

**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration****14 CFR Part 25**

[Docket No. NM175; Special Conditions No. 25-01-01-SC]

**Special Conditions: Boeing Model 777-200 Series Airplanes; Overhead Crew Rest Compartment**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Amended special conditions.

**SUMMARY:** These amended special conditions are issued to The Boeing Company for Model 777-200 series airplanes, modified by Flight Structures, Inc. This airplane has a novel or unusual design feature associated with the installation of a crew rest compartment. Special Conditions No. 25-169-SC were issued on December 1, 2000, addressing this installation. On January 16, 2001, Flight Structures, Inc., applied for an amendment to these special conditions to allow the assistance of personnel in the main passenger cabin to assist in the evacuation of an incapacitated person from the overhead crew rest compartment to the main passenger cabin. The assistance by persons in the main passenger cabin would reduce the potential for injury to the incapacitated person(s) being lowered from the overhead crew rest area to the main passenger cabin. Since the applicable airworthiness regulations, including those contained in Special Conditions No. 25-169-SC, do not contain adequate or appropriate safety standards for this design feature, 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.

**EFFECTIVE DATE:** May 2, 2001.

**FOR FURTHER INFORMATION CONTACT:** Jayson Claar, FAA, Transport Standards Staff, ANM-115, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, Washington, 98055-4056; telephone (425) 227-2194; facsimile (425) 227-1320.

**SUPPLEMENTARY INFORMATION:****Background**

On June 25, 1999, Flight Structures Inc., 4407 172 Street NE, Arlington, Washington, 98223, applied for a supplemental type certificate to install an overhead crew rest compartment in Boeing Model 777-200 series airplanes. The Boeing Model 777-200 is a large

twin-jet engine transport airplane with four pairs of Type A exits, a passenger capacity of 440, and a range of 5000 miles. The overhead crew rest compartment is a single compartment located at the door three vicinity above the main passenger compartment with eight private bunks and two seats. A stairwell entering from the door three aisle is the main entry. Two escape hatches are located on either side of the entryway door. It is to be certified for a maximum of ten occupants. Due to the novel or unusual features associated with the installation of a crew rest compartment, Special Conditions No. 25-169-SC were issued on December 1, 2000, to provide a level of safety equal to that established by the regulations incorporated by reference in the type certificate. Flight Structures, Inc., now proposes to amend Special Conditions No. 25-169-SC to allow for assistance by persons on the main passenger cabin in the evacuation of an incapacitated person from the overhead crew rest.

**Novel or Unusual Design Features**

While the installation of a crew rest compartment is not a new concept for large transport category airplanes, each compartment design has unique features by virtue of its design, location, and use on the airplane. Previously, crew rest compartments have been evaluated that are installed within the main passenger compartment area of the Boeing Model 777-200 and Model 777-300 series airplanes; other crew rest compartments have been installed below the passenger cabin area, within the cargo compartment. Similar overhead crew rest compartments have also been installed on the Boeing Model 747 airplane. The interfaces of the modification are evaluated within the interior and assessed in accordance with the certification basis of the airplane. The provisions of compliance with part 25 address cabin systems and interiors as they relate to typical passenger compartments. Part 25 does not provide the requirements for crew rest compartments within the overhead area of the passenger compartment for the Boeing Model 777-200 series airplanes.

This is a compartment that has never been used for this purpose in any previous Boeing Model 777-200 series airplanes. Due to the novel or unusual features associated with the installation of this crew rest compartment, special conditions are considered necessary to provide a level of safety equal to that established by the airworthiness regulations incorporated by reference in the type certificate.

**Discussion**

The current Special Condition No. 3 states the following: "There must be a means for the evacuation of an incapacitated person (representative of a ninety-fifth percentile male) from the crew rest compartment to the passenger cabin floor. The evacuation must be demonstrated for all evacuation routes. A flight attendant or other crewmember (a total of one assistant) may provide assistance in the evacuation." The applicant contends that assistance from persons on the main passenger cabin would reduce the possibility of injury to the incapacitated person being lowered from the overhead crew rest area into the main passenger cabin. The persons assisting could be either crewmembers or passengers seated in the area of the evacuation route.

The FAA has considered the applicant's position and agrees. These amended special conditions allow persons in the main passenger cabin to assist a flight crewmember during the evacuation of the incapacitated person, possibly reducing injury. It was the intent of the original Special Condition No. 3 to limit the number of persons in the actual crew rest area to one person when assisting in the evacuation of an incapacitated person from the overhead crew rest area.

The revised safety standard is contained in amended Special Condition No. 3. Although Special Conditions Nos. 1, 2, and 4 though 17 are standards adopted in Special Conditions No. 25-169-SC, they are repeated in these amended special conditions in order to place the revised standard in proper perspective.

**Type Certification Basis**

Under the provisions of § 21.101, Flight Structures, Inc., must show that the Boeing Model 777-200 series airplane, as changed, continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. T00001SE 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. T00001SE for the Boeing Model 777-200 series airplanes include 14 CFR part 25, as amended by Amendments 25-1 through 25-82. The U.S. type certification basis for the Boeing Model 777-200 series airplanes is established in accordance with 14 CFR §§ 21.29 and 21.17 and the type certification application date. The type

certification basis is listed in Type Certificate Data Sheet No. T00001SE.

If the Administrator finds that the applicable airworthiness regulations (i.e., part 25) do not contain adequate or appropriate safety standards for the Boeing Model 777-200 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

In addition to the applicable airworthiness regulations and special conditions, Boeing Model 777-200 series airplanes 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.

Special conditions, as appropriate, are issued in accordance with § 11.49, after public notice, as required by §§ 11.28 and 11.29(b), and become part of the type certification basis in accordance with § 21.101(b)(2).

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 the other model under the provisions of § 21.101(a)(1).

#### Discussion of Comments

No comments were received, and the amended special conditions are adopted as proposed.

#### Applicability

As discussed above, these special conditions are applicable to Boeing Model 777-200 series airplanes. Should Flight Structures, Inc., apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. T00001SE to incorporate the same novel or unusual design feature, the special conditions would apply to that model as well under the provisions of § 21.101(a)(1).

#### Conclusion

This action affects only certain novel or unusual design features on Boeing Model 777-200 series airplanes. 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 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, the Federal Aviation Administration (FAA) adopts the following amended Special Condition No. 3 as part of the type certification basis for Boeing Model 777-200 series airplanes, as modified by Flight Structures, Inc., with overhead crew rest compartments. (Existing Special Conditions (Nos. 1, 2, and 4-17 are repeated below for clarity.)

1. Occupancy of the overhead crew rest compartment is limited to a maximum of ten occupants. There must be an approved seat or berth able to withstand the maximum flight loads when occupied for each occupant permitted in the crew rest compartment.

(a) There must be appropriate placards, inside and outside to indicate:

(1) The maximum number of occupants allowed,

(2) That occupancy is restricted to crewmembers that are trained in the evacuation procedures for the overhead crew rest compartment,

(3) That occupancy is permitted during taxi, take-off and landing, and

(4) That smoking is prohibited in the crew rest compartment.

(b) There must be at least one ashtray on the inside and outside of any entrance to the crew rest compartment.

(c) There must be a means to prevent passengers from entering the compartment in the event of an emergency or when no flight attendant is present.

(d) There must be a means for any door installed between the crew rest compartment and passenger cabin to be capable of being quickly opened from inside the compartment, even when crowding occurs at each side of the door.

(e) For all doors installed, there must be a means to preclude anyone from being trapped inside the compartment. If a locking mechanism is installed, it must be capable of being unlocked from the outside without the aid of special tools. The lock must not prevent opening from the inside of the compartment at any time.

2. There must be at least two emergency evacuation routes that could be used by each occupant of the crew rest compartment to rapidly evacuate to the main cabin. In addition—

(a) The routes must be located with sufficient separation within the compartment, and between the evacuation routes, to minimize the possibility of an event rendering both routes inoperative.

(b) The routes must be designed to minimize the possibility of blockage,

which might result from fire, mechanical or structural failure, or persons standing below or against the escape route. One of two evacuation routes may not be located where, during times in which occupancy is allowed, normal movement by passengers occurs (i.e., main aisle, cross aisle, or galley complex) that would impede egress of the crew rest compartment. If there is low headroom at or near the evacuation route, provisions must be made to prevent or to protect occupants from head injury. The use of evacuation routes must not be dependent on any powered device. If the evacuation procedure involves the evacuee stepping on seats, the seats must not be damaged to the extent that they would not be acceptable for occupancy during an emergency landing.

(c) Emergency evacuation procedures must be established and transmitted to the operators for incorporation into their training programs and appropriate operational manuals.

(d) There must be a limitation in the Airplane Flight Manual or other suitable means requiring that crewmembers be trained in the use of evacuation routes.

3. There must be a means for the evacuation of an incapacitated person (representative of a ninety-fifth percentile male) from the crew rest compartment to the passenger cabin floor. The evacuation must be demonstrated for all evacuation routes. A flight attendant or other crewmember (a total of one assistant within the crew rest area) may provide assistance in the evacuation. Additional assistance may be provided by up to three persons in the main passenger compartment. These additional assistants must be standing on the floor while providing assistance. Procedures for the evacuation of an incapacitated person from the crew rest compartment must be established.

4. The following signs and placards must be provided in the crew rest compartment:

(a) At least one exit sign, located near each exit, meeting the requirements of § 25.812(b)(1)(i).

(b) An appropriate placard defining the location and the operating instructions for each evacuation route.

(c) Placards must be readable from a distance of 30 inches under emergency lighting conditions.

(d) The exit handles and evacuation path operating instruction placards must be illuminated to at least 160 microlamberts under emergency lighting conditions.

5. There must be a means in the event of failure of the airplane's main power system, or of the normal crew rest compartment lighting system, for

emergency illumination to be automatically provided for the crew rest compartment.

(a) This emergency illumination must be independent of the main lighting system.

(b) The sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system.

(c) The illumination level must be sufficient for the occupants of the crew rest compartment to locate and transfer to the main passenger cabin floor by means of each evacuation route.

6. There must be means for two-way voice communications between the crewmembers on the flight deck and the occupants of the crew rest compartment. There must also be two-way communications between the occupants of the crew rest compartment and each flight attendant station required to have a public address system microphone per § 25.1423(g) in the passenger cabin.

7. There must be a means for manual activation of an aural emergency alarm system, audible during normal and emergency conditions, to enable crewmembers on the flight deck and at each pair of required floor level emergency exits to alert occupants of the crew rest compartment of an emergency situation. Use of a public address or crew interphone system would be acceptable, providing an adequate means of differentiating between normal and emergency communications is incorporated. The system must be powered in flight, after the shutdown or failure of all engines and auxiliary power units, or the disconnection or failure of all power sources dependent on their continued operation, for a period of at least ten minutes.

8. There must be a means, readily detectable by seated occupants of the crew rest compartment, that indicates when seat belts should be fastened. Seat belt type restraints must be provided for berths and must be compatible for the sleeping attitude during cruise conditions. There must be a placard on each berth requiring that seat belts must be fastened when occupied. If compliance with any of the other requirements of these special conditions is predicated on specific head location, there must be a placard identifying the head position. In the event there are no seats, at least one sign must be provided to cover anticipated turbulence.

9. The following equipment must be provided:

(a) At least one approved hand-held fire extinguisher appropriate for the kinds of fires likely to occur;

(b) One protective breathing equipment device approved to Technical Standard Order (TSO)—C116 or equivalent, suitable for fire fighting; and

(c) One flashlight.

10. A smoke detection system (or systems) must be provided that monitors each area within the crew rest compartment, including those areas partitioned by curtains. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

(a) A visual indication to the flight deck within one minute after the start of a fire;

(b) An aural warning in the crew rest compartment; and

(c) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

11. The crew rest compartment must be designed such that fires within the compartment can be controlled without a crewmember having to enter the compartment, or the design of the access provisions must allow crewmembers equipped for firefighting to have unrestricted access to the compartment. The time for a crewmember on the main deck to react to the fire alarm, to don the fire fighting equipment, and to gain access must not exceed the time for the compartment to become smoke-filled, making it difficult to locate the fire source.

12. There must be a means provided to exclude hazardous quantities of smoke or extinguishing agent originating in the crew rest compartment from entering any other compartment occupied by crewmembers or passengers. The means must include the time periods during the evacuation of the crew rest compartment and, if applicable, when accessing the crew rest compartment to manually fight a fire. Smoke entering any other compartment occupied by crewmembers or passengers must dissipate within 5 minutes after closing the access to the crew rest compartment. Flight tests must be conducted to show compliance with this requirement.

13. There must be a supplemental oxygen system equivalent to that provided for main deck passengers for each seat and berth in the crew rest compartment. The system must provide:

(a) An aural and visual warning to the occupants of the crew rest compartment

to don oxygen masks in the event of decompression; and

(b) A decompression warning that activates before the cabin pressure altitude exceeds 15,000 feet. The warning must sound continuously until a reset pushbutton in the crew rest compartment is depressed.

14. The following requirements apply to a crew rest compartment that is divided into several sections by the installation of curtains or partitions:

(a) To compensate for sleeping occupants, there must be an aural alert that can be heard in each section of the crew rest compartment that accompanies automatic presentation of supplemental oxygen masks. Two supplemental oxygen masks are required in each section whether or not seats or berths are installed in each section. There must also be a means by which the oxygen masks can be manually deployed from the flight deck.

(b) A placard is required adjacent to each curtain that visually divides or separates, for privacy purposes, the overhead crew rest compartment into small sections. The placard must require that the curtain(s) remain open when the private section it creates is unoccupied. The vestibule section adjacent to the stairway is not considered a private area and, therefore, does not require a placard.

(c) For each crew rest section created by the installation of a curtain, the following requirements of these special conditions must be met with the curtain open or closed:

(1) No smoking placard (Special Condition No. 1),

(2) Emergency illumination (Special Condition No. 5),

(3) Emergency alarm system (Special Condition No. 7),

(4) Seat belt fasten signal (Special Condition No. 8), and

(5) The smoke or fire detection system (Special Conditions No.'s 10, 11, and 12).

(d) Overhead crew rest compartments visually divided to the extent that evacuation could be affected must have exit signs that direct occupants to the primary stairway exit. The exit signs must be provided in each separate section of the crew rest compartment, and must meet the requirements of § 25.812(b)(1)(i).

(e) For sections within an overhead crew rest compartment that are created by the installation of a rigid partition with a door physically separating the sections, the following requirements of these special conditions must be met with the door open or closed:

(1) There must be a secondary evacuation route from each section to

the main deck, or alternatively, it must be shown that any door between the sections has been designed to preclude anyone from being trapped inside the compartment.

(2) Any door between the sections must be shown to be openable when crowded against, even when crowding occurs at each side of the door.

(3) There may be no more than one door between any seat or berth and the primary stairway exit.

(4) There must be exit signs in each section meeting the requirements of § 25.812(b)(1)(i) that direct occupants to the primary stairway exit.

(f) For each smaller section within the main crew rest compartment created by the installation of a partition with a door, the following requirements of these special conditions must be met with the door open or closed:

(1) No smoking placards (Special Condition No. 1),

(2) Emergency illumination (Special Condition No. 5),

(3) Two-way voice communication (Special Condition No. 6),

(4) Emergency alarm system (Special Condition No. 7),

(5) Seat belt fasten signal (Special Condition No. 8),

(6) Emergency fire fighting and protective equipment (Special Condition No. 9), and

(7) Smoke or fire detection system (Special Conditions No.'s 10, 11, and 12).

15. The requirements of two-way voice communication with the flight deck and provisions for emergency firefighting and protective equipment are not applicable to lavatories or other small areas that are not intended to be occupied for extended periods of time.

16. Where a waste disposal receptacle is fitted, it must be equipped with an automatic fire extinguisher that meets the performance requirements of § 25.854(b).

17. Materials (including finishes or decorative surfaces applied to the materials) must comply with the flammability requirements of § 25.853(a), as amended by Amendment 25–83. Mattresses must comply with the flammability requirements of § 25.853(c), as amended by Amendment 25–83.

Issued in Renton, Washington on May 2, 2001.

**Lirio Liu Nelson,**

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[FR Doc. 01–12106 Filed 5–14–01; 8:45 am]

**BILLING CODE 4910–13–P**