

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. FAA-2011-1131; Special Conditions No. 23-255-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 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 October 12, 2011.

We must receive your comments by [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER.]

ADDRESSES: Send comments identified by docket number [FAA-2011-1131] using any of the following methods:

- Federal eRegulations Portal: Go to <http://www.regulations.gov> and follow the online instructions for sending your comments electronically.

- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery of Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, S.E., Washington, D.C., between 8 a.m., and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://regulations.gov>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Mr. Bob Stegeman, Federal Aviation Administration, Small Airplane Directorate, Aircraft Certification Service, 901 Locust, Room 301, Kansas City, MO 64106; telephone (816) 329-4140; facsimile (816) 329-4090.

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. In addition, the substance of these special conditions has been subject to the public comment process in several prior instances with no substantive comments received. 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. applied for a change to Type Certificate No. A59CE for installation of a side-facing belted passenger seat in the EMB-500 airplane. The implication of the term belted is that the passenger seat will be used 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 decision to review compliance with these regulations stems from the fact that 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 part 23 and part 25 aircraft.

Type Certification Basis

Under the provisions of § 21.101, Embraer S.A. must show that the model EMB 500, as changed, 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 following model is covered by this special condition:

Embraer S.A. EMB 500:

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.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the side facing seat as installed on this Embraer S.A. model 500 because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

The FAA issues special conditions, as defined in § 11.19, under § 11.38 and they 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 type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, the special conditions would apply to that model as well.

Novel or Unusual Design Features

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

A side facing passenger 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 2-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 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 Embraer model 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 one model of airplanes. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

The substance of these special conditions has been subjected to the notice and comment period in several prior instances and has been derived without substantive change from those previously issued. It is unlikely that prior public comment would result in a significant change from the substance contained herein. Therefore, because a delay would significantly affect the certification of the airplane, which is imminent, the FAA has determined that prior public notice and comment are unnecessary and impracticable, and good cause exists for adopting these special conditions upon issuance. The FAA is requesting comments to allow interested persons to submit views that may not have been submitted in response to the prior opportunities for comment described above.

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 Embraer S.A., model 500 airplanes.

Single-Place Side Facing Seat Dynamic Test Requirements

In addition to the provisions of 14 CFR 23.562, the following will apply:

The following minimum acceptable standards for dynamic seat certification of the single side-facing seat are as follows:

(a) *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.

(b) *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.

(c) *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 S11.5. Rational analysis, comparing an installation with another installation where TTI data were acquired and found acceptable, may also be viable.

(d) *Pelvis*. Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS Part 571.214, section S11.5.

(e) *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.

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

(g) *Emergency Evacuation*. The airplane configuration must meet the emergency evacuation requirements of its certification basis with the seat occupied.

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

The following are the agreed to methods of compliance and testing requirements:

General Test Guidelines

(a) One longitudinal test with the SID anthropomorphic test dummy (ATD) or its equivalent, undeformed floor, no yaw, and with all lateral structural supports (armrests/walls) must be accomplished.

-- Pass/fail injury assessments: TTI and pelvic acceleration.

(b) One longitudinal test with the Hybrid II ATD, deformed floor, with 10 degrees yaw, and with all lateral structural supports (armrests/walls) must be accomplished.

-- Pass/fail injury assessments: HIC and upper torso restraint load, and restraint system retention.

(c) Vertical (15 G's) test must to be conducted with modified Hybrid II ATDs with existing pass/fail criteria.

(d) The ATD can be tethered for the floor deformation test.

(e) The seatbelt is not required to have a TSO Authorization but will need to comply with the TSO-C22g Minimum Performance Standards (MPS).

Issued in Kansas City, Missouri on October 12, 2011.

s/

John Colomy
Acting Manager, Small Airplane Directorate
Aircraft Certification Service