Federal Aviation Administration

Memorandum

Date: 5/18/2010

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

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

Prepared by: Ian Won, ANM-115

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Airbus Models: A300/A300-600/A310/A318/A319/A320/A321/A330/A340/A380, FAA Project No. TD0754IB-T - Three Stage Approval Process for New Repairs to Alteration Structure.

ELOS Memo#: TD0754IB-T-A-1

Regulatory Ref: Title 14 Code of Federal Regulations (14 CFR) part 26: §§ 26.43(d)(1), (d)(2) and (f)(4); 26.45(e)(5); 26.47(e)(5); Advisory Circular 120-93

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 (ELOS) finding for the Airbus Models: A300/A300-600/A310/A318/A319/ A320/A321/A330/A340/A380.

Background

Repairs to fatigue critical structure (FCS) must be evaluated for damage tolerance per subpart E of 14 CFR part 26; this includes repairs to baseline structure as well as repairs to alterations. The rule incorporates a two stage approach for approvals of damage tolerance data for repairs developed after January 11, 2008, by which the data is to be submitted within 12 months of the airplane's return to service. Further, paragraph 214 and Appendix 5 of Advisory Circular (AC) 120-93 include provisions for a three stage approach for approving repair data. This approach is applicable only to unpublished repairs installed after January 11, 2008, that affect fatigue critical baseline structure (FCBS). Repairs to alterations are limited to the two stage approval approach as noted in §§ 26.45(e)(5) and 26.47(e)(5).

The application of the three stage repair approval approach for repairs to fatigue critical alteration structure (FCAS), as outlined in AC 120-93 for approval of repairs to FCBS, will provide an equivalent level of safety, when compared with repairs to baseline structures.

Applicable regulation(s)

§§ 26.43(d)(1), (d)(2) and (f)(4); 26.45(e)(5); 26.47(e)(5)

Regulation(s) requiring an ELOS finding

§§ 26.45(e)(5); 26.47(e)(5)

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

Per section 26.43(d), a Damage Tolerance Evaluation (DTE) must be performed to determine if Damage Tolerance Inspections (DTI) are required for unpublished repairs to FCBS that are developed and approved after January 11, 2008. The DTE and DTI must be submitted for approval to the FAA Oversight Office or its properly authorized designee within 12 months of returning the airplane to service or in accordance with a schedule approved by the FAA Oversight Office.

Paragraph 214 and Appendix 5 of Advisory Circular 120-93 provide a means of compliance through the application of a three stage approach for the approval of repair data (applicable only to unpublished repairs to FCBS, installed after January 11, 2008):

1. Approval of static strength data and a schedule for the damage tolerance analysis;
2. Approval of the damage tolerance analysis and at a minimum a threshold for inspection;
3. Inspection methods and repetitive inspection intervals.

Approval of damage tolerance data for repairs to alterations, in accordance with §§ 26.45(d) and 26.47(d), is limited to the two stage approval approach as noted in §§ 26.45(e)(5) and 26.47(e)(5).

1. Approval of static strength data and a schedule for the damage tolerance analysis;
2. Submittal of the damage tolerance analysis and damage tolerance inspection program for approval within 12 months of the airplane's return to service.

Airbus will use the three stage approval process for all repairs to FCBS and FCAS. Application of the three stage approval approach for repairs to alterations will result in an equivalent level of safety when compared with repairs to baseline structure.

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

Repairs to alterations, such as Service Bulletin modifications or Airbus owned supplemental type certificates, are no different than repairs made to baseline or unaltered structure. The procedures and methods used to analyze the static strength and damage tolerance characteristics of a repair to altered structure are the same as those employed for repairs to baseline structure. To provide a

consistent approach to all repairs, the applicant will apply the three stage repair approval approach to repairs to alterations.

The application of the three stage approval approach to repairs to alterations will result in an equivalent level of safety when compared with repairs to baseline structures.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper A-1. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Transport Airplane 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 (TC and ATC) or in the Limitations and Conditions section of the Supplemental Type Certificate. An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation(s):

§ 26.45(e)(5) Holders of Type Certificates – Alterations and repairs to alterations. Compliance times. (Documented in Transport Airplane Directorate ELOS Memorandum TD0754IB-T-A-1)

§ 26.47(e)(5) Holders of and applicants for a Supplemental Type Certificate – Alterations and repairs to alterations. Compliance times. (Documented in Transport Airplane Directorate ELOS Memorandum TD0754IB-T-A-1)

Franklin Tiangsing — *5/18/2010*

Manager, Airframe/Cabin Safety Branch
Standards Staff
Transport Airplane Directorate

Date

ELOS Originated by ANM:	Project Engineer: Ian Won	Routing Symbol ANM-115