

## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

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

**[Docket No. FAA-2008-0414; Directorate Identifier 2007-NM-095-AD; Amendment 39-15714; AD 2008-22-17]**

**RIN 2120-AA64**

**Airworthiness Directives; Boeing Model 747-100, 747-100B, 747-100B SUD, 747-200B, 747-200C, 747-200F, 747-300, 747-400, 747-400D, 747-400F, and 747SR Series Airplanes**

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

**ACTION:** Final rule.

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**SUMMARY:** The FAA is superseding an existing airworthiness directive (AD) that applies to certain Boeing Model 747 series airplanes. That AD currently requires repetitive inspections for cracking and corrosion of all exposed surfaces of the carriage spindles (including the inner bore and aft links) of the trailing edge flaps, and additional inspection and corrective action if necessary. That AD also currently requires repetitive overhaul of the carriage spindle and aft link, which terminates the repetitive inspections. This new AD adds a repetitive inspection to detect broken parts, and revises the overhaul threshold and repetitive intervals. This AD results from analysis that showed additional inspections should be done to prevent the loss of a flap, and that the flight-hour-based interval should be revised to a flight-cycle-based interval, because the greatest loads on the spindles happen during takeoff and landing. We are issuing this AD to detect and correct failed carriage spindles or aft links of the inboard or outboard trailing edge flaps. Such failure could cause the flap to depart the airplane, reducing the flightcrew's ability to maintain the safe flight and landing of the airplane.

**DATES:** This AD becomes effective December 19, 2008.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of December 19, 2008.

**ADDRESSES:** For service information identified in this AD, contact Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124-2207; telephone 206-544-9990; fax 206-766-5682; e-mail DDCS@boeing.com; Internet <http://www.myboeingfleet.com>.

## **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov>; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (telephone 800-647-5527) is the Document 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:** Gary Oltman, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98057-3356; telephone (425) 917-6443; fax (425) 917-6590.

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that supersedes AD 90-17-19, amendment 39-6705 (55 FR 33280, August 15, 1990). The existing AD applies to certain Boeing Model 747 series airplanes. That NPRM was published in the Federal Register on April 28, 2008 (73 FR 22845). That NPRM proposed to retain the requirements of the existing AD but to add a repetitive inspection to detect broken parts, and revise the overhaul threshold and repetitive intervals.

### **Comments**

We provided the public the opportunity to participate in the development of this AD. We have considered the comments that have been received on the NPRM.

### **Support for the NPRM**

Boeing has reviewed the NPRM and concurs with the contents of the proposed rule. Northwest Airlines (NWA) has no technical objection to the AD.

### **Requests To Revise Inspection Threshold**

The Hong Kong Civil Aviation Department, and Air Transport Association (ATA), on behalf of its member NWA, request that we revise the inspection threshold for the inspection for broken parts proposed in paragraph (i) of the NPRM. The commenters point out that the NPRM stated the first inspection should be done at the earlier of 12 months or 400 flight cycles after the effective date of the AD; however, Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008, specifies doing that inspection at the later of those two times.

We agree with the commenters. It was our intent that the compliance threshold should match that of the Boeing Service Bulletin 747-27-2280, Revision 6. We have revised paragraph (i) of the AD as requested.

### **Request To Clarify Compliance Times**

ATA on behalf of NWA, requests that we revise paragraph (j), "Repetitive Overhauls," of the NPRM to clarify the compliance threshold for the initial overhaul for carriage assemblies previously overhauled in accordance with the requirements of AD 90-17-19. NWA requests that we specify that

the compliance threshold is measured from the completion of the overhaul mandated by AD 90-17-19 for carriages/assemblies previously overhauled.

We agree that the compliance times can be clarified, although we do not agree that it is necessary to change the AD in this regard. Paragraph (j) of the NPRM specifies doing the initial overhaul at the later of the applicable thresholds specified in paragraph 1.E., "Compliance," of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008; or 48 months after the effective date of the AD. Paragraph 1.E. of the service bulletin includes notes (a) and (e). Note (a) states, "Compliance Time and Repeat Interval applies to each new or overhauled carriage or aft link from the time it enters service, regardless of whether the part is removed and installed on another airplane." Note (e) states, "The initial overhaul must be accomplished prior to terminating the repetitive overhauls at the compliance times specified in FAA AD 90-17-19." These notes provide the information requested by the commenter. It is the intent of this new AD that if the initial or repetitive overhaul required by AD 90-17-19 is due prior to "48 months after the effective date of this AD," the compliance time for the initial carriage overhaul will not be affected by the new requirements of this AD. However, if the initial or repetitive carriage overhaul required by AD 90-17-19 is due subsequent to "48 months after the effective date of this AD," the required carriage overhauls are governed by the new compliance times of this AD. Specifically, the compliance time for carriages with sleeved journals is to accomplish the initial overhaul within 6000 flight cycles or 8 years, whichever occurs first, since new or since completion of the overhaul mandated by AD 90-17-19; and the compliance time for carriages with chrome-plated forward and aft journals is to accomplish the initial overhaul within 9000 flight cycles or 8 years, whichever occurs first, since new or since completion of the overhaul mandated by AD 90-17-19. We have not changed the AD in this regard.

### **Request To Revise Optional Terminating Action**

Japan Airlines (JAL) requests that we refer to the latest aft links. JAL explains that the latest aft links do not require a repeat overhaul, and points out that the latest aft links are not shown in Boeing Service Bulletin 747-27-2371, dated December 20, 2000 (we referred to this service bulletin in paragraph (k) of the NPRM as the source of service information for the optional terminating action of replacing the existing 4340M aft link with a new corrosion resistant steel (CRES) aft link). JAL states that the latest aft links are shown in paragraph 3.B.5. of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008.

We agree that the newest aft links do not require a repeat overhaul and that a note in paragraph 3.B.5. of Boeing Service Bulletin 747-27-2280, Revision 6, refers to these links. Therefore, we have revised paragraph (k) of this AD to state that replacing the existing 4340M aft link with a new CRES aft link in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-27-2371, dated December 20, 2000, or with an aft link specified in paragraph 3.B.5. of the Accomplishment Instructions of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008, terminates the repetitive inspection requirements of paragraph (f) of this AD and the repetitive overhaul requirements of paragraphs (g) and (j) of this AD for that aft link only.

### **Request To Revise Repetitive Intervals**

All Nippon Airways (ANA) requests that we use the results of a Boeing analysis, using ANA flight data as a basis, to change intervals in the NPRM for Boeing Model 747-400D series airplanes, or provide the intervals as an alternative method of compliance (AMOC). ANA states that it operates five Boeing Model 747-400 series airplanes, for which the maximum takeoff weight (MTOW) is 899,600 pounds, and 11 Boeing Model 747-400D series airplanes for which the MTOW is 599,600 pounds. ANA believes that the loads on the spindles must be smaller for the Model 747-400D series airplanes because of the difference between the takeoff and landing weights. ANA requests that Boeing develop for Model 747-400D series airplanes different repetitive intervals for the flap carriage overhaul and the general visual inspection. ANA makes this request because the repetitive

flap carriage overhaul must be done every two to three C-checks (3 to 4.5 years) and the general visual inspection must be done every 2 months, thus requiring a lot of manpower and costs. ANA provided no analysis to justify this requested increase.

We disagree with the request to change the AD to include revised intervals for Boeing Model 747-400D series airplanes. The intervals for inspection proposed in the NPRM were based on analysis provided by the manufacturer. In the absence of any analysis showing the differences in landing weights for these spindles, there is no evidence that increasing the intervals would provide an acceptable level of safety. However, as ANA noted, under the provisions of paragraph (m) of the AD, we will consider requests for approval of an AMOC if sufficient data are submitted to substantiate that the change to the intervals would provide an acceptable level of safety. We have not changed the AD in this regard.

## **Conclusion**

We reviewed the available data, including the comments received, and determined that air safety and the public interest require adopting the AD with the changes described previously. We determined that these changes will not increase the economic burden on any operator or increase the scope of the AD.

## **Costs of Compliance**

There are about 925 airplanes of the affected design in the worldwide fleet, which includes 160 airplanes of U.S. registry. The following table provides the estimated costs for U.S. operators to comply with this AD. The average labor rate is \$80 per work hour.

**Estimated Costs**

<b>Action</b>	<b>Work hours</b>	<b>Parts</b>	<b>Cost per airplane</b>	<b>Fleet cost</b>
Inspection and overhaul (required by AD 90-17-19)	Between 120 and 140, per flap per cycle	\$0	Between \$9,600 and \$11,200, per flap per overhaul cycle	Between \$1,536,000 and \$1,792,000, per flap per cycle
Repetitive inspection for broken parts (new action)	2, per inspection cycle	\$0	\$160, per inspection cycle	\$25,600, per inspection cycle

## **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 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); and

(3) 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.

We prepared a regulatory evaluation of the estimated costs to comply with this AD and placed it in the AD docket. See the ADDRESSES section for a location to examine the regulatory evaluation.

### **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 Federal Aviation Administration (FAA) amends § 39.13 by removing amendment 39-6705 (55 FR 33280, August 15, 1990) and by adding the following new airworthiness directive (AD):



**2008-22-17 Boeing:** Amendment 39-15714. Docket No. FAA-2008-0414; Directorate Identifier 2007-NM-095-AD.

### **Effective Date**

- (a) This AD becomes effective December 19, 2008.

### **Affected ADs**

- (b) This AD supersedes AD 90-17-19.

### **Applicability**

(c) This AD applies to all Boeing Model 747-100, 747-100B, 747-100B SUD, 747-200B, 747-200C, 747-200F, 747-300, 747-400, 747-400D, 747-400F, and 747SR series airplanes, certificated in any category.

### **Unsafe Condition**

(d) This AD results from analysis that showed that additional inspections should be done to prevent the loss of a flap, and that the flight-hour-based interval should be revised to a flight-cycle-based interval, because the greatest loads on the spindles happen during takeoff and landing. We are issuing this AD to detect and correct failed carriage spindles or aft links of the inboard or outboard trailing edge flaps. Such failure could cause the flap to depart the airplane, reducing the flightcrew's ability to maintain the safe flight and landing 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.

### **Requirements of AD 90-17-19**

### **Repetitive Inspections**

(f) For all airplanes except those airplanes on which the repetitive overhauls required by paragraph B. of AD 90-17-19 are being accomplished as of the effective date of this AD: Prior to the accumulation of 30,000 flight hours or 8 years on each new or previously overhauled flap carriage spindle, whichever occurs first, remove the aft link and thrust collars from the trailing edge flaps' carriage spindles and perform a detailed inspection of all exposed surfaces of the carriage spindles, including inner bore, and aft links to detect cracking and corrosion, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-27-2280, Revision 3, dated November 30, 1989.

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."

(1) If no cracking or corrosion is found, repeat the inspections required by paragraph (f) of this AD at intervals not to exceed 12 months until the carriage spindles are overhauled in accordance with paragraph (g) of this AD.

(2) If a cracked carriage spindle or aft link is found, prior to further flight, replace the part(s) in accordance with the service bulletin.

(3) If corrosion is found on any part of the carriage spindle/aft link assembly, but not on the other assembly on the same flap, perform a repetitive general visual inspection in accordance with the service bulletin at intervals not to exceed 2 months. Overhaul or replace corroded parts in accordance with the service bulletin within 36 months after detection of the corrosion.

(4) If corrosion is found on any part of both carriage spindle/aft link assemblies on the same flap, prior to further flight, overhaul or replace the part(s) in accordance with the service bulletin or repair in accordance with the procedures specified in paragraph (m) of this AD.

Note 2: For the purposes of this AD, a general visual inspection is: "A visual examination of an interior or exterior area, installation, or assembly to detect obvious damage, failure, or irregularity. This level of inspection is made from within touching distance unless otherwise specified. A mirror may be necessary to ensure visual access to all surfaces in the inspection area. This level of inspection is made under normally available lighting conditions such as daylight, hangar lighting, flashlight, or droplight and may require removal or opening of access panels or doors. Stands, ladders, or platforms may be required to gain proximity to the area being checked."

### **Initial and Repetitive Overhauls**

(g) For all airplanes: Prior to the accumulation of 8 years or 30,000 flight hours on any new or previously overhauled flap carriage spindle, whichever occurs later, remove the carriage spindle and aft link, and overhaul in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-27-2280, Revision 3, dated November 30, 1989. Repeat the overhaul thereafter at intervals not to exceed 8 years or 30,000 flight hours, whichever occurs earlier. Accomplishment of initial overhaul required by this paragraph terminates the requirements of paragraph (f) of this AD.

### **New Requirements of This AD**

### **Terminating Requirements**

(h) The actions specified in paragraphs (i) and (j) of this AD must be accomplished in their entirety, at the specified compliance times, to terminate the requirements of paragraphs (f) and (g) of this AD. There is no terminating action for the requirements of paragraphs (i) and (j) of this AD.

### **Repetitive Inspection for Broken Parts**

(i) For all airplanes: Within 12 months or 400 flight cycles after the effective date of this AD, whichever occurs later, do a general visual inspection of all eight carriage spindles and aft links to detect a broken carriage spindle or broken aft link, and do all applicable corrective actions before further flight. Repeat the inspection thereafter at intervals not to exceed 400 flight cycles. Do all actions in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008. For airplanes identified in Note (d) of Table 1 in paragraph 1.E., "Compliance," of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008, the

initial compliance time and repetitive interval for a flap may be extended to 1,000 flight cycles when new carriages are installed at both the inboard and outboard carriage locations on the flap.

### **Repetitive Overhauls**

(j) For all airplanes: At the later of the times specified in paragraph (j)(1) or (j)(2) of this AD, remove the carriage spindle and aft link, and overhaul in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008. Repeat the overhaul thereafter at the applicable repeat interval specified in paragraph 1.E., "Compliance," of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008.

(1) The applicable threshold specified in paragraph 1.E. "Compliance," of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008.

(2) Within 48 months after the effective date of this AD.

### **Optional Terminating Action**

(k) For Groups 1 and 3 airplanes identified in Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008: Replacing the existing 4340M aft link with a new corrosion resistant steel (CRES) aft link in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-27-2371, dated December 20, 2000, or with an aft link specified in paragraph 3.B.5. of the Accomplishment Instructions of Boeing Service Bulletin 747-27-2280, Revision 6, dated February 14, 2008, terminates the repetitive inspection requirements of paragraph (f) of this AD, and the repetitive overhaul requirements of paragraphs (g) and (j) of this AD for that aft link only. The repetitive inspections for broken parts required by paragraph (i) of this AD cannot be terminated.

### **Credit for Actions Done Using Previous Revision of Service Bulletin**

(l) Actions done before the effective date of this AD in accordance with Boeing Service Bulletin 747-27-2280, Revision 4, dated April 26, 2001, are acceptable for compliance with the corresponding requirements of paragraphs (f) and (g) of this AD. Actions done before the effective date of this AD in accordance with Boeing Service Bulletin 747-27-2280, Revision 5, dated April 5, 2007, are acceptable for compliance with the corresponding requirements of paragraphs (i) and (j) of this AD.

### **Alternative Methods of Compliance (AMOCs)**

(m)(1) The Manager, Seattle Aircraft Certification Office (ACO), FAA, ATTN: Gary Oltman, Aerospace Engineer, Airframe Branch, ANM-120S, 1601 Lind Avenue, SW., Renton, Washington 98057-3356; telephone (425) 917-6443; fax (425) 917-6590; has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19.

(2) To request a different method of compliance or a different compliance time for this AD, follow the procedures in 14 CFR 39.19. Before using any approved AMOC on any airplane to which the AMOC applies, notify your appropriate principal inspector (PI) in the FAA Flight Standards District Office (FSDO), or lacking a PI, your local FSDO.

(3) AMOCs approved previously in accordance with AD 90-17-19 are approved as AMOCs for the corresponding provisions of this AD.

(4) Adjustments to the compliance times approved previously in accordance with AD 90-17-19 are not approved for the corresponding provisions of this AD.

(5) 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 Commercial Airplanes 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.

## **Material Incorporated by Reference**

(n) You must use the applicable service information identified in Table 1 of this AD to perform the actions that are required by this AD, unless the AD specifies otherwise. If you accomplish the optional terminating actions specified by this AD, you must use the service information identified in Table 2 of this AD to perform those actions, unless the AD specifies otherwise.

**Table 1 – Required Material Incorporated by Reference**

<b>Service Bulletin</b>	<b>Revision Level</b>	<b>Date</b>
Boeing Service Bulletin 747-27-2280	3	November 30, 1989
Boeing Service Bulletin 747-27-2280	6	February 14, 2008

Boeing Service Bulletin 747-27-2280, Revision 3, dated November 30, 1989, contains the following effective pages:

<b>Page No.</b>	<b>Revision level shown on page</b>	<b>Date shown on page</b>
1-26	3	Nov. 30, 1989.
27-29	2	Mar. 23, 1989.

**Table 2 – Optional Material Incorporated by Reference**

<b>Service Bulletin</b>	<b>Revision Level</b>	<b>Date</b>
Boeing Service Bulletin 747-27-2280	6	February 14, 2008
Boeing Service Bulletin 747-27-2371	Original	December 20, 2000

(1) The Director of the Federal Register approved the incorporation by reference of these documents in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(2) Contact Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124-2207; telephone 206-544-9990; fax 206-766-5682; e-mail DDCS@boeing.com; Internet <https://www.myboeingfleet.com>; for a copy of this service information.

(3) You may review copies of the service information that is incorporated by reference at the FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington; or 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/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

Issued in Renton, Washington, on October 20, 2008.

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