



Log 2398

National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: February 1, 1993
In reply refer to: A-93-1

Mr. Joseph M. Del Balzo
Acting Administrator
Federal Aviation Administration
Washington D.C. 20591

On September 20, 1992, Delta Airlines (Delta) flight 252, a Lockheed L-1011-385, N786DL, on a scheduled air carrier domestic flight, had an in-flight separation of the right wing vane No. 2 assembly during its final approach to runway 4R at Logan International Airport, Boston, Massachusetts.¹ The airplane landed safely, and no injuries were reported among the 302 occupants. The vane (dimensions about 10 feet by 2 feet by 6 inches) struck the ground causing no injuries or property damage.

Preliminary examination of the vane at the National Transportation Safety Board materials laboratory revealed a fracture of the inboard end fitting through the lug bore. Metallurgical examination disclosed that the inboard end fitting lug had separated as the result of stress corrosion cracking followed by fatigue. The stress corrosion, which covered about 70 percent of the cross-sectional area of the fracture surface, emanated from the center of the lug bore, between bushings installed in the upper and lower end of the lug.

In service bulletin (SB) 093-57-199, dated January 21, 1988, Lockheed Aircraft Company recommends that the vane inboard and outboard end fitting lug be inspected for evidence of corrosion and stress corrosion cracking and modified or replaced, depending on the degree of corrosion and cracking found. The modification includes reworking the lug bore by machining it oversize and inserting a sleeve.

The SB indicates that its issuance was prompted by reports of operators who found cracks in several vane lugs. The failure of one lug reportedly caused the flap system to jam during retraction after takeoff. Another failed lug was found during a special workcard inspection that resulted from the first reported failure. Examinations performed by Lockheed on these lugs showed that stress corrosion cracking had initiated in the center of each lug bore located between the upper and lower bushing.

¹ The vane No. 2 assembly is the forward airfoil surface of the trailing edge flap.

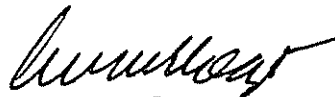
As a result of the N786DL incident, Delta initiated a special inspection program to examine the end fitting lugs on its fleet of 56 L-1011 airplanes. Of the 22 airplanes inspected as of November 23, 1992, 49 end fitting lugs out of 352 (14 percent) were found to contain cracks or corrosion. Damage to 23 of the 49 lugs was reported to be beyond the repair limits described in SB 093-57-199. Further, a spare vane removed from Delta stock also contained a crack in the inboard end fitting lug that was beyond the repair limits of the SB.

Although no accidents have occurred as a result of cracked or separated vane end fitting lugs, the Safety Board is concerned about the potential for extensive property damage and injury. Consequently, the Board believes that the inspection and modification described in SB 093-57-199 should be mandatory.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an airworthiness directive for Lockheed L-1011 airplanes to require immediate inspection and modification of the flap vane inboard and outboard lugs according to Lockheed Service Bulletin 093-57-199. (Class II, Priority Action) (A-93-1)

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in this recommendation.



By: Carl W. Vogt
Chairman