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DEPARTMENT OF TRANSPORTATION

14 CFR Part 39

[Docket No. 93-NM-183-AD; Amendment 39-8977; AD 94-15-06]

Airworthiness Directives; Boeing Model 747 Series Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment supersedes an existing airworthiness directive (AD), applicable to certain Boeing Model 747 series airplanes, that currently requires inspecting to detect cracking in certain lower lobe lap joints, and repair, if necessary; reporting any findings of discrepancies; replacing certain countersunk fasteners with protruding head fasteners; and verifying that the airplanes do not have certain countersunk fasteners. This amendment requires inspection of an expanded area, deletion of the reporting requirement, and expansion of the applicability to include additional airplanes. This amendment is prompted by reports of cracking of the fuselage skin in certain areas and findings of additional countersunk fasteners. The actions specified by this AD are intended to prevent reduced structural integrity of the fuselage.

DATES: Effective August 24, 1994.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of August 24, 1994.

ADDRESSES: The service information referenced in this AD may be obtained from Boeing Commercial Airplane Group, P.O. Box 3707, Seattle, Washington 98124-2207. This information may be examined at the Federal Aviation Administration (FAA), Transport Airplane Directorate, Rules Docket, 1601 Lind Avenue SW., Renton, Washington; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

FOR FURTHER INFORMATION CONTACT: Steven C. Fox, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Transport Airplane Directorate, Seattle Aircraft Certification Office, 1601 Lind Avenue SW., Renton, Washington 98055-4056; telephone (206) 227-2777; fax (206) 227-1181.

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) by superseding AD 90-01-07, amendment 39-6440 (55 FR 255, January 4, 1990), which is applicable to certain Boeing Model 747 series airplanes, was published in the Federal Register on February 3, 1994 (59 FR 5139). The action proposed to

require inspection of an expanded area, deletion of the reporting requirement, and expansion of the applicability.

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

One commenter supports the proposed rule.

Two commenters request that proposed paragraph (e) be revised to reduce the area of inspection to coincide with the area specified in the service bulletin (Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992) referenced in the proposal as the appropriate source of service information. The FAA does not concur. An FAA investigation has revealed that countersunk fasteners may be installed in areas other than those specified in the referenced service bulletin.

Therefore, the FAA has determined that a one-time inspection along the entire lap joint of the skin panel must be accomplished to positively confirm the exact location of these countersunk fasteners.

One commenter requests an extension to the proposed compliance time of 11,000 total landings to conduct the high frequency eddy current (HFEC) inspection required by paragraph (g) of the proposal. The commenter states that the compliance time should coincide with the time recommended in the service bulletin (Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992) referenced in the proposal as the appropriate source of service information. The compliance time in the service bulletin specifies that, for airplanes on which only the minimum number of countersunk fasteners has been installed, the HFEC inspection should commence at 20,000 total flight cycles. The commenter notes that for airplanes on which only the minimum number of countersunk fasteners have been installed, the potential for widespread multi-site damage is significantly lessened than for airplanes on which more than the minimum number of countersunk fasteners have been installed.

The FAA does not concur with the commenter's request to extend the compliance time. In developing an appropriate compliance time for this action, the FAA considered the safety implications of any cracking in this area. The FAA acknowledges that cracking in the upper row of countersunk fasteners in the lap splice in the area adjacent to the wing-to-body fairing intersection may not result in catastrophic consequences; however, the FAA finds that any cracking in this area has the potential for developing into an unsafe condition. This AD is issued to address that unsafe condition, which may result in reduced structural integrity of the fuselage of the airplane as a result of cracking in these areas. Further, since cracking has been found in this area on in-service airplanes that had accumulated less than 20,000 total flight cycles, the FAA has determined that 11,000 total landings represent the maximum interval of time allowable wherein the inspection can reasonably be accomplished and an acceptable level of safety can be maintained.

One commenter requests clarification of the proposed compliance time for re-inspection of previously modified lap joints. The commenter requests that the HFEC inspections required by proposed paragraph (k) commence from the time the lap joint was modified in accordance with AD 90-01-07, rather than from the time the lap joint is modified in accordance with proposed paragraph (j). The FAA finds that clarification is warranted. Paragraph (k) of the final rule has been revised to state that HFEC inspections are to be performed prior to the accumulation of 10,000 total landings following modifications (of locations where countersunk fasteners were found) accomplished in accordance with Boeing Service Bulletin 747-53A2312, dated June 12, 1989, Revision 1, dated March 29, 1990, or Revision 2, dated October 8, 1992, which includes modifications accomplished in accordance with AD 90-01-07, or in accordance with paragraph (j) of this AD.

Two commenters question the necessity for the inspections following modification of the lap joints required by proposed paragraph (k). One of these commenters does not see adequate justification for requiring these inspections since AD 90-01-07 terminated the inspections after

accomplishment of the modification. The other commenter states that, since other lap joints are not required to be inspected following modification, this lap joint should not be inspected following modification. From these comments, the FAA infers that these commenters are requesting that the requirement to inspect following modification be deleted. The FAA does not concur. An FAA evaluation of currently available inspection techniques reveals that current technology may not be able to adequately detect cracking beneath protruding head fasteners. Further, in-service experience has demonstrated that cracking has gone undetected beneath these protruding head fasteners.

Therefore, the FAA's intent in requiring these inspections following the modification are to detect any cracking that may develop after accomplishment of the modification and to repair any cracking prior to it adversely affecting the structural integrity of the fuselage of the airplane.

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule with the change previously described. The FAA has determined that this change will neither increase the economic burden on any operator nor increase the scope of the AD.

There are approximately 723 Boeing Model 747 series airplanes of the affected design in the worldwide fleet. The FAA estimates that 183 airplanes of U.S. registry will be affected by this AD.

The inspections that were previously required by AD 90-01-07, and retained in this AD, take approximately 14 work hours per airplane to accomplish, at an average labor rate of \$55 per work hour. Based on these figures, the total cost impact of these inspection requirements of this AD on U.S. operators is estimated to be \$140,910, or \$770 per airplane, per inspection cycle.

The additional new inspections that are required by this AD will take approximately 82 work hours per airplane to accomplish, at an average labor rate of \$55 per work hour. Based on these figures, the total cost impact of these inspection requirements of this AD on U.S. operators is estimated to be \$825,330, or \$4,510 per airplane, per inspection cycle.

The modification required by this AD will take approximately 124 work hours per airplane to accomplish, at an average labor rate of \$55 per work hour. Required parts will be nominal in cost. Based on these figures, the total cost impact of the modification requirements of this AD on U.S. operators is estimated to be \$1,248,060, or \$6,820 per airplane.

Based on the above figures, the total cost impact of the inspection and modification requirements of this AD on U.S. operators is estimated to be \$2,214,300, or \$11,407 per airplane.

The total cost impact figure discussed above is based on assumptions that no operator has yet accomplished any of the requirements of this AD action, and that no operator would accomplish those actions in the future if this AD were not adopted.

The FAA recognizes that the modification will require a large number of work hours to accomplish. However, the 20,000-landings compliance time specified in paragraph (j) of this AD should allow ample time for the modification of all countersunk fasteners locations to be accomplished coincidentally with scheduled major airplane inspection and maintenance activities, thereby minimizing the costs associated with special airplane scheduling.

The regulations adopted herein will not have substantial direct effects 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. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

For the reasons discussed above, I certify that this action (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. A final evaluation has been prepared for this action and it is contained in the Rules Docket. A copy of it may be obtained from the Rules Docket at the location provided under the caption ADDRESSES.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (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. App. 1354(a), 1421 and 1423; 49 U.S.C. 106(g); and 14 CFR 11.89.

Sec. 39.13 [Amended]

2. Section 39.13 is amended by removing amendment 39-6440 (55 FR 255, January 4, 1990), and by adding a new airworthiness directive (AD), amendment 39-8977, to read as follows:

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

Airworthiness Directive

94-15-06 BOEING: Amendment 39-8977. Docket 93-NM-183-AD. Supersedes AD 90-01-07, Amendment 39-6440.

Applicability: Model 747 series airplanes, having line numbers 201 through 814 inclusive, certificated in any category.

Compliance: Required as indicated, unless accomplished previously.

To prevent reduced structural integrity of the fuselage, accomplish the following:

Restatement of Requirements of AD 90-01-07, Amendment 39-6440

(a) For airplanes having line numbers 201 through 765: Conduct a high frequency eddy current (HFEC) inspection to detect cracking of the lower lobe lap joints in the vicinity of the wing-to-body fairing, in accordance with Boeing Alert Service Bulletin 747-53A2312, dated June 12, 1989; or Revision 1, dated March 29, 1990; or Revision 2, dated October 8, 1992; at the time specified in paragraph (a)(1), (a)(2), (a)(3), or (a)(4) of this AD, as applicable. Repeat this inspection thereafter at intervals not to exceed 4,000 landings until the inspection required by paragraph (e) of this AD is accomplished.

(1) For airplanes that have accumulated less than 11,200 total landings as of February 5, 1990 (the effective date of AD 90-01-07): Prior to the accumulation of 11,000 total landings or within the next 1,000 landings after February 5, 1990, whichever occurs later.

(2) For airplanes that have accumulated 11,200 or more total landings but less than 15,201 total landings as of February 5, 1990 (the effective date of AD 90-01-07): Within the next 1,000 landings after February 5, 1990, or prior to the accumulation of 15,500 total landings, whichever occurs earlier.

(3) For airplanes that have accumulated 15,201 or more total landings but less than 18,200 total landings as of February 5, 1990: Within the next 300 landings after February 5, 1990, or prior to the accumulation of 18,250 total landings, whichever occurs earlier.

(4) For airplanes that have accumulated 18,200 or more landings as of February 5, 1990: Within the next 50 landings after February 5, 1990.

(b) For airplanes having line numbers 201 through 765: Accomplish the requirements of paragraphs (b)(1) and (b)(2) of this AD.

(1) If any cracking is detected during the inspections required by paragraph (a) of this AD, prior to further flight, repair in accordance with Boeing Alert Service Bulletin 747-53A2312, dated June 12, 1989; or Revision 1, dated March 29, 1990; or Revision 2, dated October 8, 1992.

(2) Prior to the accumulation of 20,000 total landings or within the next 3,000 landings after February 5, 1990 (the effective date of AD 90-01-07), whichever occurs later, modify the airplane by replacing countersunk fasteners in the upper row of the lower lobe lap joints in the vicinity of the wing-to-body fairing with protruding head fasteners, in accordance with the procedures described in the Boeing Alert Service Bulletin 747-53A2312, dated June 12, 1989; or Revision 1, dated March 29, 1990; or Revision 2, dated October 8, 1992.

(c) For purposes of complying with paragraphs (a) and (b) of this AD, the number of landings may be determined to equal the number of pressurization cycles where the cabin pressure differential was greater than 2.0 p.s.i.

(d) For Model 747SR airplanes only: Based on continued mixed operation of lower cabin differentials, the inspection and modification compliance times specified paragraphs (a) and (b) of this AD may be multiplied by a 1.2 adjustment factor.

New Requirements of this AD

(e) Prior to the accumulation of 11,000 total landings, or within 1,000 landings after the effective date of this AD, whichever occurs later, unless previously accomplished within the last 3,000 landings prior to the effective date of this AD, conduct a visual inspection to determine if countersunk fasteners have been installed in the area defined in either paragraph (e)(1) or (e)(2), as applicable, in accordance with the procedures described in Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992. Accomplishment of this inspection terminates the inspection requirements of paragraph (a) of this AD.

(1) For Model 747-100, -200, -300, -400, and 747SR series airplanes: From body stations (BS) 741 to 1000 at Stringers (S-)34L, S-34R, S-39L, S-39R, S-44L, and S-44R, and from BS 1480 to 1741 at S-34L, S-34R, S-40L, and S-40R.

(2) For Model 747SP series airplanes: From BS 520 to 1000 at S-34L, S-34R, S-39L, S-39R, S-44L, and S-44R, and from BS 1480 to 1741 at S-34L, S-34R, S-40L, and S-40R.

(f) If no countersunk fastener is found in the upper row of the lap splice during the inspection required by paragraph (e) of this AD, no further action is required by this AD.

(g) If any countersunk fastener is found in the upper row of the lap splice during the inspection required by paragraph (e) of this AD, prior to further flight, perform an HFEC inspection to detect cracking at all locations where countersunk fasteners were found, in accordance with the procedures described in Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992.

(h) If no cracking is detected during any inspection required by paragraphs (g), (h), and (k) of this AD, at any location where a countersunk fastener was found, repeat the inspection thereafter at intervals not to exceed 4,000 landings, in accordance with the procedures described in the Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992.

(i) If cracking is detected during any inspection required by paragraphs (g), (h), (i), and (k) of this AD, at any location where a countersunk fastener was found, prior to further flight, repair and modify that lap joint in accordance with Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992.

(j) Prior to the accumulation of 20,000 total landings or within 1,000 landings after the effective date of this AD, whichever occurs later, modify all locations where countersunk fasteners were found, in accordance with the procedures described in Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992. For purposes of complying with the requirements of this paragraph, locations that were previously modified in accordance with paragraph (b) of this AD do not need to be modified again.

(k) Prior to the accumulation of 10,000 total landings following modification of the locations where countersunk fasteners were installed in accordance with Boeing Service Bulletin 747-53A2312, dated June 12, 1989, or Revision 1, dated March 29, 1990, or Revision 2, dated October 8, 1992, perform an HFEC inspection at all locations where countersunk fasteners were found, and repeat this inspection thereafter at intervals not to exceed 4,000 landings, in accordance with the procedures described in Boeing Service Bulletin 747-53A2312, Revision 2, dated October 8, 1992.

(l) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA, Transport Airplane Directorate. Operators shall submit their

requests through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, Seattle ACO.

Note: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Seattle ACO.

(m) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be accomplished.

(n) The actions shall be done in accordance with Boeing Service Bulletin 747-53A2312, including the ``ADDENDUM," Revision 2, dated October 8, 1992. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Boeing Commercial Airplane Group, P.O. Box 3707, Seattle, Washington 98124-2207. Copies may be inspected at the FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

(o) This amendment becomes effective on August 24, 1994.

Issued in Renton, Washington, on July 13, 1994.

Darrell M. Pederson, Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

SUPERSEDED