



Federal Aviation Administration

Memorandum

Date: October 16, 2014

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

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Jim Cashdollar, ANM-100B

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Fire Safety Requirements for the PW4062 Engine Fan Case on Boeing Model 767-2C Airplanes, FAA Project No. PS09-0863

ELOS Memo # PS09-0863-P-9

Reg. Ref.: 14 CFR 21.21(b)(1), 25.1181 and 25.1182(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 Boeing Model 767-2C airplanes.

Background

Title 14, Code of Federal Regulations (14 CFR) 25.1181(a)(6) specifically designates the compressor section of turbine engines as a fire zone. Section 25.1181(b) requires that each fire zone meet the requirements of §§ 25.863, 25.865, 25.867, 25.869, and 25.1185 through 25.1203. For a nacelle area immediately behind a firewall, § 25.1182(a) requires compliance with §§ 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.

The engine fan case compartment of the Model 767-2C airplane equipped with PW4062 engines does not comply with the firewall, fireproof skin, fire detection, and fire extinguishing requirements of § 25.1181(b). In addition, the compartment is a nacelle area behind an engine firewall (the firewall isolating the core compartment fire zone), but does not comply with the fire detection and extinguishing requirements of § 25.1182(a). The specific regulations required by §§ 25.1181(b) and 25.1182(a) that are not met are §§ 25.1191, 25.1193(e) and 25.1195 through 25.1203.

Applicable regulation(s)

14 CFR 21.21(b)(1); 25.863 through 25.869; 25.1103(b); 25.1165(d) and (e); 25.1181(a)(6) and (b); 25.1182(a); and 25.1183 through 25.1203

Regulation(s) requiring an ELOS finding

14 CFR 25.1181(b) and 25.1182(a)

Description of compensating design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (including design changes, limitations or equipment needed for equivalency)

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

- The accessory gear box (AGB) is not located in the fan case compartment.
- The manual door opening system (MDOS) has components that are not fire resistant, but it is a closed system containing approximately 5.2 fluid ounces of hydraulic fluid, which is considered non-hazardous. The MDOS is unpressurized during flight operation.
- No ignition sources are present within the fire zone during normal and foreseeable failure conditions other than low energy electrical wiring that meets ignition minimization requirements for flammable fluid leakage zones and fire zones.

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety to the level of safety intended by the regulation

Section 25.1181 defines designated fire zones and the requirements to be applied to these zones. The intent of this regulation is to identify areas of the airplane/engine where additional safety precautions must be taken, recognizing that a fire could occur in these regions because of the presence of both ignition sources and flammable fluid lines & components. The regulation identifies the necessary precautions to be taken to contain a fire, as well as to detect and extinguish a fire.

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.

Not having an appreciable quantity of flammable fluid within the designated fire zone (i.e., there is no accessory gear box installed and only a small quantity of hydraulic fluid is present in the MDOS) in combination with no ignition sources being present within the designated fire zone during normal and foreseeable failure conditions, other than low energy electrical wiring that meets ignition minimization requirements, 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 project issue paper P-9. 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 must be listed in the type certificate data sheet under the Certification Basis section. An example of an appropriate statement is provided below.

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

14 CFR 25.1181(b) Designated fire zones: regions included; and 14 CFR 25.1182(a) Nacelle areas behind firewalls, and engine pod attaching structures containing flammable fluid lines (documented in TAD ELOS Memorandum PS09-0863-P-9)

Original signed by

Victor Wicklund

Transport Airplane Directorate,
Aircraft Certification Service

October 16, 2014

Date

ELOS Originated by Boeing Aviation Safety Oversight Office	Program Manager Jim Cashdollar	ANM-100B
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