

Discussion

The limit engine torque load imposed by sudden engine stoppage due to malfunction or structural failure (such as compressor jamming) has been a specific requirement for transport category airplanes since 1957. In the past, the design torque loads associated with typical failure scenarios have been estimated by the engine manufacturer and provided to the airframe manufacturer as limit loads. These limit loads were considered simple, pure torque static loads. The size, configuration, and failure modes of jet engines have changed considerably from those envisioned when the engine seizure requirement of § 25.361(b) was first adopted. Current engines are much larger and are now designed with large bypass fans capable of producing much larger torque loads if they become jammed. It is evident from service history that the frequency of occurrence of the most severe sudden engine stoppage events is rare.

Relative to the engine configurations that existed when the rule was developed in 1957, the present generation of engines are sufficiently different and novel to justify issuance of special conditions to establish appropriate design standards. The latest generation of jet engines are capable of producing, during failure, transient loads that are significantly higher and more complex than the generation of engines that were present when the existing standard was developed. Therefore, the FAA has determined that special conditions are needed for the Bombardier Aerospace Model BD-100-1A10 airplane.

In order to maintain the level of safety envisioned in § 25.361(b), more comprehensive criteria is needed for the new generation of high-bypass engines. The special conditions would distinguish between the more common engine failure events and those rare events resulting from structural failures. For these rarer but more severe seizure events, the criteria could allow some deformation in the engine supporting structure (ultimate load design) in order to absorb the higher energy associated with the high-bypass engines, while at the same time protecting the adjacent primary structure in the wing and fuselage by providing a higher safety factor. The criteria for the more severe events would no longer be a pure static torque load condition, but would account for the full spectrum of transient dynamic loads developed from the engine failure condition.

Applicability

As discussed above, these special conditions are applicable to the Bombardier Aerospace Model BD-100-1A10 airplane. Should Bombardier Aerospace apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well under the provisions of § 21.101(a)(1) [Amendment 21-69, effective September 16, 1991].

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 Bombardier Aerospace Model BD-100-1A10 airplanes.

1. *Sudden Engine Stoppage.* In lieu of compliance with § 25.361(b), the following special conditions apply:

a. 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:

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

(2) The maximum acceleration of the engine.

b. 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:

(1) Sudden auxiliary power unit deceleration due to malfunction or structural failure.

(2) The maximum acceleration of the auxiliary power unit.

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

(1) The loss of any fan, compressor, or turbine blade.

(2) Where applicable to a specific engine design, and separately from the conditions specified in paragraph c(1)

above, any other engine structural failure that results in higher loads.

d. The ultimate loads developed from the conditions specified in paragraphs c(1) and c(2) above 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.

Issued in Renton, Washington, on March 6, 2003.

Ali Bahrami,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 71

[Airspace Docket No. 02-AEA-13]

Establishment of Class D Airspace; Rome, NY

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; delay of effective date.

SUMMARY: This corrective action changes the effective date for the establishment of the Class D airspace area at Rome, NY. The proposed commissioning date for the Airport Traffic Control Tower (ATCT) has been delayed; therefore, the effective date of the establishment of the Class D airspace must also be delayed.

EFFECTIVE DATE: 0901 UTC May 15, 2003

FOR FURTHER INFORMATION CONTACT: Mr. Francis Jordan, Airspace Specialist, Airspace Branch, AEA-520, Air Traffic Division, Eastern Region, Federal Aviation Administration, 1 Aviation Plaza, Jamaica, New York 11434-4809, telephone: (718) 553-4521.

SUPPLEMENTARY INFORMATION:

History

Federal Register Document 02-29902, Airspace Docket No. 02-AEA-13, published in the **Federal Register** on November 25, 2002 (67 FR 70533-70534), established the description of the Class D airspace area at Rome, NY. This action was originally scheduled to become effective on March 20, 2003; however, a delay in the commissioning of the ATCT has required the effective date of this action to be delayed until May 15, 2003.

Accordingly, pursuant to the authority delegated to me, the effective date for the Class D airspace area at