

Exemption No. 7742

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056**

In the matter of the petition of

The Boeing Company

for an exemption from § 25.561(b)(3)(ii) of
Title 14, Code of Federal Aviation Regulations

**Regulatory Docket No. FAA-2002-
11844**

PARTIAL GRANT OF EXEMPTION

By letter B-H360-02-1565 dated March 5, 2002, Daniel S. Blankinship, Manager, Airplane Certification, Twin Aisle Deliveries & Fleet Support, B-H360, The Boeing Company, P. O. Box 3707, Seattle, Washington 98124-2207, petitioned the Federal Aviation Administration (FAA) on behalf of The Boeing Company, for an exemption from § 25.561(b)(3)(ii) of Title 14 Code of Federal Regulations (14 CFR). The exemption, if granted, would permit relief from the requirements of § 25.561(b)(3)(ii) for the Boeing Model 747 series airplanes, to allow the manufacture/modification, certification, and delivery of these airplanes using a reduced center of gravity (c.g.) of the occupant for passenger seats that is used in the determination of interface loads for the § 25.561(b)(3)(ii) loading condition.

The petitioner requests relief from the following regulation:

Section 25.561(b)(3)(ii), Amendments 25-0, 25-23 and 25-64, requires that the structure be designed to give each occupant every reasonable chance of escaping serious injury in a minor crash landing when the occupant experiences a forward 9.0 g inertia force relative to the surrounding structure.

ANM-02-286-E

The petitioner's supportive information is as follows:

“The Boeing Company hereby petitions for expedited consideration, under 14 CFR 11.87, of an exemption from the requirements of 14 CFR 25.561(b)(3)(ii) for a limited period of time not to exceed three years, to allow continued manufacture/modification, certification and delivery of Model 747 Series aircraft by Boeing in accordance with the design methods and allowables currently in use on previously delivered aircraft. This exemption will allow continued delivery of scheduled Model 747 aircraft, both in production and retrofit, while the resolution of this effort between the FAA and Boeing is finalized. The proprietary technical details of Boeing's design and certification activities are set forth in an enclosure to this petition, which is submitted in confidence to the FAA.

“Boeing believes that granting this petition will not adversely effect aviation safety, as demonstrated by the service experience of the Model 747 fleet, and will benefit the public by enabling Boeing and its customers to provide the necessary capacity to meet the demand for air travel on those routes where the Model 747 is uniquely capable of performing the desired mission. It will not set a precedent or overturn existing FAA approval policies for certifying Model 747 aircraft. Urgent regulatory relief is necessary to allow for the scheduled near term delivery and re-delivery of Model 747 aircraft. A response by March 15, 2002 would satisfy the next committed service bulletin release date.

“(a) Summary

“The Boeing Company hereby petitions for expedited consideration of an exemption from the requirements of 14 CFR 25.561(b)(3)(ii) for a limited period of time not to exceed three years. Boeing is requesting this time period to establish the necessary seat track/floor system design modification and proposes to reflect this new design for all Model 747 airplanes delivered after the end of March 2005. This time limited exemption is to allow continued manufacture/modification, certification and delivery of Model 747 Series aircraft by Boeing in accordance with the design methods and allowables currently in use on previously delivered aircraft. Boeing believes that granting this petition will not adversely affect aviation safety, as demonstrated through the Model 747 fleet experience.

“(b) Name and Address of the Petitioner

“The Boeing Company
c/o Mr. Daniel Blankinship
PO Box 3707 Mail Code: 02-79
Seattle, WA 98124-2207

“(c) Section of 14 CFR from which Exemption is requested

Boeing is seeking a deviation through a time limited exemption to Title 14 CFR 25.561(b)(3)(ii): “The occupant experiences the following ultimate inertia forces acting separately relative to the surrounding structure; Forward, 9 g.”

“(d) Extent of Relief and Reason

“Boeing is requesting a time limited exemption from the requirements of Title 14 CFR 25.561(b)(3)(ii) for the Model 747 production and modification programs. Further proprietary technical detail is furnished in the enclosure hereto.

“(e) Public Interest

“Boeing believes that granting this petition will not adversely affect aviation safety, as demonstrated through Model 747 fleet experience. While there have unfortunately been several Model 747 accidents in the past 32 years, all information Boeing has indicates that during any survivable accident, the floor structure does give the occupants every reasonable chance of escaping serious injury. Data from recent crashes, where the fuselage was broken into two pieces, confirmed the integrity of floor and seating system in question.

“Additionally, the petition benefits the public by enabling Boeing and its customers to continue to provide the necessary capacity to meet the demand for air travel on those routes where the Model 747 is uniquely capable of performing the desired mission. Model 747 airplanes are typically delivered to customers in order to meet their high traffic demand. To satisfy this demand and allow continued economic growth, continued production and modification of the Model 747 is essential.

“Granting this petition for the time interval requested would allow Boeing time to properly develop a design that will be financially viable for both Boeing and its customers, and allow continued support of the flight deck security initiatives.

“(f) Level of Safety Provided

“With regard to 14 CFR 25.561(b)(3)(ii), Boeing believes that the currently used passenger CG height provides an adequate level of safety of the airplane for this time limited exemption. This level of safety is evident from the following:

- “The seat track lips are capable of sustaining the loads introduced by the seats, with a passenger CG location per the NAS 809 guidelines.

- “Thirty-two years of positive service experience has proven the design safe and reliable. All information that Boeing has indicates that during any survivable accident, the floor structure does give the occupants every reasonable chance of escaping serious injury.
- “Data from recent accidents, where the fuselage was broken into two pieces, confirmed the integrity of floor and seating system in question.”

The FAA has determined that good cause exists for waiving the requirement for Federal Register publication and comment because the exemption, if granted, would not set a precedent, and any delay in acting on this petition would be detrimental to The Boeing Company.

The Federal Aviation Administration's analysis/summary is as follows:

After reviewing this petition for exemption, the FAA has decided to address the request in two separate parts. The first part consists of those airplanes currently in production, i.e., those that have not yet been delivered from The Boeing Company. The second part consists of those airplanes that have been previously delivered, but are now being modified, requiring a compliance demonstration with § 25.561(b)(3)(ii) in support of new seat installations or interior reconfigurations.

Production Airplanes

Addressing airplanes not yet delivered from The Boeing Company, the FAA finds that an exemption is merited. This conclusion is based on several factors. First, although The Boeing Company has not demonstrated compliance with § 25.561(b)(3)(ii) in a manner acceptable to the Administrator, the FAA finds no in-service experience in 32 years of service history which demonstrates that, as a result of this deficiency, an unsafe condition exists in relationship to the strength of the floor structure in a survivable accident. Since 1970, when the first Boeing Model 747 entered service, there have been approximately 1300 Boeing Model 747 airplanes delivered, accumulating approximately 69,174,000 flight hours and 14,687,000 flight cycles. In this period, the FAA has found no instances of emergency landings or otherwise survivable accidents in which the strength of the floor structure was found to be inadequate.

Secondly, The Boeing Company has also identified that their technical and manufacturing resources are not unlimited. In order to implement the seat track/floor system design modifications necessary to comply with § 25.561(b)(3)(ii) in a manner acceptable to FAA, it is recognized that significant engineering efforts, likely including material, seat track configuration, and floor structure changes, will be required by The Boeing Company to provide the structural capability to accommodate seats in any desired position and pitch. Also, in support of the FAA’s requirement that all U.S. operators will have installed intrusion resistant flightdeck doors by April 9, 2003, The Boeing Company has committed substantial technical and manufacturing support to achieve this objective.

Significant time constraints exist to procure and implement new parts into production. In addition, in the production sequence, manufacturing of an individual airplane's seat tracks/floor structure is essentially the first structure assembled (to ensure that the floor is level), and the airplane is then built around these assemblies. The Boeing Company has stated that it requires 24 months manufacturing time to build a Model 747, therefore changes to this structure must be accomplished at the start of the build cycle, in order to avoid severe disruption of the manufacturing process. As a result, the production schedules for all passenger Boeing Model 747 airplanes currently in construction would be greatly impacted without relief from the requirements of § 25.561(b)(3)(ii).

Lastly, the design intent of the Boeing floor system is to allow seats to be placed in any desired position and pitch. Without relief from the requirements of § 25.561(b)(3)(ii), individual design solutions would need to be provided at certain areas for that specific interior configuration, which is different for nearly every Boeing Model 747 airplane delivered. The customer-unique planning required for each airplane to accomplish this activity would result in significant disruption of the production sequence.

Although the FAA concurs that a time-limited exemption is acceptable for airplanes in production, the FAA does not concur with The Boeing Company's assertion that a 3-year timeframe to bring newly manufactured airplanes into compliance is necessarily required. This determination is based upon the timeframe recently proposed by The Boeing Company to introduce a new Model 747 derivative, the Boeing Model 747-400XQLR that contains substantial structural modifications, well exceeding the scope of changes and level of resources necessary to correct the issues pertaining to § 25.561(b)(3)(ii). The Boeing Company has presented a plan for certifying the Model 747-400XQLR in a 2-year timeframe versus the 3-year time period requested in the petition for exemption.

Therefore, in order to better enable The Boeing Company to continue to support the intrusion resistant flightdeck door initiatives, and recognizing that incorporating a solution for the entire seat track/floor system requires significant lead time, the FAA considers that a grant of exemption expiring coincident with the certification of the Boeing Model 747-400XQLR is reasonable. Recognizing that it is not uncommon for the schedules of new airplane certification programs to be delayed due to industry market conditions, this grant of exemption applicable to new production airplanes shall expire no later than 3 years after the issuance date of this exemption, should the Boeing Model 747-400XQLR initial certification be delayed beyond the 2-year timeframe.

Once certified, the airplanes delivered under the provisions of this exemption are considered acceptable under § 21.21(b)(2) until such time as the seats or interior configuration is changed, to the extent that a compliance finding with § 25.561(b)(3)(ii) is necessary. At such time, compliance must be demonstrated as documented in the following section.

Modification of Post-Production Airplanes

Considering those airplanes previously manufactured and delivered by The Boeing Company that are now undergoing subsequent modification of new seat installations or interior reconfigurations, the FAA finds that some relief is warranted. The FAA does not, however, consider it appropriate to grant a 3-year timeframe to continue airplane modifications using a reduced c.g. of the occupant for passenger seats, for the determination of interface loads using the § 25.561(b)(3)(ii) loading condition.

When an airplane is removed from service to make configuration changes, it is possible to add local reinforcements in certain specific areas to bring the new seating configuration into compliance without the same level of disruption associated with making the same changes within The Boeing Company production line environment. Also, it is known that within the airplane modification industry, certain modifiers have added local reinforcements to the seat track/floor structure of Boeing 747 airplanes to demonstrate compliance to § 25.561(b)(3)(ii) in support of these projects, by means of structural analysis utilizing the industry-accepted seated-occupant c.g. height.

The Boeing Company has presented five current post-production modification projects committed to by Boeing Airplane Services (BAS), involving previously delivered airplanes undergoing subsequent modification. The FAA considers that without relief, these projects will be severely disrupted and impact the affected operators' ability to provide capacity. Any resultant delay in these projects would also likely cause additional financial hardship in light of the worldwide industry recovery in progress following the decrease in air travel as a result of the events of September 11, 2001.

This impact can be eliminated, prior to project initiation, by properly scheduling the modifications while accounting for the local reinforcements. These reinforcements may be needed to comply with § 25.561(b)(3)(ii), using the industry-accepted seated occupant c.g. height. Therefore, the FAA considers that an exemption from § 25.561(b)(3)(ii) applicable for the five projects currently in work by BAS is warranted, but no further relief beyond these projects is appropriate.

Once certified, the airplanes that will be modified by these 5 projects under the provisions of this exemption are considered acceptable under § 21.21(b)(2) until such time as the seats or seating configuration is changed, to the extent that a compliance finding for § 25.561(b)(3)(ii) is necessary. At such time, compliance must be demonstrated by means of structural analysis utilizing the industry-accepted seated-occupant c.g. height.

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. 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 the requirements of 14 CFR § 25.561(b)(3)(ii) for the Boeing Model 747 series airplanes, to allow the manufacture, certification, and delivery of these airplanes using a reduced c.g. of the occupant for passenger seats that is used in the determination of interface loads for the § 25.561(b)(3)(ii) loading condition until such time as the Boeing Model 747-400XQLR is certified, or 3 years, whichever occurs first.

Secondly, The Boeing Company is hereby granted an exemption from the requirements of 14 CFR § 25.561(b)(3)(ii) for the Boeing Model 747 series airplanes, to allow the modification, certification, and re-delivery of these airplanes using a reduced c.g. of the occupant for passenger seats that is used in the determination of interface loads for the § 25.561(b)(3)(ii) loading condition for those five BAS projects that are currently undergoing certification which have been identified to the FAA.

Issued in Renton Washington, on March 18, 2002

/s/

Kalene C. Yanamura
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service, ANM-100