

EMERGENCY AIRWORTHINESS DIRECTIVE



Aircraft Certification Service
Washington, DC

U.S. Department
of Transportation
**Federal Aviation
Administration**

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ISSUE DATE: February 17, 2005

AD 2005-04-51; Docket No. FAA-2005-20431; Directorate Identifier 2005-NM-040-AD

Emergency airworthiness directive (AD) 2005-04-51 is sent to all owners and operators of certain Boeing Model 747-100B SUD, -200C, -200F, and -300 series airplanes; and certain Boeing Model 747-200B series airplanes retrofitted with a stretched upper deck (SUD).

Background

On May 7, 1991, we issued AD 91-11-01, amendment 39-6887 (56 FR 22306, May 15, 1991), for certain Boeing Model 747 series airplanes. That AD requires repetitive inspections for cracks of the frame structure and skin in the fuselage section 41, and repair if necessary. That AD also provides for an optional terminating action for the repetitive inspections. That AD was prompted by recommendations of the FAA-sponsored Boeing Model 747 Structures Working Group. We issued that AD to prevent sudden decompression of the fuselage.

Since the issuance of AD 91-11-01, we have received several reports of large fatigue cracks common to fuselage frames in the upper deck area on Boeing Model 747-200C, -200F, and -300 series airplanes. Most of these airplane had been inspected in accordance with AD 91-11-01. Many fatigue cracks occurred near stringers S-10 and S-10A, but other cracks were also reported. The cracking is due to cyclic pressurization of the airplanes.

We also have received two recent reports of severed or nearly severed adjacent frames at body station (BS) 420 and BS 440 near stringer S-10A on Boeing Model 747-300 series airplanes. Both airplanes had been inspected in accordance with AD 91-11-01. In both reports, missing fasteners common to the skin at frame shear tie flanges were detected in the vicinity of cracks. In one case, eight fasteners were missing from the body skin at the severed frame at BS 440. One airplane had accumulated 11,641 total flight cycles; the other airplane had accumulated 11,880 total flight cycles.

In light of these reports, we have determined that, for certain Boeing Model 747-100B SUD, -200C, -200F, and -300 series airplanes; and certain Boeing Model 747-200B series airplanes retrofitted with a SUD; the inspections required by AD 91-11-01 do not adequately detect fatigue cracks at BS 420, 440, and 460 between stringers S-8 and S-12 inclusive. Such fatigue cracking, if not detected and corrected in a timely manner, could lead to severed frames, and consequent rapid decompression and loss of the structural integrity of the airplane.

Other Relevant Rulemaking

On May 16, 1990, we issued AD 90-06-06, amendment 39-6490 (55 FR 8374, March 7, 1990), for certain Boeing Model 747 series airplanes. That AD requires incorporation of certain structural

modifications. We issued that AD to prevent degradation in the structural capabilities of the affected airplanes. One of the required modifications incorporates a modification (reference Boeing Service Bulletin 747-53-2272, Revision 12, dated December 22, 1988) that ends the repetitive inspections of the frames in Zone 2 required by this AD.

Explanation of Relevant Service Information

We have reviewed Boeing Alert Service Bulletin 747-53A2265, Revision 9, dated February 17, 2005. Among other actions, the service bulletin describes procedures for repetitive surface high frequency eddy current (HFEC) inspections for cracks in the frames at BS 420, 440, and 460 between stringers S-8 and S-12 inclusive on the left and right sides of the airplane.

FAA's Determination and Requirements of this AD

We have evaluated all pertinent information and identified an unsafe condition that is likely to exist or develop on other Boeing Model 747-100B SUD, -200C, -200F, and -300 series airplanes; and Boeing Model 747-200B series airplanes retrofitted with a SUD of this same type design. Therefore, we are issuing this AD to detect and correct fatigue cracks in the frames and body skin at BS 420, 440, and 460 between stringers S-8 and S-12 inclusive, which could lead to severed frames, and consequent rapid decompression and loss of the structural integrity of the airplane. This AD requires repetitive external detailed inspections for cracked skin or loose or missing fasteners of the body skin between BS 420 and 460 inclusive and between stringers S-8 and S-12 inclusive on the left and right sides of the airplane. If any cracked skin or loose or missing fastener is detected, this AD also requires a surface HFEC inspection for cracks in the frames at BS 420, 440, and 460 between stringers S-8 and S-12 on the left and right sides of the airplane; repair of any cracked frame or skin; and replacement of any loose or missing fastener with a new fastener; as applicable. Accomplishing the HFEC inspection ends the repetitive external detailed inspections. The HFEC inspections must be done in accordance with the service information described previously.

Interim Action

We consider this AD interim action. We are currently considering superseding this emergency AD and AD 91-11-01 to, among other actions, reduce the initial threshold of the inspections required by AD 91-11-01 for certain airplanes and to add other actions specified in Boeing Alert Service Bulletin 747-53A2265, Revision 9, dated February 17, 2005.

Examining the Docket

You can examine the contents of this AD docket on the Internet at <http://dms.dot.gov> (on the next business day after we have issued the AD), or in person at the Docket Management Facility, U.S. Department of Transportation, 400 Seventh Street SW, room PL-401, on the plaza level of the Nassif Building, Washington, DC. This docket number is FAA-2005-20431; the directorate identifier for this docket is 2005-NM-040-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.

Determination of Rule's Effective Date

This emergency AD is issued under 49 U.S.C. Section 44701 according to the authority delegated to me by the Administrator, and is effective immediately upon receipt.

2005-04-51 BOEING: Docket No. FAA-2005-20431; Directorate Docket No. 2005-NM-040-AD.

Effective Date

(a) Emergency airworthiness directive (AD) 2005-04-51, issued on February 17, 2005, is effective immediately upon receipt.

Affected ADs

(b) None.

Applicability

(c) This AD applies to Boeing Model 747-100B SUD, -200C, -200F, and -300 series airplanes, line numbers 1 through 685 inclusive; and Boeing Model 747-200B series airplanes, line numbers 271, 276, 336, 344, 369, 389, 397, 474, 491, 518, 521, and 539; certificated in any category.

Unsafe Condition

(d) This AD was prompted by reports of large cracks common to fuselage frames in the upper deck area. The Federal Aviation Administration is issuing this AD to detect and correct fatigue cracks in the frames and body skin at body stations (BS) 420, 440, and 460 between stringers S-8 and S-12 inclusive, which could lead to severed frames, and consequent rapid decompression and loss of the structural integrity of the airplane.

Compliance

(e) You are responsible for having the actions required by this AD performed within the compliance times specified, unless the actions have already been done.

Repetitive External Detailed Inspections

(f) Before the accumulation of 8,000 total flight cycles, or within 10 flight cycles after receipt of this AD, whichever occurs later, do an external detailed inspection for cracked skin or loose or missing fasteners of the body skin between BS 420 and 460 inclusive and between stringers S-8 and S-12 inclusive on the left and right sides of the airplane. Repeat the external detailed inspection thereafter at intervals not to exceed 25 flight cycles.

Note 1: For the purposes of this AD, a detailed inspection is: “An intensive examination of a specific item, installation, or assembly to detect damage, failure, or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirror, magnifying lenses, etc., may be necessary. Surface cleaning and elaborate procedures may be required.”

Corrective Actions

(g) If any cracked skin or loose or missing fastener is detected during any external detailed inspection required by paragraph (f) of this AD, before further flight, do a surface HFEC inspection for cracks in the frames at BS 420, 440, and 460 between stringers S-8 and S-12 on the left and right sides of the airplane, in accordance with paragraph 2. and Notes 2 and 3 of Figure 17 of the Accomplishment Instructions of Boeing Alert Service bulletin 747-53A2265, Revision 9, dated February 17, 2005, except as provided by Note 1 of Figure 17 of the service bulletin. Accomplishing the surface HFEC inspection ends the repetitive inspections required by paragraph (f) of this AD.

(1) If no cracked frame is found, before further flight, repair the cracked skin and replace the loose or missing fasteners with new fasteners, as applicable, in accordance with a method approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA; or in accordance with data meeting the certification basis of the airplane approved by an Authorized Representative (AR) for the Boeing Delegation Option Authorization (DOA) Organization who 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 reference this AD.

(2) If any cracked frame is found, before further flight, repair the cracked frame and skin and replace the loose or missing fasteners with new fasteners, as applicable, in accordance with a method approved by the Manager, Seattle ACO, FAA; or in accordance with data meeting the certification basis of the airplane approved by an Authorized Representative for the Boeing DOA Organization who 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 reference this AD.

Terminating Action

(h) Modification in Zone 2 in accordance with Boeing Service Bulletin 747-53-2272, dated January 12, 1987, through Revision 18, dated May 16, 2002, constitutes terminating action for the requirements of this AD.

Note 2: Paragraph H. of AD 91-11-01, amendment 39-6887 refers to Boeing Service Bulletin 747-53-2272, dated January 12, 1987, as the appropriate source of service information for accomplishing the optional terminating action in that AD. AD 90-06-06, amendment 39-6490, refers to Boeing Service Bulletin 747-53-2272, Revision 12, dated December 22, 1988; or earlier revisions;

as an appropriate source of service information for accomplishing the mandatory terminating action in that AD.

Alternative Methods of Compliance (AMOCs)

(i)(1) The Manager, Seattle ACO, FAA, has the authority to approve AMOCs for this AD, if requested in accordance with the procedures found in 14 CFR 39.19.

(2) An AMOC that provides an acceptable level of safety may be used for any repair required by this AD, if it is approved by an Authorized Representative for the Boeing Delegation Option Authorization Organization who 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.

Contact Information

(j) For technical information about this AD, contact: Ivan Li, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle ACO, 1601 Lind Avenue, SW., Renton, Washington 98055-4056; telephone (425) 917-6437; fax (425) 917-6590. For service information identified in this AD, contact Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124-2207.

Issued in Renton, Washington, on February 17, 2005.

Original Signed By:

Ali Bahrami,
Manager,
Transport Airplane Directorate,
Aircraft Certification Service.