Federal Aviation Administration

Memorandum

Date: April 10, 2015

To: Manager, Boeing Aviation Safety Oversight Office, ANM-100B

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Rene Buendia, ANM-106B

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Other Exits in the Cargo Compartment on a Boeing Model 767-2C Airplane, Project No. PS09-0863

ELOS Memo # PS09-0863-C-2

Regulatory Ref: 14 CFR 21.21(b)(1) and 25.807(h)(2), and Exemption No. 10691

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Boeing Model 767-2C airplane.

Background

The Model 767-2C airplane is a typical freighter airplane configured with a main deck Class E cargo compartment and a supernumerary seating area aft of the flight deck and forward of the cargo compartment. A 9g cargo net with an adjacent smoke barrier separates the supernumerary seating area from the cargo compartment. The supernumerary compartment is configured for seating of up to eleven (11) supernumeraries. The evacuation means for the supernumeraries include a pair of floor-level Type A-sized emergency exits (rated as Type I) directly in front of the supernumerary seats and inertia reel descent devices adjacent to each exit. Additionally, flightcrew emergency exits with escape means are provided in the flight deck compartment.

The 9g cargo net and the adjacent smoke barrier are designed such that personnel can access the cargo compartment from the supernumerary seating area. Access means are provided on both the left-hand and right-hand sides of the net and smoke barrier. Supernumerary access to the cargo compartment during flight is necessary when transporting certain live animals such as horses and/or to allow for potential inspection of other types of cargos such as hazardous materials.

The current Model 767-2C supernumerary compartment design and associated airplane flight manual (AFM) comply with the conditions and limitations of Exemption No. 10691, which allows and controls the carriage of supernumeraries on board the Model 767-2C and also allows access into the cargo compartment during flight. The Model 767-2C design features, in combination with its AFM limitations, flightcrew member briefings and placards required by Exemption No. 10691, ensure supernumeraries are given information on which exits to use in an emergency. However, there are two pairs of provisional exits inside the Class E cargo compartment, which is not typical of most freighter airplanes. With the exception of the exterior door bands, the large aft exit pair is fully functional, with escape means (slide/rafts), exit markings and emergency lighting as if the exit pair were installed on a Model 767 passenger airplane. The over-wing exits, including the exit marking signs and floor proximity escape path system, are partially obscured by protective covers that conceal the exits and their over-door exit signs while leaving exposed the exit identifiers and the red-bezel floor proximity lights. The protective covers are necessary to protect the windows in the removable over-wing hatches.

Title 14, Code of Federal Regulations (14 CFR) 25.807(h)(2) requires any floor-level door or exit that is accessible from the passenger compartment (and is as large or larger than a Type II exit, but less than 46 inches wide) to meet the applicable emergency exit requirements of §§ 25.809 through 25.812, and that they be readily accessible. This ensures that all passengers can safely evacuate to the ground during an emergency evacuation, even if a passenger leaves the passenger compartment in which they are seated and enters a separate compartment that is equipped with an exit. Such would be the case if a supernumerary leaves the Model 767-2C seating compartment during an emergency evacuation situation and enters the main deck cargo compartment in search of an exit. Since the provisional exits inside the Model 767-2C cargo compartment cannot be considered to be “easily accessible” from the supernumerary seating compartment, the supernumeraries would be better served by the compensating features and factors being proposed to ensure that in an emergency evacuation situation, they will use the emergency exits provided for them in the supernumerary compartment. The proposed compensating features and factors will ensure that the Model 767-2C airplane provides an ELOS as compared to that intended by § 25.807(h)(2), given the closed cargo net and smoke barrier, and the distance between the supernumerary seats and the provisional exits, and the uncertainty of the supernumerary’s ability to move through the cargo compartment after a minor crash landing. Therefore, the provisional exits (including exit markings, lighting, etc.) in the cargo compartment need not be shown compliant to the passenger emergency exit requirements as if they were installed in a typical passenger cabin, but instead they will be certified to the extent possible considering the exits and supporting systems are installed inside a cargo compartment.

Applicable regulation(s)

14 CFR 21.21(b)(1) and 25.807(h)(2)

Regulation(s) requiring an ELOS finding

14 CFR 25.807(h)(2)

Description of compensating design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (including design changes, limitations or equipment needed for equivalency)

The compensating factors that provide an ELOS for the regulation not complied with are as follows:

1. The supernumerary compartment design is such that it discourages supernumeraries from attempting to access the cargo compartment in an emergency event by:
    a. Making the cargo compartment not readily accessible, since it requires gaining access through the 9g cargo net and then through the separate smoke barrier entry means, which must be respectively attached and closed during TT&L.
    b. Providing a placard that states in part, "Occupancy of Cargo Compartment is Prohibited During Taxi, Takeoff and Landing." Therefore no supernumeraries will be in the cargo compartment when an emergency evacuation could be declared.
    c. Providing a placard to include a statement such as “EXITS located in the cargo compartment shall not be used during an emergency” or equivalent, stated in the positive as a reminder of what exits to use in an emergency.
    d. Providing an AFM limitation that requires the flightcrew to provide a pre-flight briefing to the supernumeraries regarding the location and use of emergency exits including:
        i. The method of finding the emergency exits in smoke conditions,
        ii. Instructions to inspect the ground to determine whether a safe landing can be achieved, and
        iii. Emergency exits to be used in the event an evacuation becomes necessary are located in the same compartment as their seats.
2. Providing an AFM limitation that requires, when supernumeraries are being carried, the flightcrew to provide a pre-landing briefing to remind the supernumeraries what exits to use in the event of an emergency.
3. To preclude leading someone to an exit that is not available for evacuation, providing an AFM limitation that requires, when supernumeraries are being carried, the exit identifiers and red-bezel floor proximity lights at the over-wing exit pair must be obscured prior to flight and stay obscured during flight and landing.

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety to the level of safety intended by the regulation

The design features or alternative methods of compliance provide an ELOS intended by the § 25.807(h)(2) for the accessible exits in the Class E Cargo Compartment by restricting the ability of the supernumeraries to access the Class E Compartment during an emergency by the use of pre-flight and pre-landing briefings (that remind the supernumeraries of what exits to use)

and by design (that physically restricts a supernumerary from entering the Class E Cargo Compartment).

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in project issue paper C-2. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS memorandum number must be listed in the type certificate data sheet under the Certification Basis section. An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation(s):

14 CFR 25.807(h)(2) Emergency exits

(documented in TAD ELOS Memorandum PS09-0863-C-2)

Original signed by
Suzanne Masterson *April 10, 2015*

Transport Airplane Directorate, Date
Aircraft Certification Service

ELOS Originated by Boeing Aviation Safety Oversight Office	Rene Buendia	ANM-106B