Federal Aviation Administration

Memorandum

Date: June 1, 2015

To: Manager, Boeing Aviation Safety Oversight Office, ANM-100B

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Sherry Vevea, ANM-140S

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Flammable Fluid Carrying Components in Nacelle Areas Behind the Firewall on the Boeing Model 737-7, -8, and -9 Airplanes, FAA Project Numbers PS12-0037, PS12-0038, PS12-0039

ELOS Memo#: PS12-0038-P-18

Reg. Ref.: §§ 25.1182(a) and 25.1183

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Boeing Model 737-8, 737-9 and 737-7 (737 MAX) airplanes.

Background

Title 14, Code of Federal Regulations (14 CFR) 25.1182(a) requires nacelle areas immediately behind engine firewalls to meet §§ 25.1103(b), 25.1165 (d) and (e), 25.1183, 25.1185(c), 25.1187, 25.1189, and 25.1195 through 25.1203, including those regulations concerned with designated fire zones. Section 25.1183 requires components of fluid systems located within fire zones to be at least fire resistant, and requires them to be fireproof under certain conditions.

The intent of these regulations is to require protection from the effects of an engine fire, over and above the protections required of the engine fire zone itself, with the intent of preventing the spread of fires initiated within a fire zone, and of preventing initiation of fires in adjacent zones or pod attaching structures due to fluid leaks.

The 737 MAX airplanes powered by CFM LEAP-1B engines have thrust reverser sleeves and a lower bifurcation zone that are adjacent to fire zones however they do not contain fire extinguishing or detection provisions as prescriptively required by § 25.1182(a). In addition, the portion of the thrust reverser actuators in the sleeves has not been shown to be fire resistant as required by § 25.1183.

Boeing intends to show an ELOS for the thrust reverser sleeves and engine lower bifurcation zone for § 25.1182(a) and its applicable requirements based on compensating design features.

Applicable regulation(s)

§§ 21.21(b)(1), 25.1182(a) and 25.1183

Regulation(s) requiring an ELOS finding

§§ 25.1182(a), Amendment 25-11, and 25.1183, Amendment 25-101

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

The compensating factors that provide an ELOS for the regulations not complied with are as follows:

- The lower bifurcation does not have any flammable fluid carrying components and only has drain lines running through the zone which are connected to flammable fluid carrying components located in the engine core zone.

- There is minimal hydraulic fluid in the portion of the thrust reverser actuators in the thrust reverser sleeves which is considered non-hazardous.

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

Section 25.1182 requires most of the requirements applied to designated fire zones to also be applied to nacelle areas behind a firewall and to each portion of engine pod attaching structures containing flammable fluid lines. The intent of § 25.1182 is to set a level of required fire protection in areas adjacent to engine fire zones to limit the potential for engine fires to spread to those areas, and to limit the hazard if a fire does spread to those areas.

The lower bifurcation zone does not have any flammable fluid carrying components, just drain lines, and the zone is drained and ventilated as required by § 25.1187. There are no known ignition sources in this zone. The resulting configuration will be equivalently safe to the level of safety intended by the regulation.

Not having an appreciable quantity of flammable fluid within the designated fire zone for the thrust reverser actuators in combination with no ignition sources being present within the designated fire zone provides a level of safety intended by aforementioned regulations.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in the 737 MAX airplanes project Issue Paper P-18, titled "Flammable Fluid Carrying Components in Nacelle Areas Behind the Firewall." This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD 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 in accordance with the statement below:

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

§ 25.1182(a)	Nacelle Areas Behind Firewalls, and Engine Pod Attaching Structures Containing Flammable Fluid Lines
§ 25.1183	Flammable Fluid-Carrying Components

(Documented in TAD ELOS Memorandum PS12-0038-P-18)

Original Signed by

Robert Jones — June 30, 2015

Transport Airplane Directorate, Aircraft Certification Service — Date

ELOS Originated by Boeing Aviation Safety Oversight Office	BASOO Manager: Angelos Xidias	Routing Symbol: ANM-100B