight.

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– Applicable to Boeing 777-9 –

The equivalence justification below details the means and provisions (i.e. the compensating factors) that the applicant intends to use to demonstrate an equivalent level of safety.

Design proposal

Boeing considers that the proposed Boeing 777-9 design has the following compensating features for the FAD and EEAD designs:

1. Doors are fully inward opening
2. Doors will be placarded to be used by maintenance personnel only
3. Latches are not loaded during flight
4. The sizing criterion for the latch ensures a significantly robust design compared to normal operational loads.

Safety equivalency demonstration

Boeing proposes that the design of these doors provides an equivalent level of safety to doors that would meet the requirements of CS 25.783[a(1)] at Amendment 18 based on the following reasons:

1. The unlatching of the doors in flight is not a Hazard because the FAD and EEAD will satisfy all criteria in CS 25.783(h).
2. There are no single failures of structural elements of the door or surrounding structure that would allow either door to open in flight or to become a hazard due to the failure.
3. All single failures, aside from the latch pin and associated latching mechanism, have been evaluated and it has been determined that a single failure in any other structural elements in the FAD or EEAD or corresponding surrounding structure would not lead to the subject door opening or becoming a hazard.
4. The proposed design satisfies the conditions addressed by the guidance material in AMC 25.783[a(1)]. In addition, even though the Boeing 777-9 access doors will be certified per CS 25.783(h) to not be a hazard if unlatched in flight, the proposed design satisfies the conditions addressed by the guidance material in AMC 25.783[a(2)].
5. The highest hazard level due to all functions of the access doors, the failures associated with those functions, and any hazards that could occur due to those failures will be demonstrated to be Minor in accordance with the guidance in AMC 25.1309.
6. Both the FAD and EEAD will be placarded with the words "MAINTENANCE USE ONLY" and therefore are expected to always be operated by trained personnel. This will increase the likelihood that any failures are discovered during normal activities associated with these doors.
7. Based on the actions required to operate the access doors, failures of the latch pin will be obvious to the operator during normal operations.
8. A failed/missing latch pin will result in flight deck indication that the door is not closed and latched.
9. The latch pins are sized based on the ditching condition, therefore the latch pins are extremely robust relative to the loads seen during normal operations.