



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2014-0283; Directorate Identifier 2012-NM-183-AD]**

**RIN 2120-AA64**

**Airworthiness Directives; The Boeing Company Airplanes**

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

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** We propose to supersede Airworthiness Directive (AD) 2010-03-05, which applies to all The Boeing Company Model 747-200C and -200F series airplanes. AD 2010-03-05 currently requires, for section 41 upper deck floor beam upper chords, an inspection for cracks of certain fastener holes, and corrective action if necessary; and repetitive replacements of the upper chords, straps (or angles), and radius fillers of certain upper deck floor beams and, for any replacement that is done, inspections for cracks, and corrective actions if necessary. Since we issued AD 2010-03-05, we have determined that the upper deck floor beams are subject to widespread fatigue damage (WFD), the existing inspection program is not sufficient to maintain an acceptable level of safety, and section 42 upper deck floor beam upper chords are subject to the unsafe condition. This proposed AD would add post-replacement inspections for section 41 and reduce certain compliance times. This proposed AD would also require repetitive inspections of section 42 upper deck floor beam upper chords, repetitive replacements of the upper chords, post-replacement inspections, and corrective action if necessary. We are proposing this AD to detect and correct cracking of the upper chords and straps (or angles) of the floor beams, which could lead to failure of the floor beams and consequent

loss of controllability, rapid decompression, and loss of structural integrity of the airplane.

**DATES:** We must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; 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.

#### **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-2014-0283; 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 proposed AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Office

(phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Roger Caldwell, Aerospace Engineer, Technical Operations Center, ANM-100D, FAA, Denver Aircraft Certification Office (ACO), 26805 East 68th Avenue, Room 214, Denver, CO 80249; phone: 303-342-1086; fax: 303-342-1088; email: [roger.caldwell@faa.gov](mailto:roger.caldwell@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Comments Invited**

We invite you to send any written relevant data, views, or arguments about this proposed AD. Send your comments to an address listed under the ADDRESSES section. Include “Docket No. FAA-2014-0283; Directorate Identifier 2012-NM-183-AD” at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed AD because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.

**Discussion**

Structural fatigue damage is progressive. It begins as minute cracks, and those cracks grow under the action of repeated stresses. This can happen because of normal operational conditions and design attributes, or because of isolated situations or incidents such as material defects, poor fabrication quality, or corrosion pits, dings, or scratches. Fatigue damage can occur locally, in small areas or structural design details, or globally. Global fatigue damage is general degradation of large areas of structure with similar

structural details and stress levels. Multiple-site damage is global damage that occurs in a large structural element such as a single rivet line of a lap splice joining two large skin panels. Global damage can also occur in multiple elements such as adjacent frames or stringers. Multiple-site-damage and multiple-element-damage cracks are typically too small initially to be reliably detected with normal inspection methods. Without intervention, these cracks will grow, and eventually compromise the structural integrity of the airplane, in a condition known as WFD. As an airplane ages, WFD will likely occur, and will certainly occur if the airplane is operated long enough without any intervention.

The FAA's WFD final rule (75 FR 69746, November 15, 2010) became effective on January 14, 2011. The WFD rule requires certain actions to prevent structural failure due to WFD throughout the operational life of certain existing transport category airplanes and all of these airplanes that will be certificated in the future. For existing and future airplanes subject to the WFD rule, the rule requires that design approval holders (DAHs) establish a limit of validity (LOV) of the engineering data that support the structural maintenance program. Operators affected by the WFD rule may not fly an airplane beyond its LOV, unless an extended LOV is approved.

The WFD rule (75 FR 69746, November 15, 2010) does not require identifying and developing maintenance actions if the DAHs can show that such actions are not necessary to prevent WFD before the airplane reaches the LOV. Many LOVs, however, do depend on accomplishment of future maintenance actions. As stated in the WFD rule, any maintenance actions necessary to reach the LOV will be mandated by airworthiness directives through separate rulemaking actions.

In the context of WFD, this action is necessary to enable DAHs to propose LOVs that allow operators the longest operational lives for their airplanes, and still ensure that WFD will not occur. This approach allows for an implementation strategy that provides

flexibility to DAHs in determining the timing of service information development (with FAA approval), while providing operators with certainty regarding the LOV applicable to their airplanes.

On January 21, 2010, we issued AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010), for all The Boeing Company Model 747-200C and -200F series airplanes. AD 2010-03-05 requires a high frequency eddy current (HFEC) inspection for cracks of certain fastener holes, and corrective action if necessary. AD 2010-03-05 also requires repetitive replacements of the upper chords, straps (or angles), and radius fillers of certain upper deck floor beams and, for any replacement that is done, detailed and open-hole HFEC inspections for cracks of the modified upper deck floor beams, and corrective actions if necessary. AD 2010-03-05 resulted from a report from the manufacturer that the accomplishment of certain existing inspections, repairs, and modifications is not adequate to ensure the structural integrity of the affected upper chords of the upper deck floor beams made of 7075 series aluminum alloy on airplanes that have exceeded certain thresholds. We issued AD 2010-03-05 to prevent cracking of the upper chords and straps (or angles) of the floor beams, which could lead to failure of the floor beams and consequent loss of controllability, rapid decompression, and loss of structural integrity of the airplane.

**Actions Since AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010), Was Issued**

Since we issued AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010), we have determined that replacement of the upper chord of the upper deck floor beam is necessary at body stations aft of station 520. Upper chords of the upper deck floor beam aft of STA 520 (540 through 740) are made from 2024 aluminum, and these upper chords aft of STA 520 have been determined to be a structure that is also susceptible to WFD. Ongoing inspection of this structure is not sufficient to maintain an acceptable level of safety, and therefore replacement of the structure is necessary. The

modifications and inspections of the upper deck floor beams were developed to support the airplane's LOV of the engineering data that support the established structural maintenance program. It has also been determined that section 42 of the airplane is subject to the unsafe condition.

#### **Relevant Service Information**

We reviewed Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012. For information on the procedures and compliance times, see this service information at <http://www.regulations.gov> by searching for Docket No. FAA-2014-0283.

#### **FAA's Determination**

We are proposing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

#### **Proposed AD Requirements**

Although this proposed AD does not explicitly restate the requirements of AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010), this proposed AD would retain all of the requirements of AD 2010-03-05. Those retained requirements are referenced in the service information identified previously, which, in turn, is referenced in paragraphs (g) and (h) of this proposed AD. This proposed AD would require, for section 41 upper deck floor beam upper chords, an HFEC inspection for cracks of certain fastener holes, and corrective action if necessary; and repetitive replacements of the upper chords, straps (or angles), and radius fillers of certain upper deck floor beams and, for any replacement that is done, detailed and open-hole HFEC inspections for cracks of the modified upper deck floor beams, and corrective actions if necessary.

This proposed AD would add post-replacement inspections for section 41 upper deck floor beam upper chords and reduce certain compliance times. This proposed AD also would require repetitive inspections of section 42 upper deck floor beam upper chords, repetitive replacements of the upper chords, post-replacement inspections, and corrective action if necessary.

### **Differences Between this Proposed AD and the Service Information**

The service bulletin specifies to contact the manufacturer for instructions on how to repair certain conditions, but this proposed AD would require repairing those conditions in one of the following ways:

- In accordance with a method that we approve; or
- Using data that meet the certification basis of the airplane, and that have been approved by the Boeing Commercial Airplanes Organization Designation Authorization (ODA) whom we have authorized to make those findings.

### **Explanation of Compliance Time**

The compliance time for the replacement specified in this proposed AD for addressing WFD was established to ensure that discrepant structure is replaced before WFD develops in airplanes. Standard inspection techniques cannot be relied on to detect WFD before it becomes a hazard to flight. We will not grant any extensions of the compliance time to complete any AD-mandated service information related to WFD without extensive new data that would substantiate and clearly warrant such an extension.

### **Costs of Compliance**

We estimate that this proposed AD affects 25 airplanes of U.S. registry.

We estimate the following costs to comply with this proposed AD:

**Estimated costs**

<b>Action</b>	<b>Labor cost</b>	<b>Parts cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Retained inspection and replacement (AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010))	663 work-hours X \$85 per hour = \$56,355	\$0	\$56,355 per inspection/replacement cycle	\$1,408,875 per inspection/replacement cycle
New post-replacement inspections – section 41	Up to 525 work-hours X \$85 per hour = \$44,625 <sup>1</sup>	Manufacturer has not provided cost of parts	\$44,625	Up to \$1,115,625
New inspections, replacement, and post-replacement inspections - section 42	Up to 525 work-hours X \$85 per hour = \$44,625 <sup>1</sup>	Manufacturer has not provided cost of parts	\$44,625	Up to \$1,115,625

<sup>1</sup>Includes time to manufacture parts.

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

### **Regulatory Findings**

We have determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would 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 the proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under the 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.

### **The Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 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. Amend § 39.13 by removing Airworthiness Directive (AD) 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010), and adding the following new AD:

**The Boeing Company:** Docket No. FAA-2014-0283; Directorate Identifier 2012-NM-183-AD.

**(a) Comments Due Date**

The FAA must receive comments on this AD action by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**(b) Affected ADs**

This AD supersedes AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010).

**(c) Applicability**

This AD applies to all The Boeing Company Model 747-200C and -200F series airplanes, certificated in any category.

**(d) Subject**

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

**(e) Unsafe Condition**

This AD was prompted by an evaluation done by the design approval holder (DAH) indicating that the upper deck floor beams are not adequate to ensure structural integrity and are subject to widespread fatigue damage (WFD). Inspections and modifications were developed to support the airplane's limit of validity (LOV) of the engineering data that support the established structural maintenance program. We are issuing this AD to detect and correct cracking of the upper chords and straps (or angles) of the floor beams, which could lead to failure of the floor beams and consequent loss of controllability, rapid decompression, and loss of structural integrity of the airplane.

**(f) Compliance**

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

**(g) Inspection and Replacement for Section 41 Upper Deck Floor Beam Upper Chords**

At the applicable time specified in Table 1 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012: At stations (STA) 340 through STA 440, STA 500, and STA 520, do an open-hole HFEC inspection at all accessed fastener holes to detect cracking; and install new upper deck floor beam upper chords, straps, angles, and radius fillers, in accordance with Part 2 and Part 3 of the Accomplishment Instructions of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

**(h) Post-replacement Inspections and Replacements for Section 41 Upper Deck Floor Beam Upper Chords**

At the applicable time specified in Table 2 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012; or within 1,500 flight cycles after March 11, 2010 (the effective date of AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010)); whichever occurs later: Do detailed and HFEC inspections to detect cracking of the replaced upper deck floor beam chords, the floor panel attachment holes, and the permanent fastener locations of the replaced upper deck floor beam chords, in accordance with Part 4 of the Accomplishment Instructions of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012. If no crack is found, do the actions specified in paragraphs (h)(1) and (h)(2) of this AD.

(1) Do the detailed and HFEC inspections of the replaced upper deck floor beam chords within 3,000 flight cycles after the most recent inspection, or within 300 flight cycles after the effective date of this AD, whichever occurs later, and repeat thereafter at

the applicable time specified in Table 2 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

(2) Do the open-hole HFEC inspection and chord replacement required by paragraph (g) of this AD at the applicable time specified in Table 2 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012, or within 240 flight cycles after the effective date of this AD, whichever occurs later. Repeat the inspections and replacement specified in paragraph (h) of this AD at the applicable time specified in Table 2 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

**(i) Inspection and Replacement for Section 42 Upper Deck Floor Beam Upper Chords**

At the applicable time specified in Tables 3 and 4 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012, except as required by paragraph (l) of this AD: Do the actions specified in paragraph (i)(1) or (i)(2) of this AD as applicable.

(1) At STA 540 through STA 740 for Group 1 airplanes identified in Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012: Do an open-hole HFEC inspection to detect cracking, and install new upper deck floor beam upper chord replacements, in accordance with Part 7 and Part 8 of the Accomplishment Instructions of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

(2) At STA 540 through STA 780 for Group 2 airplanes identified in Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012: Do an open-hole HFEC inspection to detect cracking, and install new upper deck floor beam upper chord replacements, in accordance with Part 7 and Part 8 of the Accomplishment Instructions of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

**(j) Post-Replacement Inspections and Replacement for Section 42 Upper Deck Floor Beam Upper Chords**

At the applicable time specified in Table 5 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012; or within 1,500 flight cycles after March 11, 2010 (the effective date of AD 2010-03-05, Amendment 39-16188 (75 FR 5692, February 4, 2010)); whichever occurs later: Do HFEC inspections to detect cracking of the replaced upper deck floor beam chords, in accordance with Part 9 of the Accomplishment Instructions of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012. If no crack is found, do the actions specified in paragraphs (j)(1) and (j)(2) of this AD.

(1) Repeat the HFEC inspections of the replaced upper deck floor beam chords thereafter at the applicable time specified Table 5 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

(2) Do the open-hole HFEC inspection and chord replacement required by paragraph (i) of this AD at the applicable time specified in Table 5 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012. Repeat the inspections and replacement, as specified in paragraph (j) of this AD, at the applicable time specified in Table 5 of paragraph 1.E., “Compliance,” of Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012.

**(k) Corrective Actions**

If any cracking is found during any inspection required by this AD, before further flight, repair using a method approved in accordance with the procedures specified in paragraph (o) of this AD.

**(l) Exception to Service Information Specifications**

Where Boeing Alert Service Bulletin 747-53A2696, Revision 1, dated April 12, 2012, specifies a compliance time “after the revision 1 date on this service bulletin,” this AD requires compliance within the specified compliance time “after the effective date of this AD.”

**(m) Credit for Previous Actions**

This paragraph provides credit for the installation of floor beam replacements required by this AD, if those actions were performed before the effective date of this AD using Boeing Alert Service Bulletin 747-53A2696, dated October 16, 2008.

**(n) Special Flight Permit**

Special flight permits, as described in Section 21.197 and Section 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199), are not allowed.

**(o) 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 persons identified in paragraphs (o)(1) and (o)(2) of this AD. Information may be emailed to:

[9-ANM-Seattle-ACO-AMOC-Requests@faa.gov](mailto: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 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.

**(p) Related Information**

(1) For more information about this AD, contact Roger Caldwell, Aerospace Engineer, Technical Operations Center, ANM-100D, FAA, Denver Aircraft Certification Office, 26805 East 68th Avenue, Room 214, Denver, CO 80249; phone: 303-342-1086; fax: 303-342-1088; email: [roger.caldwell@faa.gov](mailto:roger.caldwell@faa.gov).

(2) For information about AMOCs, contact Bill Ashforth, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6432; fax: 425-917-6590; email: [bill.ashforth@faa.gov](mailto:bill.ashforth@faa.gov).

(3) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; 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.

Issued in Renton, Washington, on May 15, 2014.

Michael Kaszycki,  
Acting Manager,  
Transport Airplane Directorate,  
Aircraft Certification Service.