Rules and Regulations

Federal Register
Vol. 76, No. 142
Monday, July 25, 2011

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM454 Special Conditions No. 25–441–SC]

Special Conditions: Gulfstream Model GVI Airplane; Limit Engine Torque Loads for Sudden Engine Stoppage

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are for the Gulfstream GVI airplane. This airplane has novel or unusual design features when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. These design features include engine size and the potential torque load imposed by sudden engine stoppage. These special conditions pertain to their effects on the structural performance of the airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. 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.

DATES: *Effective Date:* August 24, 2011.

FOR FURTHER INFORMATION CONTACT: Carl Niedermeyer, FAA, Airframe/Cabin Safety Branch, ANM–115, Transport Standards Staff, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue, SW., Renton, Washington 98057–3356; telephone (425) 227–2279; electronic mail *Carl.Niedermeyer@faa.gov.*

SUPPLEMENTARY INFORMATION:

Background

On March 29, 2005, Gulfstream Aerospace Corporation (hereafter referred to as ''Gulfstream'') applied for an FAA type certificate for its new Gulfstream Model GVI passenger airplane. Gulfstream later applied for, and was granted, an extension of time for the type certificate, which changed the effective application date to September 28, 2006. The Gulfstream Model GVI airplane will be an all-new, two-engine jet transport airplane with an executive cabin interior. The maximum takeoff weight will be 99,600 pounds, with a maximum passenger count of 19 passengers.

Type Certification Basis

Under provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Gulfstream must show that the Gulfstream Model GVI airplane (hereafter referred to as ''the GVI'') meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25–1 through 25–119, 25–122, and 25–124. 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 GVI because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

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.

In addition to complying with the applicable airworthiness regulations and special conditions, the GVI 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).

Novel or Unusual Design Features

The GVI will have high bypass engines. Engines of this size, configuration, and failure modes were not envisioned when § 25.361, which addresses loads imposed by engine seizure, was adopted in 1965. Worst case engine seizure events have become increasingly more severe with increasing engine size because of the higher inertia of the rotating components. The GVI engines are sufficiently different and novel to justify issuance of a special condition to establish appropriate design standards.

Discussion of Special Conditions

Section 25.361(b)(1) requires that for turbine engine installations, the engine mounts and the supporting structures must be designed to withstand a ''limit engine torque load imposed by sudden engine stoppage due to malfunction or structural failure.'' Limit loads are expected to occur about once in the lifetime of any airplane. Section 25.305 requires that supporting structures be able to support limit loads without detrimental permanent deformation, meaning that supporting structures should remain serviceable after a limit load event.

Since adoption of § 25.361(b)(1), the size, configuration, and failure modes of jet engines have changed considerably. Current engines are much larger and are designed with large bypass fans. In the event of a structural failure, these engines are capable of producing much higher transient loads on the engine mounts and supporting structures.

As a result, modern high bypass engines are subject to certain rare-but-severe engine seizure events. Service history shows that such events occur far less frequently than limit load events. Although it is important for the airplane to be able to support such rare loads safely without failure, it is unrealistic to expect that no permanent deformation will occur.

Given this situation, the Aviation Rulemaking Advisory Committee (ARAC) has proposed a design standard for today's large engines. For the commonly-occurring deceleration events, the proposed standard would require engine mounts and structures to support maximum torques without detrimental permanent deformation. For the rare-but-severe engine seizure events such as loss of any fan, compressor, or

turbine blade, the proposed standard would require engine mounts and structures to support maximum torques without failure, but allows for some deformation in the structure.

The FAA concludes that modern large engines, including those on the GVI, are novel and unusual compared to those envisioned when § 25.361(b)(1) was adopted and thus warrant special conditions. The special conditions contain design criteria recommended by ARAC. The special conditions also clarify the design criteria that apply to auxiliary power units.

Discussion of Comments

Notice of proposed special conditions No. 25–11–11–SC for Gulfstream GVI airplanes was published in the **Federal Register** on May 5, 2011 (76 FR 25648). One supportive comment was received and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the GVI. Should Gulfstream 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 GVI. 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, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Gulfstream GVI airplanes.

The following special conditions are in lieu of § 25.361(b):

1. For turbine engine installations, the engine mounts, pylons and adjacent supporting airframe structure must be designed to withstand 1g level flight loads acting simultaneously with the maximum limit torque loads imposed by each of the following:

(a) Sudden engine deceleration due to a malfunction which could result in a temporary loss of power or thrust; and

(b) The maximum acceleration of the engine.

2. For auxiliary power unit installations, the power unit mounts and adjacent supporting airframe structure must be designed to withstand 1g level flight loads acting simultaneously with the maximum limit torque loads imposed by each of the following:

(a) Sudden auxiliary power unit deceleration due to malfunction or structural failure; and

(b) The maximum acceleration of the power unit.

3. For engine supporting structure, an ultimate loading condition must be considered that combines 1g flight loads with the transient dynamic loads resulting from:

(a) The loss of any fan, compressor, or turbine blade; and

(b) Separately, where applicable to a specific engine design, any other engine structural failure that results in higher loads.

4. The ultimate loads developed from the conditions specified in paragraphs 3(a) and 3(b) are to be multiplied by a factor of 1.0 when applied to engine mounts and pylons and multiplied by a factor of 1.25 when applied to adjacent supporting airframe structure.

5. Any permanent deformation that results from the conditions specified in paragraph 3 must not prevent continued safe flight and landing.

Issued in Renton, Washington, on July 18, 2011.

Ali Bahrami,

Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2011–18654 Filed 7–22–11; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM456; Special Conditions No. 25–442–SC]

Special Conditions: Boeing Model 747–8 Series Airplanes; Overhead Flight Attendant Rest Compartment

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for Boeing Model 747–8 series airplanes. These airplanes will have novel or unusual design features associated with the installation of an overhead flight attendant rest compartment. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. 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 Boeing 747–8 airplanes.

DATES: *Effective Date:* August 24, 2011.

FOR FURTHER INFORMATION CONTACT: Jayson Claar, 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) 227–2194; facsimile (425) 227–1149.

SUPPLEMENTARY INFORMATION:

Background

On November 4, 2005, The Boeing Company, P.O. Box 3707, Seattle, WA 98124, applied for an amendment to Type Certificate Number A20WE to include the new Model 747–8 passenger airplane. Boeing later applied for, and was granted, an extension of time for the amended type certificate, which changed the effective application date to December 31, 2006. The Model 747–8 is a derivative of the 747–400. The Model 747–8 is a four-engine jet transport airplane that will have a maximum takeoff weight of 975,000 pounds and new General Electric GEnx–2B67 engines. The Model 747–8 will have two flight crew and the capacity to carry 605 passengers.

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.101, Boeing must show that the Model 747–8 meets the applicable provisions of part 25, as amended by Amendments 25–1 through 25–120, plus amendment 25–127 for § 25.795(a), except for earlier amendments as agreed upon by the FAA. These regulations will be incorporated into Type Certificate No. A20WE after type certification approval of the 747–8.

In addition, the certification basis includes other regulations, special conditions and exemptions that are not relevant to these special conditions. Type Certificate No. A20WE will be updated to include a complete description of the certification basis for these airplanes. 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 747–8 because of a novel or unusual design feature, special