

Availability of NPRMs

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Discussion

The FAA has received a report indicating that an operator found a 24-inch crack in the front spar web of the right wing between front spar station inboard (FSSI) 637 through 662 on a Boeing Model 747-100 series airplane having accumulated 14,830 total flight cycles and 85,116 total flight hours. Metallurgical analysis of the cracked section of the web revealed three cracks originating from a hole common to a rib post located on the front spar at FSSI 656 (wing station 642). The cracks were initiated by fatigue at the hole and were spread by fatigue for a short distance; then the cracks separated by a combination of fatigue and ductile separation. The cracks resulted in a fuel leak which was found after post-flight inspection revealed fire damage to the exhaust sleeve of the inboard engine turbine. Another operator reported finding a crack in the web at approximately FSSI 694, just outboard of a web section recently replaced per AD 99-10-09, amendment 39-11162 (64 FR 25194, June 15, 1999). Such fatigue cracking, if not found and fixed, could result in fuel leakage into the area of the inboard engines and consequent increased risk of a fire.

Related Rulemaking

This AD is related to the following rulemaking actions, which require the actions in the related service bulletins specified in Boeing Special Attention Service Bulletin 747-57-2313, Revision 1, including Appendices A and B, dated February 21, 2002:

- AD 95-10-16, amendment 39-9233 (60 FR 27008, June 21, 1995). That AD references Boeing Alert Service Bulletin 747-54A2159, dated November 3, 1994, as the appropriate source of service information for accomplishment of the modification of the nacelle strut and wing structure. That AD is applicable to certain Boeing Model 747 series airplanes equipped with Pratt & Whitney Model JT9D series engines (excluding Model JT9D-70 engines). The AD requires modification of the nacelle strut and wing structure, inspections and checks to detect discrepancies, and correction of discrepancies. The modification specified in the AD also constitutes terminating action for the repetitive

inspections required by certain other ADs, including AD 98-15-21, amendment 39-10672 (63 FR 39487, July 23, 1998), which references Boeing Service Bulletin 747-57A2266 as the appropriate source of service information for accomplishment of the specified actions; and AD 90-17-18, amendment 39-6702 (55 FR 33279, August 15, 1990), which references Boeing Service Bulletin 747-57A2259 as the appropriate source of service information for accomplishment of the specified actions.

- AD 99-10-09, amendment 39-11162. That AD references Boeing Service Bulletin 747-57A2303, Revision 1, dated September 25, 1997, as the appropriate source of service information for accomplishment of the actions specified. That AD is applicable to certain Boeing Model 747-100, -200, and 747-SP series airplanes and military type E-4B airplanes, and requires repetitive inspections to detect cracking of the wing front spar web, and repair of cracked structure. That AD also provides for optional terminating action for the repetitive inspections.

Explanation of Relevant Service Information

We have reviewed and approved Boeing Special Attention Service Bulletin 747-57-2313, Revision 1, including Appendices A and B, dated February 21, 2002. The service bulletin describes procedures for repetitive inspections to find fatigue cracking of the front spar web of the wing, and repair of cracked structure, as follows:

- For airplanes on which the optional modification specified in AD 99-10-09 has not been done, the affected area is divided into two zones (A and B). Zone A is the area previously modified per the requirements specified in AD 95-10-16 for the wing front spar; and Zone B is the remaining area between FSSI 628 and 711.

- For airplanes on which the optional modification specified in AD 99-10-09 has been done, the affected area is divided into three zones (A, B, and C). Zone A is the area previously modified per the requirements specified in AD 95-10-16 for the wing front spar, and is not affected by the requirements specified in AD 99-10-09; Zone C is the area affected by AD 99-10-09; and Zone B is the remaining area between FSSI 628 and 711.

- The inspection specified in Part 1 of the service bulletin is for Zone A, B, or C, as applicable. If no cracking is found, the inspections are repeated at the intervals specified in Figure 1 of the service bulletin. If cracking is found, the inspections are also repeated at the

intervals specified in Figure 1 after the cracking is repaired.

- The modification specified in Part 2 of the service bulletin is for Zone B only. The modification includes removing the existing fasteners of the web to chord, web to rib post, and web to stiffener; straightening the holes; and doing an open-hole rotating probe high frequency eddy current inspection for cracking in the web. If no cracking is found, the service bulletin directs oversizing the holes and installing tension type fasteners in the holes; if any cracking is found, the service bulletin specifies contacting the manufacturer for repair instructions.

The service bulletin recommends prior or concurrent accomplishment of Boeing Service Bulletins 747-57A2259, 747-57A2266, and 747-54A2159. Those service bulletins are referenced in the related rulemaking described previously.

Explanation of Requirements of Proposed Rule

Since an unsafe condition has been identified that is likely to exist or develop on other products of this same type design, the proposed AD would require accomplishment of the actions specified in the service bulletin described above, except as discussed below.

Difference Between Service Information and Proposed Rule

Although the service bulletin specifies that the manufacturer may be contacted for disposition of certain repair conditions, this proposal would require the repair of those conditions to be done per a method approved by the FAA, or per data meeting the type certification basis of the airplane approved by a Boeing Company Designated Engineering Representative who has been authorized by the FAA to make such findings.

Cost Impact

There are approximately 109 airplanes of the affected design in the worldwide fleet. The FAA estimates that 59 airplanes of U.S. registry would be affected by this proposed AD, that it would take approximately 25 work hours per airplane to accomplish the proposed inspections, and that the average labor rate is \$60 per work hour. Based on these figures, the cost impact of the proposed AD on U.S. operators is estimated to be \$88,500, or \$1,500 per airplane, per inspection cycle.

The cost impact figure discussed above is based on assumptions that no operator has yet accomplished any of the proposed requirements of this AD