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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2016-9520; Product Identifier 2016-NM-163-AD; Amendment 39-18987; AD 2017-16-10]**

**RIN 2120-AA64**

#### **Airworthiness Directives; The Boeing Company Airplanes**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

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**SUMMARY:** We are adopting a new airworthiness directive (AD) for all The Boeing Company Model 777 airplanes. This AD was prompted by reports of cracks on the underwing longerons. This AD requires repetitive inspections of the left and right side underwing longerons for any crack, and 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 September 25, 2017.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of September 25, 2017.

**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, 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-2016-9520.

#### **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-2016-9520; 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 final rule, 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:** Eric Lin, Aerospace Engineer, Airframe Section, FAA, Seattle ACO Branch, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6412; fax: 425-917-6590; email: eric.lin@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 all The Boeing Company Model 777 airplanes. The NPRM published in the Federal Register on January 3, 2017 (82 FR 54) (“the NPRM”). The NPRM was prompted by reports of cracks on the underwing longerons. The NPRM proposed to require repetitive inspections of the left and right side underwing longerons for any crack, and related investigative and corrective actions if necessary. We are issuing this AD to detect and correct cracks in the underwing longerons, which could result in fuel leakage into the forward cargo area and consequent increased risk of a fire or, in a more severe case, could adversely affect the structural integrity of the airplane.

### **New Service Information**

Since we issued the NPRM, Boeing has released Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017. In the NPRM, we refer to Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016, as the appropriate source of service information. Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017, corrects typographical errors, including errors in steps 3.c.(1) and 3.c.(2) of Part 1 of the Accomplishment Instructions, and provides additional access and inspection procedures. Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017, also adds a surface high frequency eddy current (HFEC) inspection of the external surface of the fuselage skin for any crack, to the inspection of the fuselage skin that is part of the underwing longeron replacement procedure specified in Part 8 and Part 9 of the Accomplishment Instructions. No additional work is necessary on airplanes on which the inspection of the fuselage skin was already done as specified in Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016. We have determined that Revision 1 is also an appropriate source of service information and have revised this AD accordingly.

### **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.

### **Support for the NPRM**

Boeing expressed support for the NPRM.

### **Request To Delay AD Action**

Air France requested that we delay our AD action. The commenter pointed out that the manufacturer has not determined the root cause of underwing longeron failure and that because longeron cracking is a design defect, a design correction should only be implemented once during the life of the airplane. The commenter also pointed out that the service information would require multiple repairs that could be considered design corrections. The commenter stated that repetitive

inspections should not be mandated until a final fix (design improvement) is available and that Air France believes that the safety concern (as stated in the service information) of fuel leaking into the forward cargo area could be addressed by A-Check level inspections. The commenter also indicated that they believe the structural integrity safety concern (as stated in the service information) could be addressed by existing inspections, specified in the Maintenance Planning Document (MPD), that are able to detect cracked longerons and surrounding related damages and are already continuously performed on the fleet.

We disagree with the commenter's request to delay this AD. The existing MPD inspections have been reviewed and do not adequately address the unsafe condition identified in this AD. Additionally, the determinations of the unsafe conditions, mitigating action, and compliance times of this AD have been coordinated with the manufacturer, and we have determined that the actions specified in this AD are required to address the unsafe condition. We have not changed this AD in this regard.

### **Request To Extend Initial Compliance Time and Repeat Intervals**

Air France requested that we increase the compliance time for the initial inspection and include independent compliance times for the left and right underwing longeron inspections. United Airlines (UAL), Air France, All Nippon Airways (ANA), and Cathay Pacific Airways (CPA) also requested that we extend the intervals for the repetitive inspections to coincide with either A or C-Check level inspections. Additionally, ANA expressed concern that if cracking is found during the repetitive inspections then the consequent repairs could inadvertently extend the amount of time that the airplane is on the ground. UAL and CPA also noted the proposed compliance time would result in operational disruptions if not aligned with a C-check. Air France stated there are already inspections contained in the MPD and that the initial inspection compliance time should take into account when cracking was found. Air France also stated that there is no safety issue when there is a cracked underwing longeron and there is no fuel leak into the forward cargo area or a structural integrity issue.

We disagree with the commenters' requests. As stated previously, the existing MPD inspections have been reviewed and do not provide an acceptable level of safety for the affected airplanes for the identified unsafe condition. We have determined that the compliance times specified in this AD are necessary to address the identified unsafe conditions. However, we will consider requests for approval of alternative methods of compliance (AMOC), including extensions of the compliance times, if sufficient data is submitted to substantiate that a different compliance time will provide an acceptable level of safety. We have not changed this AD in this regard.

### **Request To Exclude Certain Airplanes From the Applicability**

ANA requested that we exclude Boeing Model 777-200 airplanes that do not have a center fuel tank from the applicability of the proposed AD. ANA pointed out that since the Boeing Model 777-200 airplanes do not have a center fuel tank, a fuel leak from the center fuel tank and subsequent possible fire cannot occur.

We disagree with the request to exclude Boeing Model 777-200 airplanes from the applicability of this AD. The possibility of a fuel leak into the forward cargo area and subsequent possible fire is not the only safety concern. Severe cases of uncorrected longeron cracking could adversely affect the structural integrity of the airplane. As stated previously, the determinations of the unsafe conditions, mitigating action, and compliance times in this AD have been coordinated with the manufacturer. We have not changed this AD in this regard.

### **Request To Include Alternative Modified Repetitive Inspection Program**

ANA requested that we include an alternative modified repetitive inspection program in the NPRM. ANA specifically requested that the alternative modified repetitive inspection program match

with their C-check level inspection program for the non-destructive inspection and for the detailed inspection at the “line maintenance” interval within times since certain inspections. ANA pointed out that the manufacturer has agreed that the requested alternative inspection program meets the inspection specifications in Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016.

We disagree with the request to include an alternative modified repetitive inspection program in this AD. The commenter did not provide technical justification for such a change. We have determined that the compliance times specified in this AD are necessary to address the identified unsafe conditions. However, we will consider requests for approval of AMOCs, including extensions of the compliance times, if sufficient data is submitted to substantiate that a different compliance time will provide an acceptable level of safety. Additionally, operators may do the required inspections earlier than the compliance times required by the AD. For the inspection options specified in the Boeing Alert Service Bulletin 777-53A0081, an operator can change an inspection method at their discretion to meet operational needs, and the previous inspection determines the interval to the next inspection. We have not changed this AD in this regard.

### **Request To Mandate Repair and Future Modification (for Terminating Action) as Identical Procedures**

Emirates requested that we mandate repair and future modification (for terminating action) as identical procedures to avoid incurring duplicate expenses. Emirates mentioned that the repair work is extensive (required resources, materials, and ground time) and the repair kit is expensive. Emirates pointed out that the manufacturer is expected to issue a modification service bulletin to terminate the inspection specified in Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016, and that the FAA is expected to mandate the terminating modification. The commenter also pointed out that the modification is expected to be extensive and require a modification kit that is also expensive, and concluded that the requirement of multiple kits for the repair and future planned modification would cause operators to incur duplicate expenses.

We disagree with the request because there is currently no modification kit available even though it might be possible to mitigate the unsafe condition through a modification to the underwing longeron. The inspections and repairs required by this AD are necessary to provide an acceptable level of safety for the affected airplanes. However, as stated previously, we will consider requests for AMOCs, including those that allow for revised service information, repairs, or terminating actions, if sufficient data is submitted to substantiate that different service information, repairs, or terminating actions will provide an acceptable level of safety. We have not changed this AD in this regard.

### **Request To Specify Alternate Special Tools**

ANA requested that we specifically include certain alternate special tools in the NPRM to measure the thickness of the fuel barrier sealants. The commenter indicated that they do not have the special tools that are specified in the airplane maintenance manual (AMM) (which is specified as an accepted procedure to repair the secondary fuel barrier in Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016).

We disagree that alternate special tools should be specified in this AD because this AD does not mandate using a specific tool. This AD requires operators to perform inspections and repairs in accordance with Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; or Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017. Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; and Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017, refer to a specific procedure in the AMM as an accepted procedure to repair the secondary fuel barrier. However, we do not mandate the AMM procedure in this AD; therefore, operators may repair the secondary fuel barrier using accepted methods in accordance with their maintenance or inspection program. We have not changed this AD in this regard.

## Request To Allow Simultaneous Replacement

ANA requested that we allow simultaneous replacement of the longerons rather than completing one side before beginning work on the opposite side. ANA indicated that they prefer to start work on the opposite side when 50% final fastener installation has been completed on the initial longeron replacement. ANA also pointed out that the manufacturer has agreed that this method is structurally acceptable.

We disagree that simultaneous replacement of the longerons should be included in this AD. Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; and Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017; specify that only one underwing longeron is to be removed and replaced at a time. However, as stated previously, we will consider requests for AMOCs if sufficient data is submitted to substantiate that a different method of completion will provide an acceptable level of safety. We have not changed this AD in this regard.

## 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 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 final rule.

## Related Service Information Under 1 CFR Part 51

We reviewed Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; and Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017. This service information describes procedures for repetitive detailed inspections, ultrasonic inspections, and HFEC inspections of the left and right side longerons, and related investigative and corrective actions if necessary. Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017, also includes an additional surface HFEC inspection of the external surface of the fuselage skin.

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 201 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
Option 1: Detailed Inspection	4 work-hours × \$85 per hour = \$340 per inspection cycle	\$0	\$340 per inspection cycle	\$68,340 per inspection cycle.

Option 2: Detailed and HFEC or Ultrasonic Inspection	12 work-hours × \$85 per hour = \$1,020 per inspection cycle	\$0	\$1,020 per inspection cycle	\$205,020 per inspection cycle.
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We estimate the following costs to do any necessary replacements that are 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
Left side or right side longeron replacement	102 work-hours × \$85 per hour = \$8,670 per side	\$31,000 per side	\$39,670 per side.

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

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.

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 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):

**SUPERSEDED**



**2017-16-10 The Boeing Company:** Amendment 39-18987; Docket No. FAA-2016-9520; Product Identifier 2016-NM-163-AD.

**(a) Effective Date**

This AD is effective September 25, 2017.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all The Boeing Company Model 777-200, -200LR, -300, -300ER, and 777F series airplanes, certificated in any category.

**(d) Subject**

Air Transport Association (ATA) of America Code 53, Fuselage and 57, Wings.

**(e) Unsafe Condition**

This AD was prompted by reports of cracks on the underwing longerons. We are issuing this AD to detect and correct cracks in the underwing longerons, which could result in fuel leakage into the forward cargo area and consequent increased risk of a fire or, in a more severe case, could adversely affect the structural integrity of the airplane.

**(f) Compliance**

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

**(g) Inspections**

Except as specified in paragraph (i)(1) of this AD, at the applicable times specified in tables 1 through 6 of paragraph 1.E., "Compliance," of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016: Do detailed inspections for any crack of the left and right side underwing longerons; or do detailed inspections, and high frequency eddy current (HFEC) or ultrasonic inspections, as applicable, for any crack of the left and right side underwing longerons; and do all applicable related investigative and corrective actions; in accordance with the Accomplishment Instructions of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016, or Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017, except as required by paragraph (i)(2) of this AD. Do all applicable related investigative and corrective actions before further flight. Repeat the inspections thereafter at the times specified in tables 1 through 6 of paragraph 1.E., "Compliance," of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016, as



applicable. Replacing an underwing longeron, including doing all applicable related investigative and corrective actions, in accordance with the Accomplishment Instructions of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; or Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017; except as required by paragraph (i)(2) of this AD, terminates the repetitive inspections required by this paragraph for that longeron only.

#### **(h) Repetitive Post-Replacement Inspections and Corrective Actions**

For airplanes on which any longeron replacement has been done as specified in Boeing Alert Service Bulletin 777-53A0081: At the applicable times specified in tables 7 through 14 of paragraph 1.E., "Compliance," of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016, do detailed inspections of all replaced longerons for any crack, or do detailed inspections and ultrasonic inspections of all replaced longerons for any crack, and do all applicable corrective actions; in accordance with the Accomplishment Instructions of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; or Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017; except as required by paragraph (i)(2) of this AD. Do all applicable corrective actions before further flight. Repeat the inspections thereafter at intervals not to exceed the applicable time specified in tables 7 through 14 of paragraph 1.E., "Compliance," of Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016.

#### **(i) Service Information Exceptions**

(1) Where Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016, specifies a compliance time "after the issue date of this service bulletin," this AD requires compliance within the specified compliance time after the effective date of this AD.

(2) Where Boeing Alert Service Bulletin 777-53A0081, dated September 8, 2016; or Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017; specifies to contact Boeing for appropriate action: Before further flight, repair using a method approved in accordance with the procedures specified in paragraph (j) of this AD.

#### **(j) 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 (k) 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.

(4) Except as required by paragraph (i)(2) of this AD: For service information that contains steps that are labeled as Required for Compliance (RC), the provisions of paragraphs (j)(4)(i) and (j)(4)(ii) of this AD 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.

### **(k) Related Information**

For more information about this AD, contact Eric Lin, Aerospace Engineer, Airframe Section, FAA, Seattle ACO Branch, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6412; fax: 425-917-6590; email: eric.lin@faa.gov.

### **(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 777-53A0081, dated September 8, 2016.

(ii) Boeing Alert Service Bulletin 777-53A0081, Revision 1, dated May 1, 2017.

(3) For Boeing 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, 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 August 2, 2017.

Jeffrey E. Duven,  
Director, System Oversight Division,  
Aircraft Certification Service.