



Federal Aviation Administration

Memorandum

Date: January 11, 2011

To: Manager, Transport Airplane Directorate International Branch, ANM-116

From: Manager, Transport Standards Staff, Airframe and Cabin Safety Branch, ANM-115

Prepared by: Jeff Gardlin, Aerospace Engineer, ANM-115

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Airbus Model A380 airplane, FAA Project # TD0794IB-T

ELOS Memo#: TD0794IB-T-CI-7

Regulatory Ref: §§ 21.21(b)(1), 25.856(b), 121.312(e)(3)

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate on the establishment of an equivalent level of safety finding for the Airbus Model A380 airplane..

Background

Amendment 25-111 was adopted in July 2003, to raise the level of fire safety on transport category airplanes both from an in-flight and post-crash standpoint. With respect to post-crash fire safety, the new requirements involve a stringent test method for thermal/acoustic insulation installed in the lower half of the fuselage. This requirement is implemented for newly manufactured airplanes in U.S. air carrier operations by concurrent Amendment 121-301. The intent of the requirement is to provide an additional barrier between the occupants and a post crash fire that will extend the time available for evacuation. The rule applies to the thermal/acoustic insulation that is installed, but does not require the installation of insulation.

Since transport category airplanes are generally insulated in the lower half, the FAA considered that this approach was appropriate. However, the rulemaking also noted that if insulation were to be removed to avoid compliance, the issue of whether to require insulation in the lower half of the fuselage would be revisited. The preamble to the regulation also acknowledged that other methods of achieving the objective would be entertained using the equivalent level of safety provisions of Title 14 Code of Federal Regulations (14 CFR) 21.21 (b)(1).

Applicable regulation(s)

§§ 21.21(b)(1), 25.856(b), 121.312(e)(3).

Regulation(s) requiring an ELOS finding

§ 25.856(b)

Description of compensating design features or alternative standards which allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)

Certain Airbus airplanes incorporate a carbon fiber belly fairing, over a substantial portion of the lower fuselage. Some of the insulation on the fuselage skin, under the belly fairing does not comply with the requirements of § 25.856(b), however, the fairing itself does. Airbus has proposed an alternative method under the equivalent level of safety provisions of § 21.21 (b)(1).

Explanation of how design features or alternative standards provide an equivalent level of safety to the level of safety intended by the regulation

The Belly Fairing covers the lower half of the fuselage in its lower part. Per design, the Belly Fairing on the A380 is a composite part, which is post-crash fire resistant in terms of Appendix F, part VII. Consequently, the Belly Fairing can be used as an alternative method to meet the intent of § 25.856(b), and thus the modification according to § 25.856(b) of existing insulation materials inboard of the lowest part of the fuselage, could be avoided.

For A380, the total surface of the Belly Fairing is considered in the scope of the ELOS, providing that the Belly Fairing constitutes the primary flame penetration protection. Areas that are already protected, such as the Lower Deck Cargo Compartment (ELOS memo TD0794IB-T-CI-6, and the wing box are excluded of area of consideration. These areas where the Belly Fairing is installed, but that are already protected, therefore have an additional barrier for the fire to penetrate the aircraft, but the fairing is not the primary means to provide a burn through protection.

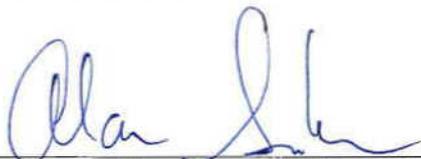
The critical case in terms of thickness and distance from the fuselage skin was identified and tested. In addition to tests of the basic fairing construction, tests have been successfully performed on A380 access panels. The latches are part of the design to meet the test requirement.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper CI-7 "Fuselage Burnthrough Substantiation for belly fairing." This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Transport Directorate has assigned a unique ELOS Memorandum

number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section (TCs & ATCs) or in the Limitations and Conditions Section of the STC Certificate in accordance with the statement below:

Equivalent Level of Safety Findings have been made for the following regulation(s):
14 CFR 25.856(b), Improved Flammability standards for Thermal/Acoustic insulation materials
(documented in TAD ELOS Memo TD07941B-T-CI-7).



Manager, Transport Airplane Directorate,
Aircraft Certification Service

1/14/2011
Date

ELOS Originated by: TAD	Project Engineer: Jeff Gardlin	Routing Symbol ANM-115
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