Exemption No. 10114

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98057-3356

In the matter of the petition of

The Boeing Company

for exemption from § 25.809(a) of Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2010-0459

GRANT OF EXEMPTION

By letter BDCO-10-00887, dated April 21, 2010, Ms. Christine Thompson, Lead Project Administrator, Development Projects, The Boeing Company, P.O. Box 3707, Seattle, Washington 98124-2207, petitioned the Federal Aviation Administration (FAA) for an exemption from the requirements of Title 14, Code of Federal Regulations (14 CFR) 25.809(a), as amended by Amendment 25-116. This exemption, if granted, would permit relief from the requirement that flightcrew emergency exits have a means to view outside conditions under all lighting situations for the Boeing Model 787 series airplane.

The petitioner requests relief from the following regulations:

Section 25.809(a), at Amendment 25-116, requires that each emergency exit be provided with a means to view conditions outside the airplane prior to opening an exit, under all lighting conditions.

The petitioner supports its request with the following information:

This section quotes the relevant information from the petitioner's request. The complete petition is available at the Department of Transportation's Federal Docket Management System, on the Internet at http://regulations.gov, in Docket No. FAA-2010-0459.

Petition Overview

Under the provisions set forth in Title 14 Code of Federal Regulations (14 CFR) 11.81, The Boeing Company is seeking an exemption to allow partial relief from § 25.809(a) at Amendment 25-116 for the flightcrew emergency exit on Model 787-8 and -9 airplanes. Partial relief is being sought from the requirement that the outside viewing means provided for the flightcrew emergency exit permit viewing of the likely area of evacuee ground contact, that the likely area of evacuee contact be viewable during all lighting conditions with the landing gear extended as well as in all conditions of landing gear collapse. The FAA has acknowledged that while the outside viewing capability provided by the flightdeck windows on the 787 should be sufficient for an overhead flightcrew exit, the flightdeck geometry results in a viewing area from the flightdeck windows which does not meet the literal language of the rule. Relief is necessary since literal compliance with the rule would require extensive design changes to the airplane, including additional outside viewing windows in the flightdeck and/or an external video camera system, and a new exterior lighting system to permit viewing of the likely areas of evacuee ground contact during all lighting conditions and with the landing gear extended and in conditions of landing gear collapse. Making these extensive design changes would create an additional burden for the airline operators without any material difference to the level of safety from that provided by the current 787 flightdeck design.

Background

In an emergency situation it is generally accepted that an exit should not be opened if opening it would create a more hazardous situation for the occupants of the airplane. With Amendment 25-116, the FAA introduced, in part, previously un-codified requirements for airframe manufacturers to provide outside viewing means at each emergency exit. 14 CFR 25.809(a) now includes the requirement that an outside viewing means at emergency exits permit viewing of the likely area of evacuee ground contact and that the likely area of evacuee contact be viewable during all lighting conditions with the landing gear extended as well as in all conditions of landing gear collapse. While the primary evacuation route for the flightcrew is typically through the flightdeck door and out of one of the passenger cabin emergency exits, a flightcrew emergency exit is provided in the flightdeck. For the Model 787, the flightcrew exit is an overhead escape hatch. The nearby large flightdeck windows provide an effective means for the flightcrew to assess external conditions when deciding whether or not to open the overhead hatch. This includes viewing of the ground near where the evacuees would normally be expected to make their initial contact when using the emergency egress assist means provided.

Partial relief from § 25.809(a) at Amendment 25-116 is necessary because basic design of the Model 787 design is complete and it would require extensive design changes for the flightcrew exits to comply with the outside viewing requirements with no material difference in the level of safety.

The emergency egress assist means provided at the 787-8 flightcrew emergency exit are inertia reel descent devices. These devices, which are similar to those commonly used on

other models, provide for safe evacuation of the flightdeck occupants when the airplane is positioned normally on its landing gear and when positioned at the adverse attitudes that correspond to the loss of one or more landing gear. Once an evacuee using an inertia reel descent device clears the fuselage, they are essentially lowered straight down to the ground in a controlled manner. While the flightdeck windows provide an excellent means for assessing the outside conditions, they don't allow direct viewing of the ground where the evacuees would normally be expected to make their initial ground contact. This is due to the local curvature of the fuselage in the vicinity of the flightdeck and the vertical path to the ground evacuees take when using the emergency egress assist means provided. Also, since the flightcrew exit is located overhead, the flightdeck windows don't allow viewing just outside of the closed exit. This is considered acceptable since it is very unlikely that there could be a hazard directly above the airplane that couldn't be detected by viewing out the flightdeck windows.

The FAA has acknowledged that the flightdeck windows will normally provide an adequate means for assessing outside conditions when determining whether to open the flightdeck exit. In the preamble to Amendment 25-116, the FAA stated that "*in most cases, it should be possible to view the outside conditions sufficiently well from a nearby passenger or flightdeck window to ascertain whether to open an overhead exit. This is considered acceptable*." Since the outside viewing capability provided by the Model 787 flightdeck windows is consistent with that of nearly every other widebody model in-service today, it is believed that the use of the flightdeck windows as the outside viewing means for the Model 787 flightcrew exit meets the intent of outside viewing area requirement in § 25.809(a).

Since there is not a direct line of sight from the flightdeck window to the point of evacuee ground contact, there is very limited benefit in having a dedicated exterior lighting system to illuminate the evacuee ground contact point. However, the 787 flightdeck will be equipped with a minimum of one flashlight that can be used by the flightcrew to aid in the assessment of the general outside area in night time conditions when there are no external light sources (e.g., runway and/or airport lighting). In Denial of Exemption No. 9957, the FAA has acknowledged that for the type of flightcrew exit and emergency egress assist means provided on the Model 787, "*an acceptable method of compliance may be to provide a general view of the outside area, and provide portable illumination, e.g., a flashlight for the flightcrew exit, that can be used by the crew*."

Statement of no Adverse Effect on Safety

Granting this petition will have no appreciable effect on the level of safety. The FAA's stated intent was to upgrade the regulations to improve the overall level of safety in areas where the state-of-the-art and good design practice have indicated that such upgrades are warranted. The emergency exit, emergency egress assist means, outside viewing means and emergency lighting systems provided in the Model 787 flightdeck are all consistent with good industry design practice and are considered to be state-of-the-art in all regards.

During an airplane emergency requiring an evacuation, there is the potential for an external hazard that could pose an immediate threat to the occupants of the airplane if an

exit were opened. While fire is the principle external hazard, there are other types of hazards such as water or large obstructions that could make not opening an exit the preferred course of action. However, since the Model 787 flightcrew exit is located overhead and it is not equipped with an automatically deploying emergency assist means, it is much less likely that these types of external hazards would actually pose an immediate threat to the occupants of the flightdeck just by opening the overhead exit. Given the wide viewing area provided by the nearby flightdeck windows and the availability of a portable illumination means, it is very likely that any severe external hazard that could create an immediate hazard to the occupants of the flightdeck could be detected prior to deciding whether or not to open the overhead exit. Boeing has reviewed several airplane accident databases and found no evidence of pertinent service history that suggests that the flightdeck windows do not provide adequate outside viewing capability for the flightcrew exits. Furthermore, the FAA's intent as clearly stated in NPRM 96-9 was to ensure that the current state-of-the-art and existing design practices are maintained for future airplane programs. Therefore, there is no appreciable difference between the level of safety provided by the outside viewing means provided for the 787-8 and 787-9 flightcrew exit and that intended by the new regulation.

Statement of Public Interest

Granting this petition is in the public's interest because the outside viewing means provided for the 787-8 and 787-9 flightcrew exits, in combination with an available flashlight, provide the level of safety the FAA intended to promulgate with the new rule. Not granting the exemption would lead to an extensive unplanned design and manufacturing effort to add an additional outside viewing means (windows and/or an exterior viewing camera system) and a new exterior emergency lighting system for the flightcrew exits. Incorporating these types of design changes would not materially enhance the level safety provided for the flightcrew and it would impact introduction of the Model 787 airplanes.

A grant of exemption in this case would allow the avoidance of the added weight, flightdeck complexity, and maintenance costs associated with the additional outside viewing means and lighting system. Conversely, if required to add these new systems, an increase in weight and complexity to the 787-8 and 787-9 would occur, resulting in an increased burden for airline operators due to increased flightcrew work load, and the added maintenance and spare parts provisioning that would be required. Additionally, any increase in weight results in increased fuel consumption and emissions. Therefore, granting the exemption is in the public interest.

Conclusion

For the Model 787-8 and 787-9, the large flightdeck windows, in combination with an available flashlight, provide the means for the flightcrew to quickly assess the outside conditions when deciding whether or not to open the overhead flightcrew exit. This includes viewing of the ground near where the evacuees would normally be expected to make their initial contact when the airplane is positioned at a normal attitude. The 787-8 flightdeck windows, in combination with an available flashlight, provide an external viewing means nearly equivalent to that intended by the new regulation as identified in

the preamble to Amendment 25-116. They provide a level of safety that is at least equivalent to the vast majority of models in the jet transport fleet, which Boeing believes was the FAA's stated intent when codifying the requirement for an outside viewing means at the emergency exits. Passenger and crew safety will not be degraded by a grant of this exemption petition.

Per § 11.81 (h), Boeing requests the privileges of this exemption be extended outside the United States. This extension of privileges is necessary for operations based within foreign countries having bilateral agreements with the United States accepting FAA 14 CFR Part 25 as their airworthiness standards for transport category aircraft. The 787 is intended for the global market place with the launch customer being based in a country utilizing the United States airworthiness standards.

***Federal Register* publication**

A summary of this petition was published in the Federal Register on May 12, 2010 (75 FR 26843). No comments were received.

The FAA's analysis

The FAA has reviewed the information provided by Boeing and has concluded that granting this exemption is in the public interest for the reasons discussed below.

At the time the NPRM and final rule for Amendment 25-116 were written, the primary focus was on passenger exits, although the FAA intended to have consistency between passenger and crew exits as well. Thus, the requirements are identical for the two exit categories. Nonetheless, flightcrew exits have several characteristics that influence the effectiveness of the outside viewing means, and may justify a different approach.

First, as noted, there are flightcrew exits for which the point of ground contact cannot be seen from a flightdeck window because of fuselage curvature, and the path from the exit to the ground contact point is not a straight line. In this case, the value in illuminating that point is questionable, since the person using the exit would not be able to see the illuminated location on the ground anyway. Of course, more sophisticated features such as cameras or optical scopes could be installed, however, these go beyond the intent of the requirement, assuming a flightdeck window is available, and has a typical field of view.

Second, flightcrew exits are generally used when the passenger exits are not available to the crew, or the situation demands more rapid egress than is possible by leaving the flightdeck and moving to a passenger exit. In those cases, outside viewing of the specific ground contact point is largely moot, because there is no alternative to using the flightcrew exit(s). As noted in the final rule, however, there should be a means to see outside the airplane to generally assess conditions, even if the specific point of ground contact is not visible. Flightdeck windows typically satisfy this need.

Third, and as noted in the petition, for an overhead hatch, the potential hazards are reduced with respect to opening of the exit. Since the hatch is on top of the airplane, the main hazard for which opening of the exit could jeopardize safety is a fire, and a fire of that magnitude will be visible from the flightdeck windows. Again, while there is value in being able to generally assess outside conditions (under all lighting conditions), the need to see specific points on the ground is greatly reduced. In the case of an overhead hatch, an acceptable approach may be to provide a general view of the outside area, and provide portable illumination, e.g., a flashlight for the flightcrew exit, that can be used by the crew. However, some form of exterior illumination is required, per the regulation.

Boeing's principal argument with regard to why compliance is not feasible and an exemption is in the public interest centers on the cost of redesign, and their view that literal compliance will have no appreciable effect on safety. The FAA agrees that the current requirement would impose unintended design consequences on the Model 787 airplane, and would not provide commensurate safety benefits. For this reason, we are considering an amendment to the requirement that would better reflect the original intent with respect to flightdeck exits. The European Aviation Safety Agency (EASA) is currently addressing several FAA amendments that are not yet codified into the Certification Specifications in Europe. We are working with EASA with respect to the outside viewing requirement of § 25.809(a), with a goal of developing a common standard that distinguishes between passenger and flightcrew exits. Should rulemaking result from either EASA or FAA, we anticipate a new, harmonized requirement will ultimately be adopted by both authorities.

The FAA's decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, The Boeing Company is hereby granted an exemption from § 25.809(a), to permit relief from the requirements that flightcrew emergency exits have a means to view outside conditions under all lighting situations for the Boeing Model 787 series airplanes, subject to the following limitations.

1. This exemption is limited to airplanes that have an overhead hatch in the flightdeck as the flightcrew exit.

2. If airplane-mounted exterior illumination is not available under emergency conditions to view outside the flightdeck window, portable illumination capable of providing outside visibility under
dark of night conditions must be readily accessible to either pilot.

Issued in Renton, Washington, on August 11, 2010

/s/ Ali Bahrami

Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service