



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2017-0033; Special Conditions No. 25-670-SC]

**Special Conditions: Bombardier Aerospace, Model BD-700-2A12 and BD-700-2A13
Airplanes; Limit Engine Torque Loads**

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Bombardier (Bombardier) Inc. Models BD-700-2A12 and BD-700-2A13 airplanes. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is the engine torque-load limit imposed by sudden engine stoppage due to malfunction or structural failure. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. 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: This action is effective on Bombardier on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Send your comments on or before **[INSERT A DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Send comments identified by docket number FAA-2017-0033 using any of the following methods:

- *Federal eRegulations Portal:* Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 8 a.m. and 5 p.m., Monday through Friday, except federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478).

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.

FOR FURTHER INFORMATION CONTACT: Mark Freisthler, FAA, Airframe and Cabin Safety Branch, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601

Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-1119; facsimile 425-227-1232.

SUPPLEMENTARY INFORMATION:

The substance of these special conditions has been subject to the public notice and comment period in several prior instances, and has been derived without substantive change from those previously issued. It is unlikely that prior public comment would result in a significant change from the substance contained herein. Therefore, the FAA has determined that prior public notice and comment are unnecessary and impracticable, and good cause exists for adopting these special conditions upon issuance. The FAA is requesting comments to allow interested persons to submit views that may not have been submitted in response to the prior opportunities for comment described above. It is further unnecessary to delay the effective date for the reasons previously stated.

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive on or before the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On May 30, 2012, Bombardier applied for an amendment to Type Certificate No. T00003NY to include the new Model BD-700-2A12 and BD-700-2A13 airplanes. These airplanes are derivatives of the Model BD-700 series of airplanes and are marketed as the Bombardier Global 7000 (Model BD-700-2A12) and Global 8000 (Model BD-700-2A13). These

airplanes are twin-engine, transport-category, executive-interior business jets. The maximum passenger capacity is 19 and the maximum takeoff weights are 106,250 lbs. (Model BD-700-2A12) and 104,800 lbs. (Model BD-700-2A13).

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.101, Bombardier must show that the Model BD-700-2A12 and BD-700-2A13 airplanes meet the applicable provisions of the regulations listed in Type Certificate No. T00003NY, or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

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 Model BD-700-2A12 and BD-700-2A13 airplanes 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 feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model BD-700-2A12 and BD-700-2A13 airplanes 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 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 § 21.101.

Novel or Unusual Design Feature

The Bombardier Model BD-700-2A12 and BD-700-2A13 airplanes will incorporate a novel or unusual design feature associated with engine-seizure requirements due, in part, to large bypass fans capable of producing much larger and more complex dynamic loads than would other bypass fans.

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.

It is evident from service history that the engine-failure events that tend to cause the most severe loads are fan-blade failures. These events occur much less frequently than the typical “limit” load condition.

Regulatory authorities and industry have developed a standardized requirement in the Aviation Rulemaking Advisory Committee (ARAC) forum (Aviation Rulemaking Advisory Committee; Loads and Dynamics Harmonization Working Group [58 FR 13819]). The technical aspects of this requirement have been agreed upon, and the ARAC Loads and Dynamics Harmonization Working Group has accepted them. These special conditions reflect the ARAC recommendation. The ARAC recommendation includes corresponding advisory material, which is considered an acceptable means of compliance to these special conditions.

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.

Applicability

As discussed above, these special conditions are applicable to the Model BD-700-2A12 and BD-700-2A13 airplanes. Should Bombardier 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 the other model as well.

Conclusion

This action affects only one novel or unusual design feature on Bombardier Model BD-700-2A12 and BD-700-2A13 airplanes. It is not a rule of general applicability and affects only the applicant who applied to FAA for approval of this feature on the airplane.

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 Proposed 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 Model BD-700-2A12 and BD-700-2A13 airplanes.

In lieu of § 25.361(b) the following special conditions apply:

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 that could result in a temporary loss of power or thrust, and
 - b. The maximum acceleration of the engine.
2. For auxiliary power unit (APU) 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 APU deceleration due to malfunction or structural failure; and
 - b. The maximum acceleration of the APU.
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 separately
 - b. 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) of these special conditions 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 April 27, 2017.

Paul Bernado

Acting Manager, Transport Airplane Directorate

Aircraft Certification Service

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