Federal Aviation Administration

Memorandum

Date: June 22, 2015

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

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Nicole R. Potter, ANM-106B

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Engine Aft Fairing Compartment and Main Strut Fire Safety Requirements on the Boeing Model 737-7, 737-8, and 737-9 Airplanes, FAA Project Numbers PS12-0037, PS12-0038, PS12-0039

ELOS Memo#: PS12-0038-P-20

Reg. Ref.: §§ 21.21(b)(1), 25.1182(a) and 25.1183(a)

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 737-7, -8 and -9 (737 MAX) airplanes.

Background

Title 14, Code of Federal Regulations (14 CFR) 25.1182(a) requires most of the requirements applied to fire zones defined by § 25.1181 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 fire does spread to those areas. In relationship to this ELOS finding, § 25.1182(a) requires that each portion of any engine pod attaching structure containing flammable fluid lines must meet the requirements of § 25.1183(a).

Section 25.1183(a) requires that flammable fluid lines and components be fire resistant, and flammable fluid tanks be fireproof or otherwise protected. Boeing has proposed a

design of certain components within the aft fairing compartment and main strut that do not directly comply with the aforementioned regulations.

The Boeing Model 737-8, 737-9 and 737-7 (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 section 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 requested an ELOS for the engine aft fairing and main strut for § 25.1183(a).

Applicable regulation(s)

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

Regulation(s) requiring an ELOS finding

§ 25.1183(a)

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 aft fairing compartment is isolated from the engine fire zones by distance and intervening compartments.

- The main strut compartment is isolated from the engine fire zones by distance and intervening compartments.

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

The degree of isolation of the aft fairing compartment from the engine fire zones, provided by distance and intervening compartments compensates for the lack of direct compliance to § 25.1183(a). Additionally, the absence of electrical components, pumps, or valves in the aft fairing compartment removes the potential for ignition sources in the event of a component(s) failure.

The main strut contains flammable fluid lines for fuel supply, hydraulic supply, and hydraulic pressure and a case drain that are metallic, but have not been shown to be fire-resistant as required by § 25.1183(a). The additional fire risk created by the non-compliant components in the main strut are compensated for by the reduced risk of fires

in the engine fire zone due to the intervening compartments (e.g. dry bay) and the distance between the main strut compartment and fire zone.

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-20, titled "Engine Aft Fairing and Main Strut Fire Safety Requirements." 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):

§ 25.1183(a) Flammable Fluid-Carrying Components

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

Original Signed by

Victor Wicklund July 9, 2015

Transport Airplane Directorate, Date
Aircraft Certification Service

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