

Availability of NPRMs

Any person may obtain a copy of this NPRM by submitting a request to the FAA, Transport Airplane Directorate, ANM-114, Attention: Rules Docket No. 2002-NM-164-AD, 1601 Lind Avenue, SW., Renton, Washington 98055-4056.

Discussion

The FAA has received reports indicating failure of the bolts and bushings that attach the hinge fittings to the inboard and outboard flaps on certain McDonnell Douglas Model DC-10 airplanes. In two cases, the failure was in the radius area of the bolt head; in one case, the failure was in the threaded portion of the bolt; in another case, both the head and threaded end had failed. Additional failures occurred in the lubrication hole in the middle of the shank. The cause of these failures has been attributed to hydrogen embrittlement. Subsequent to installation of new hinge bolts with improved corrosion protection, the corrosion and failures continued to occur.

In addition, multiple reports have been received from operators of corrosion on the bolt and bushing. Investigation revealed that a lack of lubrication caused the initiation of corrosion, and the corrosion led to the stress corrosion failure of the bolt and bushing. The bolt and bushing provide a fail-safe mechanism at the flap hinge pivot point. Such conditions, if not corrected, could result in failure of the bolts and bushings that attach the hinge fitting to the flap, which could result in loss of the flap and consequent reduced controllability of the airplane.

Explanation of Relevant Service Information

We have reviewed and approved Boeing Alert Service Bulletin DC10-57A148, Revision 01, dated August 13, 2002, which describes procedures for magnetic particle and visual inspections for cracking and corrosion of the outboard pivot bolt assemblies and bushings on the hinge fittings of the inboard flaps of the left and right wings. The service bulletin also describes procedures for follow-on actions and repair of any discrepancy found, as follows:

- *Condition 1—No cracking or corrosion found:* Option 1—Reinstall each existing bushing, replace each existing pivot bolt assembly with a new assembly made from corrosion-resistant steel, and lubricate the assembly. Option 2—Reinstall each existing bushing and pivot bolt assembly, lubricate the assembly, repeat the

lubrication at the intervals specified, and do repetitive ultrasonic inspections of each assembly for cracking at the intervals specified.

- *Condition 2—Corrosion on bolt and/or bushing:* Option 1—Replace each affected bushing with a new equivalent part, replace each affected pivot bolt assembly with a new assembly made from corrosion-resistant steel, and lubricate the assembly. Option 2—Repair the existing bushing and pivot bolt assembly and reinstall them, lubricate the assembly, repeat the lubrication at the intervals specified, and do repetitive ultrasonic inspections of each assembly for cracking at the intervals specified.

- *Condition 3—Cracks in bolt and/or bushing:* Option 1—Replace each affected bushing with a new equivalent part, replace each affected pivot bolt assembly with a new assembly made from corrosion-resistant steel, and lubricate the assembly. Option 2—Replace each affected bushing and pivot bolt assembly with new equivalent parts, lubricate the assembly, repeat the lubrication at the intervals specified, and do repetitive ultrasonic inspections of each assembly for cracking at the intervals specified.

We also have reviewed and approved Boeing Alert Service Bulletin DC10-57A117, Revision 01, dated July 23, 2002, which describes procedures for magnetic particle and visual inspections for cracking and corrosion of the pivot bolt assemblies on the hinge fitting of the outboard flaps of the left and right wings. The service bulletin also describes procedures for follow-on actions and repair of any discrepancy found, as follows:

- *Condition 1—No cracking or corrosion found:* Option 1—Replace each existing pivot bolt assembly with a new assembly made from multi-phase material, and lubricate the assembly. Option 2—Reinstall each pivot bolt assembly, lubricate the assembly, repeat the lubrication at the intervals specified, and do repetitive ultrasonic inspections of each assembly for cracking at the intervals specified.

- *Condition 2—Corrosion on bolt:* Option 1—Replace each affected pivot bolt assembly with a new assembly made from multi-phase material, and lubricate the assembly. Option 2—Repair the existing pivot bolt assembly and reinstall, lubricate the assembly, repeat the lubrication at the intervals specified, and do repetitive ultrasonic inspections of each assembly for cracking at the intervals specified.

- *Condition 3—Cracks in bolt:* Option 1—Replace each affected pivot bolt assembly with a new assembly made

from multi-phase material, and lubricate the assembly. Option 2—Replace each affected pivot bolt assembly with a new equivalent part, lubricate the assembly, repeat the lubrication at the intervals specified, and do repetitive ultrasonic inspections of each assembly for cracking at the intervals specified.

Accomplishment of the actions specified in the service bulletins is intended to adequately address the identified unsafe condition.

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 previously.

Changes to 14 CFR part 39/Effect on the Proposed AD

On July 10, 2002, the FAA issued a new version of 14 CFR part 39 (67 FR 47997, July 22, 2002), which governs the FAA's airworthiness directives system. The regulation now includes material that relates to altered products, special flight permits, and alternative methods of compliance. Because we have now included this material in part 39, we no longer need to include it in each individual AD.

Cost Impact

There are approximately 402 airplanes of the affected design in the worldwide fleet. The FAA estimates that 297 airplanes of U.S. registry would be affected by this proposed AD.

It would take approximately 1 work hour per airplane to accomplish the proposed initial inspections, at an average labor rate of \$60 per work hour. Based on these figures, the cost impact of the proposed inspections on U.S. operators is estimated to be \$17,820, or \$60 per airplane.

It would take approximately 2 work hours per flap, to accomplish the proposed replacement, at an average labor rate of \$60 per work hour. Required parts would cost approximately \$2,982 for the outboard flap, and \$2,825 for the inboard flap. Based on these figures, the cost impact of the proposed replacement on U.S. operators is estimated to be \$1,795,959, or \$6,047 per airplane.

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