DESIGN CRITERIA FOR ENCLOSED STOWAGE COMPARTMENTS NOT LIMITED TO STOWAGE OF EMERGENCY OR AIRPLANE-SUPPLIED EQUIPMENT—Continued

Fire protection features	Applicability of fire protection requirements by interior volume		
	Less than 25 cubic feet	25 cubic feet to less than 57 cubic feet	57 cubic feet to 200 cubic feet
Fire Location Detector [4]	No	Yes	Yes.

[1] Compliant Materials of Construction: The material used in constructing each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components (*i.e.,* 14 CFR part 25 Appendix F, Parts I, IV, and V) per the requirements of § 25.853. For compartments less than 25 ft.^{3} in interior volume, the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

[2] Smoke or Fire Detectors: Enclosed stowage compartments equal to or exceeding 25 ft.^{3} in interior volume must be provided with a smoke- or fire-detection system to ensure that a fire can be detected within a one-minute detection time. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

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

(b) An aural warning in the OFCR compartment.

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

[3] Liner: If material used in constructing the stowage compartment can be shown to meet the flammability requirements of a liner for a Class B cargo compartment (*i.e.,* § 25.855 at Amendment 25–116, and Appendix F, part I, paragraph (a)(2)(ii)), then no liner would be required for enclosed stowage compartments equal to or greater than 25 ft.^{3} but less than 57 ft.^{3} in interior volume. For all enclosed stowage compartments equal to or greater than 57 ft.^{3} in interior volume but less than or equal to 200 ft.^{3}, a liner must be provided that meets the requirements of § 25.855 for a Class B cargo compartment.

[4] Fire Location Detector: If an OFCR compartment has enclosed stowage compartments exceeding 25 ft.^{3} interior volume that are located separately from the other stowage compartments (located, for example, away from one central location, such as the entry to the OFCR compartment or a common area within the OFCR compartment, where the other stowage compartments are), that OFCR compartment would require additional fire-protection features and/or devices to assist the firefighter in determining the location of a fire.

Issued in Renton, Washington, on February 15, 2011.

K.C. Yanamura,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM411; Special Conditions No. 25–418–SC]

Special Conditions: Boeing Model 787–8 Airplane; Overhead Flightcrew-Rest Compartment Occupiable During Taxi, Takeoff, and Landing

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Boeing Model 787–8 airplane. This airplane will have novel or unusual design features associated with an overhead flightcrew-rest (OFCR) compartment, which is proposed to be occupiable during taxi, takeoff, and landing (TT&L). The applicable airworthiness regulations 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. Additional special conditions will be issued for other novel or unusual design features of the Boeing Model 787–8 airplanes.

DATES: *Effective Date:* March 28, 2011.

FOR FURTHER INFORMATION CONTACT: Jeff Gardlin, FAA, Airframe/Cabin Safety Branch, ANM–115, Transport Standards Staff, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue, SW., Renton, Washington 98055–4056; telephone (425) 227–2136; facsimile (425) 227–1320.

SUPPLEMENTARY INFORMATION:

Background

On March 28, 2003, The Boeing Commercial Airplane Group (hereafter referred to as "Boeing") applied for an FAA type certificate for its new Boeing Model 787–8 passenger airplane. The company applied for an extension of time for the type certificate on March 9, 2009, and was granted that extension on March 13, 2009. The Boeing Model 787–8 airplane will be an all-new, two-engine, jet transport airplane with a two-aisle cabin. The maximum takeoff weight will be 476,000 pounds, with a maximum passenger capacity of 381.

Type Certification Basis

Under provisions of Title 14 Code of Federal Regulations (14 CFR) 21.17, Boeing must show that the Boeing Model 787–8 airplane (hereafter referred to as "the 787") meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25–1 through 25–117, 25–120, 25–124, 25–125 and 25–128, except that § 25.1309 remains at Amendment 25–117 for cargo-fire protection systems. 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 787 because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

In addition to complying with the applicable airworthiness regulations and special conditions, the 787 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 must also issue a finding of regulatory adequacy pursuant to section 611 of Public Law 92–574, the "Noise Control Act of 1972."

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 § 21.17(a)(2).

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 features, the special conditions would also apply to the other model under provisions of § 21.101.

Novel or Unusual Design Features

Flightcrew rest compartments have been installed and certificated on several Boeing airplane models in locations as varied as the main passenger seating area, the overhead space above the main passenger-cabin

seating area, and below the passenger-cabin seating area within the cargo compartment. In each case, the Administrator has determined that the applicable regulations (*i.e.,* 14 CFR part 25) did not provide all of the necessary requirements because each installation had unique features by virtue of its design, location, and use on the airplane. The special conditions contain safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Most recently for the Boeing Model 777 series airplanes, the FAA has issued Special Conditions No. 25–230–SC, dated April 9, 2003, for crew-rest compartments allowed to be occupied by crewmembers and flight crewmembers during flight, and Special Conditions No. 25–260–SC, dated April 14, 2004, for crew-rest compartments allowed to be occupied by crewmembers and flight crewmembers during TT&L, as well as during flight.

For the 787, an OFCR compartment is located in the overhead space above the main passenger cabin seating area immediately aft of the first pair of main deck emergency exits (Door 1). This compartment includes two private berths and up to two seats. Occupancy of the compartment will be limited to a maximum of four trained crewmembers during flight and two trained flight crewmembers, one in each seat, during TT&L. Stairs through a vestibule access the compartment from the main deck. In addition, a secondary evacuation route, which opens directly into the main passenger-seating area, will be available as an alternate for evacuating occupants of the compartment. A smoke detection system and an oxygen system will be provided in the compartment. Other optional features, such as a sink with cold-drink stowage or a lavatory, may be provided as well.

This 787 OFCR compartment is unique because of its design, location, and use on the airplane. It is also unique because it is in the overhead area of the passenger compartment and is proposed to be occupied by trained flightcrew during TT&L.

Because of the novel or unusual features associated with installation of this OFCR compartment, special conditions are considered necessary to provide a level of safety equal to that established by the airworthiness regulations.

These special conditions do not negate the need to address applicable part 25 regulations.

Discussion of Comments

Notice of proposed special conditions 25–09–07–SC for the Boeing Model 787 series airplanes was published in the **Federal Register** on January 4, 2010. No comments were received, and these special conditions are adopted as proposed.

Consideration of a Requirement for an External Exit

For Boeing Model 777 Special Conditions No. 25–260–SC, the FAA considered whether or not a special condition should require that the OFCR compartment have an external exit leading directly outside the airplane. The Air Line Pilots Association, International (ALPA), and International Federation of Air Line Pilots (IFALPA) reviewed the design of the 777 OFCR compartment and informed the FAA that in their opinion an external exit was not needed because two independent, internal evacuation routes were provided. That input, and the fact that flight crewmembers would be the only occupants of the compartment during TT&L, supported the FAA in determining that a special condition requiring an external exit was not required. The FAA considers that the following, in addition to Special Conditions No. 25–260–SC, provide a level of safety equivalent to that established by part 25 for main-deck occupants:

1. The distances along the evacuation routes from the seats in the OFCR compartment to the Door 1 exits on the main deck are significantly shorter than the maximum distance a seated passenger on the main deck would need to travel to reach an exit.

2. Occupancy during TT&L will be limited to two flight crewmembers trained in the evacuation, fire fighting, and depressurization procedures of the OFCR compartment. An airplane-flight-manual limitation must be established to restrict occupancy to only persons the pilot in command has determined are able to use both evacuation routes rapidly. The ability of such persons to fit through the escape hatch must be considered in this determination.

For the reasons noted above, the FAA does not believe that this special condition should require that the 787 OFCR compartment have an external exit.

Operational Evaluations and Approval

These special conditions establish requirements for OFCR-compartment design approvals administered by the FAA's Aircraft Certification Service. Before operational use of an OFCR compartment, the FAA's Flight Standards Service must evaluate and approve the "basic suitability" of the compartment for crew occupation. Additionally, if an operator wishes to use an OFCR compartment as "sleeping quarters," the compartment must undergo an additional evaluation and approval (reference 14 CFR 121.485(a), 121.523(b), and 135.269(b)(5)). Compliance with these special conditions does not ensure that the applicant has demonstrated compliance with the requirements of parts 121 or 135.

To obtain an operational evaluation, the type certificate holder must contact the appropriate aircraft evaluation group (AEG) in the Flight Standards Service and request a "basic suitability" evaluation or a "sleeping quarters" evaluation of its OFCR compartment. The results of these evaluations should be documented in a 787 flight standardization board (FSB) report appendix. Individual operators may reference these standardized evaluations in discussions with their FAA principal operating inspector (POI) as the basis for an operational approval, in lieu of an on-site operational evaluation.

Any changes to the approved OFCR compartment configuration that affect crewmember emergency egress, or any other procedures affecting safety of the occupying crewmembers or related emergency training, will require re-evaluation and approval. The applicant for an OFCR compartment design change that affects egress, safety procedures, or training is responsible for notifying the FAA's AEG that a new compartment evaluation is required. The results of a re-evaluation should also be documented in a 787 FSB report appendix.

Procedures must be developed to ensure that a crewmember, acting as firefighter, entering the OFCR compartment through the stairway/vestibule to fight a fire, will examine the stairway/vestibule and the adjacent galley or lavatory areas (if installed) for the source of the fire before entering the remaining areas of the compartment. This is intended to ensure that the source of the fire is not between the crewmember and the entrance to the OFCR compartment. If a fire source is not immediately evident to the firefighter, the firefighter should check for potential fire sources at areas closest to the OFCR compartment entrance first, then proceed to check areas in such a manner that the fire source, when found, will not be between the firefighter and his or her way to get out of the compartment. Procedures describing methods for searching the

OFCR compartment for fire source(s) must be transmitted to operators for incorporation into their training programs and appropriate operational manuals.

Discussion of Rescue-Crew Training Materials

Installation of an OFCR compartment that can be occupied during TT&L by flightcrew is unusual. Appropriate information must be provided to airport fire-rescue personnel so that they understand that this remote compartment may be occupied during an emergency landing. The applicant must provide rescue-crew training materials to the local FAA Airports Division, Safety and Standards Branch, to address this issue. The FAA Airports Division, Safety and Standards Branch, will ensure that these materials are distributed to appropriate airports, domestic and foreign. A special condition is not considered appropriate to address this issue.

Discussion of the Special Conditions

These special conditions apply to OFCR compartments that are occupiable during TT&L and are installed immediately aft of the Door 1 exits on the 787. These special conditions supplement 14 CFR part 25. Except as noted below, these special conditions for the 787 are identical to Boeing Model 777 Special Conditions No. 25–260–SC.

Special Conditions 6 and 16 contain requirements for the exit signs that must be provided in the OFCR compartment. Symbols that satisfy the equivalent level of safety finding established for the 787 may be used in lieu of the text required by § 25.812(b)(1)(i). The FAA expects that the meaning of any symbolic exit sign will be reinforced as a part of crewmember training in evacuation procedures.

Special Condition 15 contains requirements for supplemental oxygen systems. Special Conditions No. 25–260–SC required that each berth be provided with two oxygen masks. This was intended to address the case where a person not in a berth was moving around within the flightcrew rest compartment and needed quick access to the oxygen. For the designs used in the model 777, this requirement was sufficient. However, for the 787, the requirement to have two masks per berth may not always meet the objective of having masks available to persons who are in transition within the compartment. Therefore, the wording of this special condition has been modified to better state the objective rather than specifying a two-masks-per-berth requirement. In addition, the requirement to have adequate illumination to retrieve the mask, while implied previously, is made explicit in these special conditions.

Special Condition 18 contains the requirements for materials used in the construction of the OFCR compartment. Special Conditions No. 25–260–SC stated that § 25.853 as amended by Amendment 25–83 is the appropriate regulation. Section 25.853 has since been further amended, and these special conditions reference the latest amendment level for § 25.853, Amendment 25–116.

Compliance with these special conditions does not relieve the applicant from the existing airplane certification-basis requirements. One particular area of concern is that installation of OFCR compartments changes the compartment volume in the overhead area of the airplane. The applicant must comply with the pressurized compartment loads requirements of § 25.365(e), (f), and (g) for the OFCR compartment, as well as for any other airplane compartments whose decompression characteristics are affected by the installation of an OFCR compartment. Compliance with § 25.813 emergency exit access requirements must be demonstrated for all phases of flight during which occupants will be present.

The configuration includes a seat installed adjacent to the OFCR compartment exit which will be occupiable during TT&L. It should be noted that the emergency landing conditions requirements of §§ 25.561(d) and 25.562(c)(8)apply to this configuration. Deformations resulting from required static and dynamic structural tests must not impede rapid evacuation of the OFCR compartment occupants. Seat deformations must not prevent opening of the secondary escape hatch or rapid evacuation through the secondary escape route.

Section 25.785(h)(2) mandates that the flight attendant seats required by the operating rules be located in a position that provides a direct view of the cabin area for which the flight attendant is responsible. Since the OFCR compartment will be occupied only by trained crewmembers, the FAA does not consider this requirement applicable to the seating area in the OFCR compartment.

Section 25.787(a) requires each stowage compartment in the passenger cabin, except for underseat and overhead stowage compartments for passenger convenience, to be completely enclosed. This requirement does not apply to the flight deck, because flight crewmembers must be able to quickly access items to better perform their duties. Flight crewmembers occupying the OFCR compartment will not be performing flight deck duties however. Therefore, stowage compartments in the OFCR compartment, except for underseat compartments for occupant convenience, should be completely enclosed. This will provide occupants of the OFCR compartment a similar level of safety to that provided to passengers on the main deck. Special Condition 20 contains this requirement.

Section 25.811(c) requires that means be provided to assist occupants in locating the exits in conditions of dense smoke. Section 25.812(e) requires floor proximity emergency escape path marking to provide guidance for passengers when all sources of illumination above 4 feet from the cabin aisle floor are totally obscured. The FAA considers that the current OFCR compartment design is sufficient in regard to these regulations. The two OFCR compartment seats are only a couple of steps away from the stairway and once a trained flight crewmember is at the top of the stairway, the stairway itself will guide him/her to the main deck. Once the crewmember is on the main deck, floor proximity lighting and exit marker signs, which are less than 4 feet above the floor, are provided.

Section 25.813(e) prohibits installation of interior doors between passenger compartments, but the FAA has historically found flightcrew rest-compartment doors to be acceptable, because flightcrew rest compartments are not passenger compartments. Special Conditions 2 and 16 provide requirements for flightcrew rest-compartment doors which are considered to provide an appropriate level of safety to OFCR compartment occupants.

Sections 25.1443, 25.1445, and 25.1447 describe oxygen requirements for flightcrew, passengers, and cabin attendants. Flight crewmembers occupying the OFCR compartment are not on duty, and therefore are considered passengers in determining compliance with these oxygen regulations.

Applicability

As discussed above, these special conditions are applicable to the 787. 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 features, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features of the 787. It is not a rule of general applicability.

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) proposes the following special conditions as part of the type certification basis for the Boeing Model 787–8 airplanes with an OFCR compartment installed adjacent to or immediately aft of the first pair of exits (Door 1).

1. During flight, occupancy of the OFCR compartment is limited to the total number of installed bunks and seats in the compartment, and that are approved to the maximum flight-loading conditions. During TT&L, occupancy of the OFCR compartment is limited to the total number of installed seats approved for the flight- and ground-load conditions, and emergency-landing conditions. Therefore, the OFCR compartment is limited to a maximum of four crewmembers during flight, and two flight crew members during TT&L.

(a) Appropriate placards must be located inside and outside each entrance to the OFCR compartment to indicate:

(1) The maximum number of crewmembers allowed during flight and the maximum number of flight crewmembers allowed during TT&L.

(2) Occupancy is restricted to crewmembers the pilot in command has determined to be both trained in the emergency procedures for the OFCR compartment and able to rapidly use the evacuation routes.

(3) Smoking is prohibited in the OFCR compartment.

(4) Stowage in the OFCR compartment area is limited to crew personal luggage. The stowage of cargo or passenger baggage is not allowed.

(b) At least one ashtray must be located on both the inside and the outside of any entrance to the OFCR compartment.

(c) A limitation in the airplane flight manual must be established to restrict occupancy to crewmembers the pilot in command has determined to be both trained in the emergency procedures for the OFCR compartment and able to rapidly use the evacuation routes of the OFCR compartment.

2. The following requirements are applicable to OFCR compartment door(s):

(a) A means for any door installed between the OFCR compartment and the passenger cabin to be quickly opened from inside the OFCR compartment, even when crowding from an emergency evacuation occurs at each side of the door.

(b) Doors installed across emergency egress routes must have a means to latch them in the open position. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate inertia forces, relative to the surrounding structure, listed in § 25.561(b).

(c) A placard must be displayed in a conspicuous place on the outside of the entrance door of the OFCR compartment, and on any other door(s) installed across emergency egress routes of the OFCR compartment, requiring those doors to be latched open during TT&L when the OFCR compartment is occupied.

(1) This requirement does not apply to emergency-escape hatches installed in the floor of the OFCR compartment.

(2) A placard must be displayed in a conspicuous place on the outside of the entrance door to the OFCR compartment that requires it to be closed and locked when it is not occupied.

(3) Procedures for meeting these requirements must be transmitted to the operator for incorporation into its training programs and appropriate operational manuals.

(d) For all doors installed in the OFCR compartment, a means must be in place to preclude anyone from being trapped inside the OFCR 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 OFCR compartment at any time.

3. In addition to the requirements of § 25.562 for seats, which are occupiable during takeoff and landing, and restraint systems, the OFCR compartment structure must be compatible with the loads imposed by the seats as a result of the conditions specified in § 25.562(b).

4. At least two emergency evacuation routes must be available and which could be used by each occupant of the OFCR compartment to rapidly evacuate to the main cabin. These evacuation routes must be able to be closed from the main passenger cabin after evacuation. In addition—

(a) The routes must be located with sufficient separation within the OFCR compartment to minimize the possibility of an event either inside or outside of the OFCR compartment rendering both routes inoperative.

Compliance with requirements of Special Condition 4(a) may be shown by inspection or by analysis. Regardless of which method is used, the maximum acceptable distance between flightcrew-rest compartment exits is 60 feet.

Compliance by Inspection

Inspection may be used to show compliance with Special Condition 4(a). An inspection finding that an OFCR compartment has evacuation routes located so that each occupant of the seats and berths has an unobstructed route to at least one of the OFCR compartment exits, regardless of the location of a fire, would be reason for a finding of compliance. A fire within a berth that only blocks the occupant of that berth from exiting the berth need not be considered. Therefore, flightcrew rest-compartment exits that are located at opposite ends (i.e., adjacent to opposite end walls) of the OFCR compartment would require no further review or analysis with regard to exit separation.

Compliance by Analysis

Analysis must show that the OFCR compartment configuration and interior features allow all occupants of the OFCR compartment to escape the compartment in the event of a hazard inside or outside of the compartment. Elements to consider in this evaluation are as follows:

(1) Fire inside or outside the OFCR compartment, considered separately, and the design elements used to reduce the available fuel for the fire.

(2) Design elements used to reduce fire-ignition sources in the OFCR compartment.

(3) Distribution and quantity of emergency equipment within the OFCR compartment.

(4) Structural failure or deformation of components that could block access to the available evacuation routes (e.g., seats, folding berths, contents of stowage compartments, etc).

(5) An incapacitated person blocking the evacuation routes.

(6) Any other foreseeable hazard not identified above that could cause the evacuation routes to be compromised.

Analysis must consider design features affecting access to the evacuation routes. Possibilities for design components affecting evacuation that should be considered include, but are not limited to, seat deformations (reference §§ 25.561(d) and 25.562(c)(8)), seat-back break-over, rigid structure that reduces access from one part of the compartment to another, and

items known to be the cause of potential hazards. Factors that also should be considered are availability of emergency equipment to address fire hazards; availability of communications equipment; supplemental restraint devices to retain items of mass that, if broken loose, could hinder evacuation; and load-path isolation between components containing evacuation routes.

Analysis of fire threats should be used in determining placement of required fire extinguishers and protective breathing equipment (PBE). This analysis should consider the possibility of fire in any location in the OFCR compartment. The location and quantity of PBE equipment and fire extinguishers should allow occupants located in any approved seats or berths access to the equipment necessary to fight a fire in the OFCR compartment.

The intent of this special condition is to provide sufficient exit-route separation. Therefore, the exit-separation analysis described above should not be used to approve OFCR-compartment exits that have less physical separation (measured between the centroid of each outlet opening) than the minimums prescribed below, unless compensating features are identified and submitted to the FAA for evaluation and approval.

For an OFCR compartment with one outlet located near the forward or aft end of the compartment (as measured by having the centroid of the exit opening within 20 percent of the forward or aft end of the total OFCR-compartment length), the outlet separation from one outlet to the other should not be less than 50 percent of the total OFCR-compartment length.

For OFCR compartments with neither required flightcrew rest-compartment outlet located near the forward or aft end of the compartment (as measured by not having the centroid of either outlet opening within 20 percent of the forward or aft end of the total OFCR-compartment length), the outlet separation from one outlet to the other should not be less than 30 percent of the total OFCR-compartment length.

(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 flightcrew-rest compartment outlets. One of the two OFCR compartment outlets should not be located where normal movement or evacuation by passengers occurs (main aisle, cross aisle, or galley complex, for example) that would impede egress from the OFCR compartment. If an evacuation route is in an area where normal movement or evacuation of passengers occurs, it must be demonstrated that passengers would not impede egress to the main deck. If low headroom is at or near the evacuation route, provisions must be made to prevent or to protect occupants of the OFCR compartment from head injury. Use of evacuation routes must not depend on any powered device. If an OFCR-compartment outlet is over an area of passenger seats, a maximum of five passengers may be displaced from their seats temporarily during the process of evacuating an incapacitated person(s). If such an 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, including procedures for emergency evacuation of an incapacitated occupant from the OFCR compartment, must be established. The applicant must transmit all of these procedures to the operator for incorporation into its training programs and appropriate operational manuals.

(d) A limitation must be included in the airplane flight manual or other suitable means to require that crewmembers are trained in the use of the OFCR-compartment evacuation routes. This training must instruct them to ensure that the OFCR compartment (including seats, doors, etc.) is in its proper TT&L configuration during TT&L.

(e) In the event no flight attendant is present in the area around the door to the OFCR compartment, and also during an emergency, including an emergency evacuation, a means must be available to prevent passengers on the main deck from entering the OFCR compartment.

(f) Doors or hatches separating the OFCR compartment from the main deck must not adversely affect evacuation of occupants on the main deck (slowing evacuation by encroaching into aisles, for example) or cause injury to those occupants during opening or while opened.

(g) The means of opening doors and hatches to the OFCR compartment must be simple and obvious. The OFCR compartment doors and hatches must be able to be closed from the main passenger cabin.

5. A means must be available for evacuating an incapacitated person (representative of a 95th percentile male) from the OFCR compartment to the passenger cabin floor.

(a) Such an evacuation must be demonstrated for all evacuation routes. A crewmember (a total of one assistant within the OFCR compartment) 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. For evacuation routes with stairways, the additional assistants may ascend up to one half the elevation change from the main deck to the OFCR compartment, or to the first landing, whichever is lower.

6. The following signs and placards must be provided in the OFCR compartment and they must meet the following criteria:

(a) At least one exit sign, located near each OFCR compartment outlet, meeting the emergency lighting requirements of § 25.812(b)(1)(i). One allowable exception would be a sign with reduced background area of no less than 5.3 square inches (excluding the letters), provided that it is installed so that the material surrounding the exit sign is light in color (white, cream, light beige, for example). If the material surrounding the exit sign is not light in color, a sign with a minimum of a one-inch-wide background border around the letters would be acceptable. Another allowable exception is a sign with a symbol that the FAA has determined to be equivalent for use as an exit sign in an OFCR compartment.

(b) An appropriate placard located conspicuously on or near each OFCR-compartment door or hatch that defines the location and the operating instructions for access to and operation of the outlet door or hatch.

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

(d) The door or hatch handles and operating-instruction placards required by Special Condition 6(b) of these special conditions must be illuminated to at least 160 microlamberts under emergency lighting conditions.

7. A means must be available, in the event of failure of the aircraft's main power system, or of the normal OFCR compartment lighting system, for emergency illumination to be automatically provided for the OFCR compartment.

(a) This emergency illumination must be powered independently 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 to allow occupants of the OFCR compartment to locate and move to the main passenger cabin floor by means of each evacuation route.

(d) The illumination level must be sufficient, with the privacy curtains in the closed position, for each occupant of the OFCR compartment to locate a deployed oxygen mask.

8. A means must be available for two-way voice communications between crewmembers on the flight deck and occupants of the OFCR compartment. Two-way communications must also be available between occupants of the OFCR compartment and each flight attendant station in the passenger cabin that is required per § 25.1423(g) to have a public-address-system microphone. In addition, the public-address system must include provisions to provide only the relevant information to the crewmembers in the OFCR compartment (*e.g.,* fire in flight, aircraft depressurization, preparation of the compartment for landing, *etc.*). That is, provisions must be made so that occupants of the OFCR compartment will not be disturbed with normal, non-emergency announcements made to the passenger cabin.

9. A means must be available 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 OFCR compartment of an emergency situation. Use of a public address or crew interphone system will be acceptable, provided 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, for a period of at least ten minutes.

10. A means, readily detectable by seated or standing occupants of the OFCR compartment, must be in place to indicate when seat belts should be fastened. Seatbelt-type restraints must be provided for berths and must be compatible with the sleeping position during cruise conditions. A placard on each berth must require that these restraints be fastened when occupied. If compliance with any of the other requirements of these special conditions is predicated on specific head position, a placard must identify that head position.

11. In lieu of the requirements specified in § 25.1439(a) pertaining to isolated compartments, and to provide a level of safety equivalent to that provided to occupants of an isolated galley, the following equipment must be provided in the OFCR compartment:

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

(b) Two PBE devices suitable for firefighting, or one PBE for each hand-held fire extinguisher, whichever is greater. All PBE devices must be approved to Technical Standard Order (TSO)–C116 or equivalent.

(c) One flashlight.

Note: Additional PBE devices and fire extinguishers in specific locations, beyond the minimum numbers prescribed in Special Condition 11, may be required as a result of the egress analysis accomplished to satisfy Special Condition 4(a).

12. A smoke- or fire-detection system (or systems) must be provided that monitors each occupiable space within the OFCR compartment, including those areas partitioned by curtains or doors. Flight tests must be conducted to show compliance with this requirement. If a fire occurs, 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 OFCR compartment.

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

13. A means to fight a fire must be provided. This can be either a built-in extinguishing system or a manual, hand-held extinguishing system.

(a) For a built-in extinguishing system:

(1) The system must have adequate capacity to suppress a fire considering the fire threat, volume of the compartment, and the ventilation rate. The system must have sufficient extinguishing agent to provide an initial knockdown and suppression environment per the minimum performance standards that have been established for the agent being used. In addition, certification flight testing will verify the acceptable duration that the suppression environment can be maintained.

(2) If the capacity of the extinguishing system does not provide effective fire suppression that will last for the duration of flight from the farthest point in route to the nearest suitable landing site expected in service, an additional manual firefighting procedure must be established. For the built-in extinguishing system, the time duration for effective fire suppression must be established and documented in the firefighting procedures in the airplane flight manual. If the duration of time for demonstrated effective fire suppression provided by the built-in extinguishing agent will be exceeded, the firefighting procedures must instruct the crew to:

(i) Enter the OFCR compartment at the time that demonstrated fire suppression effectiveness will be exceeded.

(ii) Check for and extinguish any residual fire.

(iii) Confirm that the fire is out.

(b) For a manual, hand-held extinguishing system (designed as the sole means to fight a fire or to supplement a built-in extinguishing system of limited suppression duration) for the OFCR compartment:

(1) A limitation must be included in the airplane flight manual or other suitable means requiring that crewmembers be trained in the firefighting procedures.

(2) The OFCR compartment design must allow crewmembers equipped for firefighting to have unrestricted access to all parts of the OFCR compartment.

(3) The time for a crewmember on the main deck to react to the fire alarm, don the firefighting equipment, and gain access to the OFCR compartment must not exceed the time it would take for the compartment to become filled with smoke, thus making it difficult to locate the fire source.

(4) Approved procedures describing methods for searching the OFCR compartment for fire source(s) must be established. These procedures must be transmitted to the operator for incorporation into its training programs and appropriate operational manuals.

14. A means must be provided to prevent hazardous quantities of smoke or extinguishing agent originating in the OFCR compartment from entering any other occupiable compartment.

(a) Small quantities of smoke may penetrate from the OFCR compartment into other occupied areas during the one-minute smoke detection time.

(b) A provision in the firefighting procedures must ensure that all doors and hatches at the OFCR compartment outlets are closed after evacuation of the compartment and during firefighting to minimize smoke and extinguishing agent entering other occupiable compartments.

(c) All smoke entering any occupiable compartment when access to the OFCR compartment is open for evacuation must dissipate within five minutes after the access to the OFCR compartment is closed.

(d) Hazardous quantities of smoke may not enter any occupied compartment during access to manually fight a fire in the OFCR compartment. The amount of smoke entrained by a firefighter exiting the OFCR compartment is not considered hazardous.

(e) Flight tests must be conducted to show compliance with this requirement.

15. A supplemental oxygen system within the OFCR compartment must provide the following:

(a) At least one mask for each seat and berth in the OFCR compartment.

(b) If a destination area (such as a changing area) is provided in the OFCR compartment, an oxygen mask must be readily available for each occupant who can reasonably be expected to be in the destination area (with the maximum number of required masks within the destination area being limited to the placarded maximum occupancy of the OFCR compartment).

(c) An oxygen mask must be readily accessible to each occupant who can reasonably be expected to be moving from the main cabin into the OFCR compartment, moving around within the OFCR compartment, or moving from the OFCR compartment to the main cabin.

(d) The system must provide an aural and visual alert to warn occupants of the OFCR compartment to don oxygen masks in the event of decompression. The aural and visual alerts must activate concurrently with deployment of the oxygen masks in the passenger cabin. To compensate for sleeping occupants, the aural alert must be heard in each section of the OFCR compartment and must sound continuously for a minimum of five minutes or until a reset switch within the OFCR compartment is activated. A visual alert that informs occupants that they must don an oxygen mask must be visible in each section.

(e) A means must be in place by which oxygen masks can be manually deployed from the flight deck.

(f) Approved procedures must be established for OFCR occupants in the event of decompression. These procedures must be transmitted to the operator for incorporation into its training programs and appropriate operational manuals.

(g) The supplemental oxygen system for the OFCR compartment must meet the same 14 CFR part 25 regulations as the supplemental oxygen system for the passenger cabin occupants except for the 10 percent additional masks requirement of 14 CFR 25.1447(c)(1).

(h) The illumination level of the normal OFCR compartment-lighting system must automatically be sufficient for each occupant of the compartment to locate a deployed oxygen mask.

16. The following additional requirements apply to OFCR compartments that are divided into several sections by the installation of curtains or partitions:

(a) A placard is required adjacent to each curtain that visually divides or separates, for example, for privacy purposes, the OFCR compartment into multiple sections. The placard must require that the curtain(s) remains open when the section it creates is unoccupied. The vestibule section adjacent to the stairway is not considered a private section and, therefore, does not require a placard.

(b) For each section of the OFCR compartment 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 requirement (Special Condition 1).

(2) Emergency illumination requirement (Special Condition 7).

(3) Emergency alarm-system requirement (Special Condition 9).

(4) Seatbelt-fasten signal or return-to-seat signal as applicable requirement (Special Condition 10).

(5) Smoke- or fire-detection system requirement (Special Condition 12).

(6) Oxygen-system requirement (Special Condition 15).

(c) OFCR compartments that are visually divided to the extent that evacuation could be adversely affected must have exit signs directing occupants to the primary stairway outlet. The exit signs must be provided in each separate section of the OFCR compartment, except for curtained bunks, and must meet requirements of § 25.812(b)(1)(i). An exit sign with reduced background area or a symbolic exit sign, as described in Special Condition 6(a), may be used to meet this requirement.

(d) For sections within an OFCR compartment created by the installation of a rigid partition with a door separating the sections, the following requirements of these special conditions must be met with the door open or closed:

(1) A secondary evacuation route from each section to the main deck, or the applicant must show that any door between the sections precludes anyone from being trapped inside a section of the compartment. Removal of an incapacitated occupant from within this area must be considered. A secondary evacuation route from a small room designed for only one occupant for a short time duration, such as a changing area or lavatory, is not required, but removal of an incapacitated occupant from within such a small room must be considered.

(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) No more than one door may be located between any seat or berth and the primary stairway door.

(4) In each section, exit signs meeting requirements of § 25.812(b)(1)(i), or shown to have an equivalent level of safety, must direct occupants to the primary stairway outlet. An exit sign with reduced background area or a symbolic exit sign, as described in Special Condition 6(a), may be used to meet this requirement.

(5) Special Conditions 1 (no-smoking placards), 7 (emergency illumination), 9 (emergency alarm system), 10 (fasten-seatbelt signal or return-to-seat signal as applicable), 12 (smoke- or fire-detection system), and 15 (oxygen system) must be met with the OFCR compartment door open or closed.

(6) Special Conditions 8 (two-way voice communication) and 11 (emergency firefighting and protective equipment) must be met independently for each separate section except for lavatories or other small areas that are not intended to be occupied for extended periods of time.

17. If a waste-disposal receptacle is fitted in the OFCR compartment, it must be equipped with an automatic fire extinguisher that meets the performance requirements of § 25.854(b).

18. Materials (including finishes or decorative surfaces applied to the materials) must comply with flammability requirements of § 25.853 as amended by Amendment 25–116. Seat cushions and mattresses must comply with the flammability requirements of § 25.853(c) as amended by Amendment 25–116 and the test requirements of part 25, appendix F, part II, or other equivalent methods.

19. The addition of a lavatory within the OFCR compartment would require the lavatory to meet the same requirements as those for a lavatory installed on the main deck except with regard to Special Condition 12 for smoke detection.

20. Each stowage compartment in the OFCR compartment, except for underseat compartments for occupant convenience, must be completely enclosed. All enclosed stowage compartments within the OFCR compartment that are not limited to stowage of emergency equipment or airplane-supplied equipment (*i.e.,* bedding) must meet the design criteria described in the table below. Enclosed stowage compartments greater than 200

ft.^{3} in interior volume are not addressed by this special condition. The in-flight accessibility of very large, enclosed, stowage compartments and the subsequent impact on the crewmembers' ability to effectively reach any part of the compartment with the contents of a hand-held fire-extinguishing system will require additional fire-protection considerations similar to those required for inaccessible compartments such as Class C cargo compartments.

DESIGN CRITERIA FOR ENCLOSED STOWAGE COMPARTMENTS NOT LIMITED TO STOWAGE OF EMERGENCY OR AIRPLANE-SUPPLIED EQUIPMENT

Fire protection features	Applicability of fire protection requirements by interior volume		
	Less than 25 cubic feet	25 cubic feet to less than 57 cubic feet	57 cubic feet to 200 cubic feet
Compliant Materials of Construction [1].	Yes	Yes	Yes.
Smoke or Fire Detectors [2]	No	Yes	Yes.
Liner [3]	No	Conditional	Yes.
Fire Location Detector [4]	No	Yes	Yes.

[1] Compliant Materials of Construction: The material used in constructing each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components (i.e., 14 CFR part 25 Appendix F, Parts I, IV, and V) per the requirements of § 25.853. For compartments less than 25 ft.^{3} in interior volume, the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

[2] Smoke or Fire Detectors: Enclosed stowage compartments equal to or exceeding 25 ft.^{3} in interior volume must be provided with a smoke- or fire-detection system to ensure that a fire can be detected within a one-minute detection time. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

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

(b) An aural warning in the OFCR compartment.

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

[3] Liner: If material used in constructing the stowage compartment can be shown to meet the flammability requirements of a liner for a Class B cargo compartment (*i.e.,* § 25.855 at Amendment 25–116, and Appendix F, part I, paragraph (a)(2)(ii)), then no liner would be required for enclosed stowage compartments equal to or greater than 25 ft.^{3} but less than 57 ft.^{3} in interior volume. For all enclosed stowage compartments equal to or greater than 57 ft.^{3} in interior volume but less than or equal to 200 ft.^{3}, a liner must be provided that meets the requirements of § 25.855 for a Class B cargo compartment.

[4] Fire Location Detector: If an OFCR compartment has enclosed stowage compartments exceeding 25 ft.^{3} interior volume that are located separately from the other stowage compartments (located, for example, away from one central location, such as the entry to the OFCR compartment or a common area within the OFCR compartment, where the other stowage compartments are), that OFCR compartment would require additional fire-protection features and/or devices to assist the firefighter in determining the location of a fire.

Issued in Renton, Washington, on February 15, 2011.

K.C. Yanamura,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 27

[Docket No. SW025; Special Conditions No. 27–025–SC]

Special Conditions: Bell Helicopter Textron Canada Limited Model 407 Helicopter, Installation of a Hoh Aeronautics, Inc. Autopilot/Stabilization Augmentation System (AP/SAS)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the modification of the Bell Helicopter Textron Canada Limited (Bell) model 407 helicopter. This model helicopter will have novel or unusual design features when modified by installing the Hoh Aeronautics, Inc. (Hoh) complex Autopilot/Stabilization Augmentation System (AP/SAS) that has potential failure conditions with more severe adverse consequences than those envisioned by the existing applicable airworthiness regulations. These special conditions contain the added safety standards the Administrator considers necessary to ensure the failures and their effects are sufficiently analyzed and contained.

DATES: The effective date of these special conditions is February 14, 2011. We must receive your comments by April 26, 2011.

ADDRESSES: You must mail your comments to: Federal Aviation Administration, Rotorcraft Directorate, *Attn:* Rules Docket (ASW–111), Docket No. SW025, 2601 Meacham Blvd., Fort Worth, Texas 76137. You may deliver your comments to the Rotorcraft Directorate at the indicated address. You must mark your comments: Docket No. SW025. You can inspect comments in the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 4 p.m., in the Rotorcraft Directorate.

FOR FURTHER INFORMATION CONTACT: Mark Wiley, Aviation Safety Engineer, FAA, Rotorcraft Directorate, Regulations and Policy Group (ASW–111), 2601 Meacham Blvd., Fort Worth, Texas 76137; telephone (817) 222–5134; facsimile (817) 222–5961.

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 design approval and thus delivery of the affected aircraft. In addition, the substance of these special conditions has been subject to the public comment process previously with no substantive comments received. The FAA therefore finds that good cause exists for making these special conditions effective on issuance.

Comments Invited

While we did not precede this with a notice of proposed special conditions, we invite interested people to take part in this action by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any