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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2014–0667; Special Conditions No. 25–569–SC]

Special Conditions: Boeing Model 777–300ER, Single-Occupant, Oblique (Side-Facing) Seats With Inflatable Lapbelts

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special condition; request for comments.

SUMMARY: These special conditions are issued for Boeing Model 777–300ER airplanes with single-occupant, oblique (side-facing) seats equipped with inflatable lapbelts. This installation is novel or unusual, and the applicable airworthiness regulations do not contain adequate or appropriate safety standards for occupants of seats installed at an oblique angle of 30 degrees to the centerline of the airplane or for inflatable restraint systems. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: The effective date of these special conditions is September 25, 2014. We must receive your comments by November 10, 2014.

ADDRESSES: Send comments identified by docket number FAA–2014–0667 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, DC 20590–0001.

Hand Delivery or Courier: Take comments to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 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://www.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, DC, between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.

FOR FURTHER INFORMATION CONTACT: John Shelden, Airframe and Cabin Safety, ANM–115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98057–3356; telephone 425–227–2785; facsimile 425–227–1232; email *john.shelden@faa.gov.*

SUPPLEMENTARY INFORMATION: The FAA has determined that notice of, and opportunity for prior public comment on, these special conditions are impracticable because such procedures would significantly delay issuance of the design approval and thus the delivery of the affected airplane, and such impracticability was not of the applicant's creation. The FAA therefore finds that good cause exists for making these special conditions effective upon publication in the **Federal Register**.

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 will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On July 18, 2014, Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124, applied for a type certificate design change to type certificate no. T00001SE to install single-occupant seats installed at an oblique angle to the centerline of the airplane, and which are equipped with inflatable lapbelts, in Boeing Model 777–300ER airplanes. The Model 777 series airplane is a swept-wing, conventional-tail, twin-engine, turbofan-powered, transport-category airplane.

Amendment 25–15 to part 25, dated October 24, 1967, introduced the subject of side-facing seats and a requirement that each occupant in a side-facing seat must be protected from head injury by a safety belt and a cushioned rest that will support the arms, shoulders, head, and spine.

Subsequently, Amendment 25–20, dated April 23, 1969, clarified the definition of sideward-facing seats to require that each occupant of a seat that is positioned at more than an 18-degree angle to the vertical plane containing the airplane centerline must be protected from head injury by a safety belt and an energy-absorbing rest that supports the arms, shoulders, head, and spine; or by a safety belt and shoulder harness that prevents the head from contacting injurious objects. The FAA concluded that a maximum 18-degree angle would provide an adequate level of safety based on tests that were performed at that time, and thus adopted that standard.

Part 25 was amended June 16, 1988, by Amendment 25–64, to revise the emergency-landing conditions that must be considered in the design of the airplane. Amendment 25–64 revised the static-load conditions in § 25.561, and added a new § 25.562 that required

dynamic testing for all seats approved for occupancy during takeoff and landing. The intent of Amendment 25–64 is to provide an improved level of safety for occupants on transport-category airplanes. Because most seating is forward-facing on transport-category airplanes, the pass/fail criteria developed in Amendment 25–64 focused primarily on these seats. As a result, the FAA issued Policy Memorandums ANM–03–115–30 and PS–ANM–100–2000–00123 to provide additional guidance to demonstrate the level of safety required by the regulations for side-facing seats.

To address more recent research findings, the FAA developed a methodology to address all fully side-facing seats (i.e, seats oriented in the airplane with the occupant facing 90 degrees to the direction of airplane travel) and has documented those requirements in a set of proposed new special conditions. In this regard, the FAA has issued Policy Statement PS–ANM–25–03–R1, which conveys revised injury criteria associated with neck and leg injuries.

The Model 777–300ER China Airlines business-class seat installation is novel or unusual in that the current airworthiness standards, and the current Model 777 side-facing-seat special conditions, do not contain adequate or appropriate safety standards, regarding occupants' neck and spine, for oblique (side-facing) seat installation that restricts the occupant's knees/legs from aligning with both the upper torso and the impact vector during a forward event. As such, the Boeing Company proposes a revised seating configuration that requires new special conditions.

Type Certification Basis

Under the provisions of 14 CFR 21.101, Boeing must show that the 777–300ER meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25–128, except for earlier amendments as agreed upon by the FAA. These regulations will be incorporated into type certificate no. T00001SE after type certification approval of the 777–300ER. The regulations incorporated by reference in T00001SE are as follows:

The type-certification basis for the Model 777–300ER airplane is 14 CFR part 25, effective February 1, 1965, as amended by Amendments 25–1 through 25–98, including special conditions 25–295–SC and 25–187A–SC. In addition, the certification basis includes certain special conditions, exemptions, or later amended sections of the applicable part that are not relevant to these proposed special conditions.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Boeing Model 777–300ER airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

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 also apply to the other model.

In addition to the applicable airworthiness regulations and special conditions, the Boeing Model 777–300ER airplane must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.101.

Novel or Unusual Design Features

The Boeing Model 777–300ER airplane will incorporate the following novel or unusual design features:

The seating configuration proposed by Boeing in Certification Plan No. 13668, ''Installation of B/E Aerospace Business Class Seats on China Airlines (CHI) WE501,'' which consists of Super Diamond model, oblique (side-facing), business-class passenger seats, manufactured by B/E Aerospace, in a Boeing Model 777–300ER airplane. These seats will also incorporate inflatable restraints.

The applicable airworthiness regulations do not contain adequate or appropriate safety standards for occupants of seats installed in the proposed configuration. To provide a level of safety equivalent to that afforded to occupants of forward- and aft-facing seats, additional airworthiness standards, in the form of special conditions, are necessary.

Although special conditions 25–295–SC and 25–187A–SC already apply to the 777–300ER, these do not directly address the complex occupant-loading conditions introduced by this oblique (side-facing) seat configuration. In addition, this seat-angle configuration is not specifically addressed in Policy Statement PS–ANM–25–03–R1, which is intended to address fully side-facing seats, i.e., 90-degree installation angle.

Discussion

Boeing's proposed seating configuration could introduce complex loading of the occupant. In conjunction with the 30-degree oblique (side-facing) orientation of the seats, surrounding structure restricts the occupant's knees and legs, in a forward event, from aligning with both the upper torso and the impact vector. In addition, the inflatable lapbelt design, intended to provide occupant restraint and injury prevention, introduces a significant rebound flail of the head and neck.

The level of safety intended by current rules is that aircraft seating configurations protect the occupant from serious injury. Development testing of the proposed seating configuration has shown that the inflatable restraint contributes to loading of the head and neck in the fore and aft directions, and has also produced significant head twisting. National Highway Traffic Safety Administration (NHTSA) regulations specify neck injury criteria for the 50th percentile male as part of the FMVSS No. 208 alternative test, S13.2. Therefore, we find that it is appropriate to adopt the same neck-injury criteria used in the FMVSS 571.208, and measure it using the FAA Hybrid III anthropomorphic test dummy (ATD). The neck injury criteria, called ''N_{ij}'', imposes critical limits for all four possible modes of neck loading; tension or compression combined with either flexion (forward) or extension (rearward) bending moment. The N_{ij} is defined as the sum of the normalized loads and moments of the neck load cells installed in the ATD. We will also limit the head rotation based on existing relevant research literature. Impact of the neck with any surface could cause serious neck injury from concentrated loading; therefore these special conditions do not allow such contact.

Preliminary results from FAA-sponsored oblique-seat research indicate that unrestricted flailing of the upper torso during forward impacts can produce significant injuries. Although specific injury criteria to predict these injuries is not yet available, limiting the amount of forward flailing has been observed to reduce the magnitude and duration of spinal loading. Therefore, these special conditions require that seat designs limit the forward flail of the upper body to reduce the risk of these injuries.

These special conditions contain the additional safety standards that the Administrator considers necessary to

establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to the Boeing Model 777–300ER airplane. Should Boeing 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 airplane. It is not a rule of general applicability.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the **Federal Register**; however, as the certification date for the Boeing Model 777–300ER airplane is imminent, the FAA finds that good cause exists to make these special conditions effective upon publication in the **Federal Register**.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

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 Boeing Model 777–300ER airplanes.

Inflatable Lapbelt Special Conditions

The inflatable lapbelts must meet the criteria of Special Conditions 25–187A–SC.

Single-Occupant, Oblique (side-facing) Seats Special Conditions

1. Longitudinal (16g) occupant injury test(s), must be performed with the FAA Hybrid III ATD, undeformed floor, most critical yaw case(s) for injury, and with all lateral structural supports (armrests/walls). The criteria for the pass/fail injury assessments are listed in special conditions 2 through 5 in this section.

2. Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupant of an oblique (side-facing) seat. Head injury criterion (HIC) assessments are only required for head contact with the seat and/or adjacent structures. If there is no apparent contact with seat/structure but there is contact with an inflatable restraint, the HIC15 score for that contact must be less than 700.

3. Body-to-Wall/Furnishing Contact Criteria: If an oblique (side-facing) seat is installed aft of structure (e.g., an interior wall or furnishing) that does not provide a homogenous contact surface for the expected range of occupants and yaw angles, then additional analysis and/or test(s) may be required to demonstrate that the injury criteria are met for the area which an occupant could contact. For example, if difference yaw angles could result in different inflatable restraint performance then additional analysis or separate test(s) may be necessary to evaluate.

4. Neck-Injury Criteria:

a. In demonstrating that the design meets the criteria of FMVSS 571.208, the applicant must show the N_{ij} to be below 1.0, where $N_{ij} = F_z/F_{zc} + M_y/M_{yc}$, and N_{ij} intercepts limited to:

i. F_{zc} = 1530 lb for tension

ii. F_{zc} = 1385 lb for compression

iii. M_{yc} = 229 lb-ft in flexion

iv. M_{yc} = 100 lb-ft in extension

b. In addition, peak F_z must be below 937 lb in tension and 899 lb in compression.

c. Rotation of the head about its vertical axis relative to the torso is limited to 105 degrees in either direction from forward-facing.

d. The neck must not impact any surface.

5. Spine and Torso Injury Criteria:

a. The shoulders must remain aligned with the hips throughout the impact sequence, or support for the upper torso must be provided to prevent forward or lateral flailing beyond 45 degrees from the vertical during significant spinal loading.

b. Occupant must not interact with the armrest or other seat components in any manner significantly different than would be expected for a forward-facing seat installation.

6. One longitudinal (16g) structural test must be performed with the Hybrid II ATD or FAA Hybrid III, deformed floor, with 10 degrees yaw, and with all lateral structural supports (armrests/walls). Use existing structural pass/fail criteria from § 25.562.

7. One vertical (14g) test must be conducted with Hybrid II ATDs or FAA Hybrid III. Use existing pass/fail structural and injury criteria from § 25.562.

Note: The applicant must demonstrate that the installation of seats via plinths or pallets meets all applicable requirements. Compliance with the guidance contained in FAA Policy Memorandum PS–ANM–100–2000–00123, dated February 2, 2000, titled ''Guidance for Demonstrating Compliance with Seat Dynamic Testing for Plinths and Pallets,'' is acceptable to the FAA.

Issued in Renton, Washington September 19, 2014.

Michael Kaszycki,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91

[Docket No.: FAA–2014–0458; Amendment No. 91–333]

RIN 2120–AA66

Airports/Locations: Special Operating Restrictions

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; technical amendment.

SUMMARY: This action amends the Appendix listing airports/locations with special operating restrictions in FAA's general operating and flight rules. Specifically, this action adds an additional entry for Houston, TX (William P. Hobby Airport), and San Diego, CA (Marine Corps Air Station Miramar), to the Appendix, which lists the airports where aircraft operating within 30 nautical miles (NM) of the listed airports, from the surface upward to 10,000 feet mean sea level (MSL) must be equipped with an altitude encoding transponder. The FAA is taking this action to correctly identify applicable airports under the appropriate sections in the Appendix.

DATES: *Effective Date:* November 13, 2014.

FOR FURTHER INFORMATION CONTACT: Colby Abbott, Airspace Policy and Regulations Group, AJV–113, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267–8783, email *colby.abbott@faa.gov.*

SUPPLEMENTARY INFORMATION:

Background

Title 14 of the Code of Federal Regulations, part 91, appendix D, section 1, lists the airports where special operating restrictions apply. Specifically, this section lists the locations at which aircraft operating within 30 NM of the listed airports,