



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR part 25

[Docket No. FAA-2013-0892; Notice No. 25-13-21-SC]

Special Conditions: Airbus, A350-900 series airplane; crashworthiness – emergency landing conditions.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This action proposes special conditions for the Airbus Model A350-900 series airplanes. These airplanes will have a novel or unusual design feature associated with crashworthiness of carbon fiber reinforced plastic used in the construction of the fuselage. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed 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: 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-2013-0892 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 9 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), as well as at <http://DocketsInfo.dot.gov/>.

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: Todd Martin, FAA, Airframe/Cabin Safety, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone (425) 227-1178; facsimile (425) 227-1320.

SUPPLEMENTARY INFORMATION:

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 proposed special conditions, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

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

Background

On August 25, 2008, Airbus applied for a type certificate for their new Model A350-900 series airplane. Later, Airbus requested and the FAA approved an extension to the application for FAA type certification to June 28, 2009. The Model A350-900 series has a conventional layout with twin wing-mounted Rolls-Royce Trent XWB engines. It features a twin aisle 9-abreast economy class layout, and accommodates side-by-side placement of LD-3 containers in the cargo compartment. The basic Model A350-900 series configuration will accommodate 315 passengers in a standard two-class arrangement. The design cruise speed is Mach 0.85 with a Maximum Take-Off Weight of 602,000 lbs. Airbus proposes the Model A350-900 series to be certified for extended operations (ETOPS) beyond 180 minutes at entry into service for up to a 420-minute maximum diversion time.

Changes in the structural behavior of the Airbus Model A350-900 series airplanes compared to currently certificated designs could degrade the survivability of Model A350-900 series occupants in crash conditions that are within the limits of survivability for other designs.

There is no aircraft-level survivable crash condition specified in the airworthiness regulations, and metallic aircraft have not been specifically designed against survivable impact conditions. However, the structural behavior of previously certificated aircraft in a survivable crash event and the associated limits are considered generally acceptable. It is therefore reasonable to expect that a design using new materials, such as the Model A350-900 series airplanes use, should be assessed to ensure that the material meets the currently accepted level of safety. The FAA and industry have collected a significant amount of experimental data as well as data from crashes of transport category airplanes that show a high occupant survival rate at vertical descent velocities up to 30 ft/sec. Based on this information, the FAA finds it appropriate and necessary for an assessment of the Model A350-900 series airplanes to span a range of airplane vertical descent speeds up to 30 ft/sec.

Type Certification Basis

Under Title 14, Code of Federal Regulations (14 CFR) 21.17, Airbus must show that the Model A350-900 series meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-129.

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 A350-900 series because of a novel or unusual design feature, special conditions are prescribed under § 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 or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model

A350-900 series 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 and the FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the "Noise Control Act of 1972."

The FAA issues special conditions, as defined in 14 CFR 11.19, under § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The Airbus Model A350-900 series will incorporate the following novel or unusual design feature: fuselage fabricated with a combination of carbon fiber reinforced plastic (CFRP) and metallic structure. This is a novel and unusual design feature for a large transport airplane. Structure fabricated from CFRP may behave differently than metallic structure in crash conditions because of differences in material ductility, stiffness, failure modes, and energy absorption characteristics. Therefore, the impact response characteristics of the Model A350-900 series airplane must be evaluated to ensure that its survivable crashworthiness characteristics provide at least the same level of safety as those of a similarly sized airplane constructed from traditionally used metallic materials.

There are no existing regulations that adequately address this potential difference in impact response characteristics for what are considered survivable crash conditions. The proposed special conditions are necessary to ensure a level of safety equivalent to that provided by 14 CFR part 25.

Discussion

Factors in crash survivability are retention of items of mass, maintenance of occupant emergency egress paths, maintenance of acceptable acceleration and loads experienced by the

occupants, and maintenance of a survivable volume. To provide the same level of safety as exists with conventional airplane construction, Airbus should show that the Model A350-900 series airplanes have sufficient crashworthiness capabilities under foreseeable survivable impact events. To show this, Airbus should evaluate the impact response characteristics of the Model A350-900 series airplane to ensure that its crashworthiness characteristics are not significantly different from those of a similarly sized airplane built from traditionally used metallic materials.

In their evaluation of the Model A350-900 series airplane response to an impact event, Airbus should demonstrate that the structural behavior is similar to that expected from a metallic airframe of similar size to the Model A350-900, or incorporate mitigating design features that provide a similar level of safety.

Airbus should demonstrate either through analysis using validated analytical tools or by direct test evidence that the crash dynamics of the A350 fuselage structure provides a level of occupant protection consistent with previously certificated large transport category airplanes.

Applicability

As discussed above, these proposed special conditions apply to Airbus Model A350-900 series airplanes. Should Airbus apply later for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the proposed special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the Airbus Model A350-900 series airplanes. 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 Proposed Special Conditions

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for Airbus Model A350-900 series airplanes.

The Airbus Model A350-900 series airplanes must provide an equivalent level of occupant safety and survivability to that provided by previously certificated wide-body transports of similar size under foreseeable survivable impact events for the following four criteria. In order to demonstrate an equivalent level of occupant safety and survivability, the applicant must demonstrate that Model A350-900 series airplanes meet the following criteria for a range of airplane vertical descent velocities up to 30 ft/sec.

1. Retention of items of mass. The occupants, i.e., passengers, flight attendants, and flightcrew, must be protected during the impact event from release of seats, overhead bins, and other items of mass due to the impact loads and resultant structural deformation of the supporting airframe and floor structures. The applicant must show that loads due to the impact event and resultant structural deformation of the supporting airframe and floor structure at the interface of the airplane structure to seats, overhead bins, and other items of mass are comparable to those of previously certificated wide-body transports of similar size for the range of descent velocities stated above. The attachments of these items need not be designed for static emergency landing loads in excess of those defined in § 25.561 if impact response characteristics of the Airbus Model A350-900 series airplanes yield load factors at the attach points that are comparable to those for a previously certificated wide-body transport category airplane.

2. Maintenance of acceptable acceleration and loads experienced by the occupants. The applicant must show that the impact response characteristics of the Airbus Model A350-900 series airplane, specifically the vertical acceleration levels experienced at the seat/floor interface and loads experienced by the occupants during the impact events, are consistent with those found in § 25.562(b) or with levels expected for a previously certificated wide-body transport category airplane for the conditions stated above.

3. Maintenance of a survivable volume. For the conditions stated above, the applicant must show that all areas of the airplane occupied for takeoff and landing provide a survivable volume comparable to that of previously certificated wide-body transports of similar size during and after the impact event. This means that structural deformation will not result in infringement of the occupants' normal living space so that passenger survivability will not be significantly affected.

4. Maintenance of occupant emergency egress paths. The evacuation of occupants must be comparable to that from a previously certificated wide-body transport of similar size. To show this, the applicant must show that the suitability of the egress paths, as determined following the vertical impact events, is comparable to the suitability of the egress paths of a comparable, certificated wide-body transport, as determined following the same vertical impact events.

Issued in Renton, Washington, on October 22, 2013

Stephen P. Boyd
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Aircraft Certification Service

[FR Doc. 2014-00104 Filed 01/07/2014 at 8:45 am; Publication Date: 01/08/2014]