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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2015-3142; Directorate Identifier 2015-NM-003-AD; Amendment 39-18725; AD 2016-25-02]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for certain The Boeing Company Model 787-8 airplanes. This AD was prompted by reports of the accumulation of very fine particle deposits in the power control unit (PCU) electro-hydraulic servo valves (EHSVs) used in the flight control system; this accumulation caused degraded performance due to reduced EHSV internal hydraulic supply pressures, resulting in the display of PCU fault status messages from the engine indication and crew alerting system (EICAS). This AD requires installing markers to limit the hydraulic system fluid used to a specific brand, doing hydraulic fluid tests of the hydraulic systems, replacing hydraulic system fluid if necessary, and doing all applicable related investigative and corrective actions. We are issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective January 20, 2017.

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of January 20, 2017.

ADDRESSES: For service information identified in this final rule, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminster Blvd., MC 110-SK57, Seal Beach, CA 90740; telephone 562-797-1717; Internet https://www.myboeingfleet.com. You may view this referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221. It is also available on the Internet at http://www.regulations.gov by searching for and locating Docket No. FAA-2015-3142.

Examining the AD Docket

You may examine the AD docket on the Internet at http://www.regulations.gov by searching for and locating Docket No. FAA-2015-3142; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Docket Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Fnu Winarto, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, FAA, Seattle Aircraft Certification Office (ACO), 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6659; fax: 425-917-6590; email: fnu.winarto@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to certain The Boeing Company Model 787-8 airplanes. The NPRM published in the Federal Register on August 19, 2015 (80 FR 50233) ("the NPRM"). The NPRM was prompted by reports of the accumulation of very fine particle deposits in the PCU EHSVs used in the flight control system; this accumulation caused degraded performance due to reduced EHSV internal hydraulic supply pressures, resulting in the display of PCU fault status messages from the EICAS. The NPRM proposed to require installing markers to limit the hydraulic system fluid used to a specific brand, doing hydraulic fluid tests of the hydraulic systems, replacing hydraulic system fluid if necessary, and doing all applicable related investigative and corrective actions. We are issuing this AD to prevent the failure of flight control hydraulic PCUs, which could lead to reduced controllability of the airplane.

Comments

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request To Refer to Revised Service Information

United Airlines (UAL) stated that there are many errors, omissions, and inconsistencies in Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014, and provided examples of those mistakes. UAL asked that this service information be revised to correct these problems.

Boeing has issued Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016. The revised service information corrects typographical errors and makes clarifications to the Accomplishment Instructions in Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014. We have included Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016, in paragraphs (c) and (h) of this AD. We have also included a new paragraph (i) in this AD to provide credit for actions done prior to the effective date of this AD using Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014. The subsequent paragraphs have been redesignated accordingly.

Request To Clarify the Reason for the Unsafe Condition

Boeing asked that we remove all references to hydraulic fluid contamination causing EHSV restriction, in the SUMMARY, the Discussion section of the NPRM, and paragraph (e) of the proposed AD. Boeing stated that the issue is not hydraulic fluid contamination causing EHSV restriction, but the accumulation of very fine particle deposits within the EHSV causing degraded performance due to reduced EHSV internal hydraulic supply pressures. Boeing added that the solution is to change the hydraulic fluid to a specific brand, considering that it has been verified to significantly reduce the rate of accumulation of particles in the EHSVs. Boeing concluded that this would clarify the cause of the EICAS messages.

We agree that the reason for the unsafe condition should be clarified, for the reasons provided. Therefore, we have removed the references to hydraulic fluid contamination causing EHSV restriction and replaced that language with a more accurate reason for the unsafe condition in the SUMMARY, the Discussion section of the final rule, and paragraph (e) of this AD.

Request To Issue Global Alternative Method of Compliance (AMOC)

UAL asked that a fleet-wide AMOC be issued for Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, to correct a part number (P/N) reference. Task 1, Figure 1, and Task 2, Figure 1, of Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, identify P/N 710Z7290-9##ALT1 for the left and right engine diagonal braces; however, the correct P/N is 710Z7290-9 with no ##ALT suffix. UAL stated that the correct part number is identified in the Illustrated Parts Catalog (IPC).

We acknowledge the commenter's concern that an incorrect part number for the left and right engine diagonal braces is identified in Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014. We have discussed this error with Boeing, and it was confirmed that the part number in the IPC (as noted by UAL) is correct and should be used. In light of this information, we do not agree that a global AMOC should be issued. However, we have added a new Note 2 to paragraph (g) of this AD to clarify the correct part number.

Request To Change Certain Instructions in the Service Information

UAL stated that Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, includes procedures for the HyJet V marker installation, which is a "Required for Compliance (RC)" item in Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014, and must be done before or concurrently with that service information. UAL noted that there is no RC language in Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, which makes the entire service bulletin "RC." UAL asked that the steps that specify access and close be marked as non-RC steps.

We do not agree to change Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, to mark the steps RC and non-RC. However, we do agree to clarify the steps that are required to accomplish the marker installation. Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014, has an RC step that specifies to install markers. That RC step does not specify to perform access and close steps for the marker installation; therefore those access and close steps are not required by this AD. We have not changed this AD in this regard.

UAL also asked we change the procedures in Part 4 of Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014, which specify options for either replacing the hydraulic fluid again, or draining and filling the hydraulic reservoir. UAL stated that if either option is used, then Part 2 of the service information titled "Cycle Hydraulic Fluid" must again be done, or the airplane must be flown at least one flight cycle, and then a sample drawn for testing. UAL added that this procedure, done in accordance with the instructions in the referenced service information, results in excessive cycling if the operator needs to only replace a small amount of fluid

and chooses the reservoir drain-and-fill option. UAL asked to use a procedure that would specify draining and filling the reservoir, flight control cycling, and taking a fresh sample for testing, all at the same time. UAL noted that Option 10 specifies "Drain and Fill Hydraulic Reservoir" and is acceptable to operate the flight controls six to eight times to let the fluid flow through all the systems. UAL stated that this is the procedure used by Boeing before taking fluid samples per the Boeing 787 Airplane Maintenance Manual.

We do not agree to change the procedure for servicing the hydraulic fluid. Although UAL's proposal is an accepted procedure in the Boeing 787 Airplane Maintenance Manual, this procedure does not include operating the other hydraulic-powered subsystems, such as the landing gear, thrust reverser, and brakes. Subsequently, it could result in stagnant fluid measurements not intermixing with other hydraulic system fluid following replacement of the hydraulic system fluid, and could generate fluid test samples that do not include the entire system. In light of these factors, we have not changed this AD in this regard.

Clarification to Paragraph (g) of This AD

We have added a new Note 1 to paragraph (g) of this AD to refer to Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, as an additional source of guidance for installing markers to allow servicing of hydraulic systems with only HyJet V hydraulic fluid.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously and minor editorial changes. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

Related Service Information Under 1 CFR Part 51

We have reviewed Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016. This service information describes procedures for installing markers to limit the hydraulic system fluid used to a specific brand; doing hydraulic fluid tests of the hydraulic systems, replacing the hydraulic system fluid if necessary, and related investigative and corrective actions. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

Costs of Compliance

We estimate that this AD affects 11 airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Install markers	2 work-hours × $85 per hour = $170	$95	$265	$2,915

Test and replace left, center, and right hydraulic system fluid	104 work-hours × $85 per hour = $8,840	1,020	9,860	108,460

We estimate the following costs to do any necessary replacements that may be required based on the results of the inspection. We have no way of determining the number of aircraft that might need these replacements:

On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Replace power control unit of elevator	9 × $85 per hour = $765	$108,000	$108,765
Replace power control unit of aileron	9 × $85 per hour = $765	118,000	118,765

According to the manufacturer, some of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals. We do not control warranty coverage for affected individuals. As a result, we have included all costs in our cost estimate.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

(1) Is not a "significant regulatory action" under Executive Order 12866,

(2) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),

(3) Will not affect intrastate aviation in Alaska, and

(4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39–AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

2016-25-02 The Boeing Company: Amendment 39-18725; Docket No. FAA-2015-3142; Directorate Identifier 2015-NM-003-AD.

(a) Effective Date

This AD is effective January 20, 2017.

(b) Affected ADs

None.

(c) Applicability

This AD applies to The Boeing Company Model 787-8 series airplanes, certificated in any category, as identified in Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016.

(d) Subject

Air Transport Association (ATA) of America Code 27, Flight Control Systems.

(e) Unsafe Condition

This AD was prompted by reports of the accumulation of very fine particle deposits in the power control unit (PCU) electro-hydraulic servo valves (EHSVs) used in the flight control system; this accumulation caused degraded performance due to reduced EHSV internal hydraulic supply pressures, resulting in the display of PCU fault status messages from the engine indication and crew alerting system (EICAS). We are issuing this AD to prevent failure of flight control hydraulic PCUs, which could lead to reduced controllability of the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Marker Installation

Within 36 months after the effective date of this AD, install markers to allow servicing of hydraulic systems with only HyJet V hydraulic fluid, in accordance with the Accomplishment Instructions of Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016.

Note 1 to paragraph (g) of this AD: Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016, refers to Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, as an additional source of guidance for installing markers to allow servicing of hydraulic systems with only HyJet V hydraulic fluid.

Note 2 to paragraph (g) of this AD: Task 1, Figure 1, and Task 2, Figure 1, of Boeing Service Bulletin B787-81205-SB290022-00, Issue 001, dated September 4, 2014, identify P/N 710Z7290-9##ALT1 for the left and right engine diagonal braces; however, the correct P/N is 710Z7290-9 with no ##ALT suffix.

(h) Fluid Tests of the Left, Right, and Center Hydraulic Systems

For airplanes identified in Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016, as Group 1, Configuration 2, Group 2: Within 36 months after the effective date of this AD, do hydraulic fluid tests of the left, right, and center hydraulic systems, replace the hydraulic system fluid, if necessary, and do all applicable related investigative and corrective actions, in accordance with the Accomplishment Instructions of Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016. Do all applicable related investigative and corrective actions within 36 months after the effective date of this AD.

(i) Credit for Previous Actions

This paragraph provides credit for the actions required by paragraphs (g) and (h) of this AD, if those actions were performed before the effective date of this AD using Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 001, dated November 25, 2014.

(j) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle Aircraft Certification Office (ACO), FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ACO, send it to the attention of the person identified in paragraph (k)(1) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) For service information that contains steps that are labeled as Required for Compliance (RC), the provisions of paragraphs (j)(3)(i) and (j)(3)(ii) apply.

(i) The steps labeled as RC, including substeps under an RC step and any figures identified in an RC step, must be done to comply with the AD. If a step or sub-step is labeled "RC Exempt," then the RC requirement is removed from that step or sub-step. An AMOC is required for any deviations to RC steps, including substeps and identified figures.

(ii) Steps not labeled as RC may be deviated from using accepted methods in accordance with the operator's maintenance or inspection program without obtaining approval of an AMOC, provided the RC steps, including substeps and identified figures, can still be done as specified, and the airplane can be put back in an airworthy condition.

(4) An AMOC that provides an acceptable level of safety may be used for any repair required by this AD if it is approved by the Boeing Commercial Airplanes Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO to make those findings. For a repair method to be approved, the repair must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(k) Related Information

(1) For more information about this AD, contact Fnu Winarto, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, FAA, Seattle ACO, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6659; fax: 425-917-6590; email: fnu.winarto@faa.gov.

(2) Service information identified in this AD that is not incorporated by reference is available at the addresses specified in paragraphs (l)(3) and (l)(4) of this AD.

(l) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Boeing Alert Service Bulletin B787-81205-SB270026-00, Issue 002, dated June 13, 2016.

(ii) Reserved.

(3) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminster Blvd., MC 110-SK57, Seal Beach, CA 90740; telephone 562-797-1717; Internet https://www.myboeingfleet.com.

(4) You may view this service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal-register/cfr/ibr-locations.html.

Issued in Renton, Washington, on November 25, 2016.
John P. Piccola, Jr.,
Acting Manager, Transport Airplane Directorate,
Aircraft Certification Service.