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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2017-0904; Product Identifier 2017-NM-071-AD; Amendment 39-19310; AD 2018-12-06]

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 and 787-9 airplanes. This AD was prompted by a report of an in-service reliability issue of a latent flow sensor failure combined with single cabin air compressor (CAC) operation. This condition resulted in reduced airflow which led to a persistent single CAC surge condition that caused overheat damage to the CAC inlet. This AD requires installing new pack control unit (PCU) software for the cabin air conditioning and temperature control system (CACTCS) and new CAC outlet pressure sensor J-tube hardware, and doing related investigative and corrective actions if necessary. We are issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective July 16, 2018.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of July 16, 2018.

ADDRESSES: For service information identified in this final rule, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; internet <https://www.myboeingfleet.com>. You may view this service information at the FAA, Transport Standards Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2017-0904.

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-2017-0904; or in person at Docket Operations between 9 a.m. and 5

p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, the regulatory evaluation, any comments received, and other information. The address for Docket Operations (phone: 800-647-5527) is Docket Operations, 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: Allison Buss, Aerospace Engineer, Cabin Safety and Environmental Systems Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3564; email: allison.buss@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 Boeing Model 787-8 and 787-9 airplanes. The NPRM published in the Federal Register on October 6, 2017 (82 FR 46719). The NPRM was prompted by a report of an in-service reliability issue of a latent flow sensor failure combined with single CAC operation. This condition resulted in reduced airflow which led to a persistent single CAC surge condition that caused overheat damage to the CAC inlet. The NPRM proposed to require installing new PCU software for the CACTCS and new CAC outlet pressure sensor J-tube hardware, and doing related investigative and corrective actions if necessary. We are issuing this AD to prevent CAC inlet overheating leading to structural degradation of the CAC inlet, fumes in the cabin and flight deck, and interruption to in-service air conditioning.

Comments

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

Support for the NPRM

A commenter, Nicholas Weber, and the Air Line Pilots Association, International (ALPA) had no objection to the NPRM. United Airlines and Jetstar Airways agreed with the NPRM but submitted comments, which are addressed below.

Request to Reference Latest Service Information

Boeing and Etihad Airways requested we refer to Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017. Boeing stated that the NPRM refers to Boeing Service Bulletin B787-81205-SB210077-00, Issue 003, dated October 20, 2016, and it should be Issue 004 instead.

We agree that this final rule should refer to the latest service information. We have reviewed Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017, which provides minor corrections. We have determined the revised actions have no effect on airplanes on which the earlier actions were completed. We revised the "Related Service Information under 1 CFR part 51" paragraph of this final rule to refer to Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017. We revised paragraphs (c)(2) and (g)(1) of this AD to refer to Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017. We also added paragraph (h)(5) to this AD to provide credit for using Boeing Service Bulletin B787-81205-SB210077-00, Issue 003, dated October 20, 2016, to accomplish the required actions in paragraph (g) of this AD, provided those actions were performed before the effective date of this AD.

Request To Allow Updated Software Version

Jetstar Airways and United Airlines requested that paragraph (g) of the proposed AD be updated to allow for compliance to also be met by installing the newer PCU Y-103 (software part number (P/N) HAM56-21PC-1030) software per Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017. Jetstar Airways stated that since the release of Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017; and Boeing Service Bulletin B787-81205-SB210077-00, Issue 003, dated October 20, 2016; which describe procedures for installation of PCU Y-102 (software P/N HAM57-21PC-1020) software via Work Package 1, there has been new PCU Y-103 software released per Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017. Jetstar stated its understanding that Work Packages 2 and 3 of Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017; or Boeing Service Bulletin B787-81205-SB210077-00, Issue 003, dated October 20, 2016; must also be done in order to meet compliance with the proposed AD.

We agree because we reviewed Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017, and we have determined that compliance can be met by installing the new PCU Y-103 (software P/N HAM56-21PC-1030) software or installing the previous PCU Y-102 (software P/N HAM57-21PC-1020) software, provided that Work Packages 2 and 3 of Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017; or Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017; are also done. We revised the “Related Service Information under 1 CFR part 51” paragraph of this final rule to include Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017. We have revised paragraphs (g)(1) and (g)(2) of this AD to allow Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017, as an optional method of compliance for Work Package 1 of Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017; and Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017.

Request To Include Required for Compliance (RC) Steps

United Airlines observed Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017; and Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017; do not contain steps that are designated as RC (Required for Compliance).

We infer the commenter is requesting that Boeing revise the service information or that we clarify which steps are RC. We disagree with making any changes because the operators can still complete the AD requirements with the steps contained in the Accomplishment Instructions of the referenced service information. In addition, waiting for Boeing to change the service information would delay the release of the AD. Further, certain steps include aircraft maintenance manual (AMM) reference material. When the words “refer to” are used and the operator has an accepted alternative procedure, the accepted alternative procedure can be used without the need to obtain an alternative method of compliance (AMOC). We have not changed this AD in this regard.

Requests To Clarify the Discussion Section

Boeing requested that we make several clarifications to the Discussion section of the NPRM. Boeing requested that the following changes be made to the Discussion section of the NPRM:

- Add the following statement: “The redesigned CAC outlet pressure sensor J-Tube hardware is to prevent transducer fouling, which could compromise surge detection.” Boeing stated the NPRM does not describe the purpose of the hardware change.
- In the sentence, “Smarter Environmental Control System ensures that airflow is distributed equally across the CACs,” replace the phrase “Smarter Environmental Control System” with “the system controller.” Boeing stated airflow distribution amongst CACs does not pertain to

what they refer to as the Smarter Environmental Control System, and the fundamental control approach for CACs attempts to distribute flow equally across CACs.

- Modify the sentence “PCU software logic was only designed to detect the surge when both CACs were operating on the same pack, and therefore, it was unable to detect a persistent single CAC surge condition which led to CAC inlet overheating” to “PCU software logic was only designed to react to the surge when both CACs are operating on the same pack, and therefore, it was unable to command a termination of the persistent single CAC surge condition which led to CAC inlet overheating.” Boeing stated that when only a single CAC is operating on a pack and airflow drops to an unintended low level, the surge will be detected by the system controls. Boeing explained that due to a software requirements error, the CAC will not be shut down and the surge can persist. Boeing concluded that the issue is not that the surge is undetected but rather that the issue is that the controls fail to react to that surge condition.
- Modify the sentence “In addition, we received a report of an in-service event involving foreign object debris in the CAC inlet and accumulation at the ozone converter that also led to a persistent single CAC surge resulting in overheat damage to the CAC inlet housing” to “In addition, we received a report of an in-service event involving persistent single CAC surge resulting in overheat damage to the CAC inlet housing and foreign object debris in the CAC inlet and accumulation at the ozone converter.” Boeing stated that aspects of this particular event are unknown; however, it is likely the foreign object debris was a result of the persistent surge event.
- Modify the sentence “The proposed PCU software change would redistribute the airflow to provide more flow to a single CAC, reducing the potential for a CAC surge” to “The PCU software change enables a single CAC in surge to be commanded off in order to prevent the persistent surge condition. Additionally, the software redistributes the airflow to provide more flow to a single CAC, reducing the potential for a CAC surge.” Boeing stated the software changes are not “proposed” and already exist. Boeing also stated the key software feature needed for persistent surge prevention was not in the original sentence.
- Modify the sentence “Reduced airflow leading to persistent CAC surge conditions and CAC inlet overheating, if not corrected, could result in structural degradation of the CAC inlet, and fumes in the cabin and flight deck, as well as causing interruption to in-service air conditioning” to “PCU controls that do not react to a single CAC in persistent CAC surge conditions leading to CAC inlet overheating, if not corrected, could result in structural degradation of the CAC inlet, and fumes in the cabin and flight deck, as well as causing interruption to in-service air conditioning.” Boeing stated that the purpose of the redistribution of CAC airflow is to minimize surge occurrence and does not relate to the overall prevention of CAC inlet overheat.

We agree that the changes requested by Boeing are accurate. However, since the text of the NPRM that Boeing referenced is not restated in this final rule, no change to the final rule is necessary.

Request for Credit for Previous Actions Accomplished

Boeing and Etihad Airways requested that we include Boeing Service Bulletin B787-81205-SB210077-00, Issue 001, dated April 19, 2016, as a method of compliance in the proposed AD. Boeing also requested that we include Boeing Service Bulletin B787-81205-SB210075-00, Issue 001, dated February 24, 2016. Boeing requested that the service information be added to paragraph (h) of the proposed AD as credit for previous actions. Boeing stated that not all service information revisions were included in paragraph (h) of the proposed AD, yet they all warrant credit for addressing the AD. Etihad Airways noted that incorporation of all revisions of Boeing Service Bulletin B787-81205-SB210075-00 comply with the proposed AD requirements.

We agree. We have reviewed Boeing Service Bulletin B787-81205-SB210075-00, Issue 001, dated February 24, 2016; and Boeing Service Bulletin B787-81205-SB210077-00, Issue 001, dated April 19, 2016; and the changes made to later revisions are clarifications. We have determined that airplanes on which the actions specified in the earlier revisions were done would be compliant with this AD.

In paragraph (h)(1) of this AD, we added Boeing Service Bulletin B787-81205-SB210075-00, Issue 001, dated February 24, 2016, to provide credit and redesignated subsequent paragraphs accordingly. We also added paragraph (h)(3) of this AD to add Boeing Service Bulletin B787-81205-SB210077-00, Issue 001, dated April 19, 2016.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this final rule 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 addressing 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 final rule.

Related Service Information Under 1 CFR Part 51

We reviewed Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017; and Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017. The service information describes procedures for installing new PCU software for the CACTCS and new CAC outlet pressure sensor J-tube hardware, and doing related investigative and corrective actions. These documents are distinct since they apply to different airplane models.

We reviewed Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017. The service information describes procedures for installing new PCU software for the CACTCS to recover the CAC from surges by reconfiguration flow schedules.

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 62 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
Software Installation	1 work-hour × \$85 per hour = \$85	\$0	\$85	\$5,270
Modify Left and Right Inboard and Outboard CAC Modules	20 work-hours × \$85 per hour = \$1,700	22,821	24,521	1,520,302

We have received no definitive data that would enable us to provide cost estimates for the on-condition actions specified in this AD.

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.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to transport category airplanes and associated appliances to the Director of the System Oversight Division.

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):



2018-12-06 The Boeing Company: Amendment 39-19310; Docket No. FAA-2017-0904; Product Identifier 2017-NM-071-AD.

(a) Effective Date

This AD is effective July 16, 2018.

(b) Affected ADs

None.

(c) Applicability

This AD applies to The Boeing Company Model 787-8 and 787-9 airplanes, certificated in any category, as identified in the applicable service information specified in paragraphs (c)(1) and (c)(2) of this AD.

(1) Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017 (for Model 787-8 airplanes);

(2) Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017 (for Model 787-9 airplanes).

(d) Subject

Air Transport Association (ATA) of America Code 21, Air conditioning.

(e) Unsafe Condition

This AD was prompted by a report of an in-service reliability issue involving a latent flow sensor failure combined with single cabin air compressor (CAC) operation. This condition resulted in reduced airflow which led to a persistent single CAC surge condition that caused overheat damage to the CAC inlet. We are issuing this AD to prevent CAC inlet overheating leading to structural degradation of the CAC inlet, fumes in the cabin and flight deck, and interruption to in-service air conditioning.

(f) Compliance

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

(g) Software and Hardware Installation

Within 36 months after the effective date of this AD: Install new pack control unit (PCU) software for the cabin air conditioning and temperature control system (CACTCS) and new CAC outlet pressure sensor J-tube hardware, and do all applicable related investigative and corrective actions; in accordance with the Accomplishment Instructions of the applicable service information

specified in paragraph (g)(1) or (g)(2) of this AD. Related investigative and corrective actions must be done before further flight.

(1) Boeing Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017 (for Boeing Model 787-8 airplanes); or Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017 (for Boeing Model 787-9 airplanes).

(2) Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017 (for all airplanes); and Work Packages 2 and 3 of the applicable service information identified in paragraph (g)(1) of this AD.

(h) Credit for Previous Actions

This paragraph provides credit for the actions specified in paragraph (g) of this AD, if those actions were performed before the effective date of this AD using the applicable service information specified in paragraphs (h)(1) through (h)(5) of this AD.

(1) Boeing Service Bulletin B787-81205-SB210075-00, Issue 001, dated February 24, 2016 (for Model 787-8 airplanes);

(2) Boeing Service Bulletin B787-81205-SB210075-00, Issue 002, dated May 11, 2016 (for Model 787-8 airplanes);

(3) Boeing Service Bulletin B787-81205-SB210077-00, Issue 001, dated April 19, 2016 (for Model 787-9 airplanes);

(4) Boeing Service Bulletin B787-81205-SB210077-00, Issue 002, dated May 11, 2016 (for Model 787-9 airplanes);

(5) Boeing Service Bulletin B787-81205-SB210077-00, Issue 003, dated October 20, 2016 (for Model 787-9 airplanes).

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, 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 certification office, send it to the attention of the person identified in paragraph (j) 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) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration 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 Branch, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(j) Related Information

For more information about this AD, contact Allison Buss, Aerospace Engineer, Cabin Safety and Environmental Systems Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3564; email: allison.buss@faa.gov.

(k) 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 Service Bulletin B787-81205-SB210075-00, Issue 003, dated March 29, 2017;

(ii) Boeing Service Bulletin B787-81205-SB210077-00, Issue 004, dated September 22, 2017;

(iii) Boeing Service Bulletin B787-81205-SB210083-00, Issue 001, dated February 9, 2017.

(3) For The Boeing Company service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; internet <https://www.myboeingfleet.com>.

(4) You may view this service information at the FAA, Transport Standards Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

(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 Des Moines, Washington, on May 31, 2018.

Michael Kaszycki,
Acting Director, System Oversight Division,
Aircraft Certification Service.