

68-18

DEPARTMENT OF TRANSPORTATION  
NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20591

NC-1-NA-96

IN REPLY  
REFER TO:

Honorable William F. McKee  
Administrator  
Federal Aviation Administration  
Department of Transportation  
Washington, D. C. 20590

Dear General McKee:

The Board's investigation of a fatal helicopter accident at Hanalei, Kauai, Hawaii, December 13, 1967, involving a Bell Model 47J2A, N8501F, disclosed a fatigue failure in the tail rotor blade which resulted in an inflight structural separation.

Metallurgical examination of the fatigue fracture, which occurred near Blade Station 6.0, revealed that the origins of the fatigue cracks were on the inside surfaces of the blade shell midway between the trailing and the leading edges. These cracks propagated circumferentially around the blade root and were effectively hidden from any visual detection by the blade doubler straps for most of the fatigue crack progression. Airworthiness Directive 66-28-2, requiring a daily visual inspection of these areas, was being complied with.

For several years the Board has been concerned about the number of accidents caused by fatigue failures in the tail rotor blades of Model 47 Bell helicopters and on March 18, 1966, as a result of a history of fifteen such failures a letter was sent to the Director of Flight Standards recommending essentially a study for possible blade redesign for greater fatigue strength and a mandatory periodic X-ray inspection. The FAA subsequently issued Airworthiness Directives 66-17-1 (effective July 9, 1966) and 66-28-2 (effective November 15, 1966) requiring only daily visual inspections.

Since our recommendation of March 18, 1966, there have been five accidents caused by tail rotor blade failures, four since the issuance of AD 66-17-1, with three of these being of the internal crack origin type and these would not have been detectable by visual methods.

Hence, as a result of the most recent fatal accident, the Board strongly recommends an immediate X-ray inspection of all

Honorable William F. McKee (2)

Bell 47 tail rotor blades and a continuing X-ray and visual inspection at prescribed safe intervals until the manufacturer can demonstrate a satisfactory solution for these tail rotor blade fatigue failures.

Our investigators have discussed this action with your Flight Standards personnel in Washington, cognizent FAA personnel from the Southwest Region, and also personnel representing the manufacturer. Our Engineering Division personnel are available to provide you with any further information or assistance as desired.

Sincerely yours,

---

Joseph J. O'Connell, Jr.  
Chairman