

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE311; Special Conditions No. 23-251-SC]

Special Conditions: Embraer S.A.; Model EMB 500; Single-Place Side-Facing Seat

Dynamic Test Requirements

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the installation of a single-place side-facing seat/lavatory on Embraer S.A. EMB 500 aircraft. Side-facing seats are considered a novel design, and their installation in a part 23 airplane was not envisaged and is not adequately addressed in 14 CFR part 23. The FAA has determined that the existing regulations do not provide adequate or appropriate safety standards for occupants of single-place side-facing seats. In order to provide a level of safety that is equivalent to that afforded to occupants of forward and aft facing seating, additional airworthiness standards, in the form of special conditions, are necessary.

DATES: The effective date of these special conditions is March 22, 2011.

Comments must be received on or before [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER.]

ADDRESSES: Comments on these special conditions may be mailed in duplicate to: Federal Aviation Administration (FAA), Regional Counsel, ACE-7, Attention: Rules Docket, Docket No. CE311, 901 Locust, Room 506, Kansas City, Missouri 64106, or delivered in duplicate to

the Regional Counsel at the above address. Comments must be marked: Docket No. CE311. Comments may be inspected in the Rules Docket weekdays, except Federal holidays, between 7:30 a.m. and 4:00 p.m.

FOR FURTHER INFORMATION CONTACT: Mr. Bob Stegeman, Federal Aviation Administration, Aircraft Certification Service, Small Airplane Directorate, ACE-111, 901 Locust, Kansas City, Missouri, 816-329-4140, fax 816-329-4090, e-mail Robert.Stegeman@faa.gov.

SUPPLEMENTARY INFORMATION:

The FAA has determined that notice and opportunity for prior public comment hereon are impracticable because these procedures would significantly delay issuance of the approval design and thus delivery of the affected aircraft. The FAA therefore finds that good cause exists for making these special conditions effective upon issuance.

COMMENTS INVITED

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will file in the docket all comments we receive, as well as a report summarizing each substantive public contact with FAA personnel concerning these special conditions. You can inspect the docket before and after the comment closing date. If you wish to review the docket in person, go to the address in the ADDRESSES section of this preamble between 7:30 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays.

We will consider all comments we receive on or before the closing date for comments.

We will consider comments filed late if it is possible to do so without incurring expense or delay.

We may change these special conditions based on the comments we receive.

Background

On December 26, 2009, Embraer S.A. submitted request for a change to type certificate No. A59CE for a design change application (DCA) for installation of a side-facing belted toilet in the EMB-500 airplane. The implication of the term belted is that the toilet will be used for a passenger seat during takeoff and landing and so must comply with the provisions of 14 CFR §§ 23.562 and 23.785 (in addition to the certification basis as established in type certificate A59CE) and any additional requirements that the FAA determines are applicable. In this case, the approval of a side-facing seat to these provisions is considered new and novel and, as such, will require special conditions and specific methods of compliance to certificate.

14 CFR part 23 was amended August 8, 1988, by Amendment 23-36, to revise the emergency landing conditions that must be considered in the design of the airplane. Amendment 23-36 revised the static load conditions in § 23.561, and added a new § 23.562 that required dynamic testing for all seats approved for occupancy during takeoff and landing. The intent of Amendment 23-36 is to provide an improved level of safety for occupants on part 23 airplanes. Because most seating is forward-facing in part 23 airplanes, the pass/fail criteria developed in Amendment 23-36 focused primarily on these seats. Since the regulations do not address side-facing seats, these criteria should be documented in special conditions.

The FAA decided to review compliance with these regulations because the current regulations do not provide adequate and appropriate standards for the type certification of this type of seat.

These requirements are substantially similar to other single place side-facing seat installations approved for use on several different 14 CFR part 25 airplanes.

Type Certification Basis

Under the provisions of § 21.101, Embraer S.A. must show that the model EMB 500, as modified, continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. A59CE or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The regulations incorporated by reference in Type Certificate No. A59CE are as follows:

Part 23 of the Code of Federal Regulations effective February 1, 1965, as amended by 23-1 through 23-55; Part 36 of the Code of Federal Regulations effective December 1, 1969, as amended by 36-1 through 36-28; Part 34 of the Code of Federal Regulations effective September 10, 1990, as amended by 34-1 through 34-3.

For the model listed above, the certification basis also includes all exemptions, if any; equivalent level of safety findings, if any; and special conditions not relevant to the special conditions adopted by this rulemaking action.

The Administrator has determined that the applicable airworthiness regulations (i.e., part 23 as amended) do not contain adequate or appropriate safety standards for the Embraer EMB

500 side-facing seat because of a novel or unusual design feature. Therefore, special conditions are prescribed under the provisions of § 21.16.

Special conditions, as appropriate, as defined in § 11.19, are issued in accordance with § 11.38, and become part of the type certification basis in accordance with § 21.101.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same novel or unusual design feature, the special conditions would also apply to that model under the provisions of § 21.101.

Novel or Unusual Design Features

The Embraer S.A., model EMB 500 will incorporate the following novel or unusual design feature:

A side-facing lavatory seat intended for taxi/takeoff and landing

Discussion

The seat is to incorporate design features that reduce the potential for injury in the event of an accident. In a severe impact, the occupant will be restrained by a 3-point seatbelt and bear on an adjacent padded wall. In addition to the design features intended to minimize occupant injury during an accident sequence, the installation will also require operational procedures that will facilitate egress after an accident, including leaving the lavatory door locked open during taxi, takeoff and landing. The adjacent forward wall/bulkhead interior structure will have padding, which will provide some protection to the head of the occupant.

The Code of Federal Regulations states performance criteria for forward and aft facing seats and restraints in an objective manner. However, none of these criteria are adequate to

address the specific issues raised concerning side-facing seats. Therefore, the FAA has determined that, in addition to the requirements of part 21 and part 23, special conditions are needed to address the installation of this seat installation/restraint.

Accordingly, these special conditions are for the Embraer S.A. model EMB 500 side-facing seat location. Other conditions may be developed, as needed, based on further FAA review and discussions with the manufacturer and civil aviation authorities.

Applicability

As discussed above, these special conditions are applicable to the EMB 500. Should Embraer S.A. apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the previously identified Embraer S.A. model. It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113 and 44701; 14 CFR 21.16 and 21.101; and 14 CFR 11.38 and 11.19.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Embraer S.A. model EMB 500, as changed to allow installation of a single-place side-facing seat.

The minimum acceptable standards for dynamic seat certification of the belted lavatory seat are as follows:

1. *Existing Criteria.* As referenced by § 23.785(b), all injury protection criteria of §§ 23.562(c)(1) through (c)(7) apply to the occupants of the side-facing seats. Head injury criteria (HIC) assessments are only required for head contact with the seat and/or adjacent structures.

2. *Body-to-wall/furnishing contact.* The seat must be installed aft of a structure such as an interior wall or furnishing that will contact the pelvis, upper arm, chest, or head of an occupant seated next to the structure. A conservative representation of the structure and its stiffness must be included in the tests. It is required that the contact surface of this structure must be covered with at least two inches of energy absorbing protective padding (foam or equivalent), such as Ensolite.

3. *Thoracic Trauma.* Testing with a Side Impact Dummy (SID), as defined by 49 CFR Part 572, Subpart F, or its equivalent, must be performed in order to establish Thoracic Trauma Index (TTI) injury criteria. TTI acquired with the SID must be less than 85, as defined in 49 CFR Part 572, Subpart F. SID TTI data must be processed as defined in Federal Motor Vehicle

Safety Standard (FMVSS) Part 571.214, section S6.13.5. Rational analysis, comparing an installation with another installation where TTI data were acquired and found acceptable, may also be viable.

4. *Pelvis.* Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS Part 571.214, section S6.13.5.

5. *Shoulder Strap Loads.* Where upper torso straps (shoulder straps) are used for occupants, tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

6. *Compression Loads.* The compression load measured between the pelvis and the lumbar spine of the ATD may not exceed 1,500 pounds.

7. *Emergency Evacuation.* When occupied, the lavatory door must be latched open for takeoff and landing and must remain latched under the § 23.561(b) loads. The airplane configuration must meet the emergency evaluation requirements of its certification basis with the seat occupied.

8. *Lavatory Door Placard.* A placard specifying the lavatory door must be latched open for takeoff and landing when occupied must be displayed on the outside of the door.

9. *Test Requirements in § 23.562 dynamic loads.* The tests in § 23.562(a) (b) and (c) must be conducted on the lavatory seat. Floor deformation is required except for a seat that is cantilevered to the bulkhead.

Issued in Kansas City, Missouri on March 22, 2011.



Earl Lawrence
Manager, Small Airplane Directorate
Aircraft Certification Service