LOG 1217

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: November 7, 1980

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-111

On December 27, 1979, a Hamilton Standard propeller blade (P/N 6353A-18) separated from the right engine of a Douglas DC-3C aircraft, N100SD. The separated blade damaged the underside of the fuselage and one of the left propeller blades.

Metallurgical examination of the butt end of the separated blade (metallurgist's factual report No. 80-58) revealed that the fracture was caused by the presence of high cycle, low stress fatigue cracking which had progressed through a substantial part of the blade cross section. The primary fatigue crack initiated from an area of corrosion on the shank of the blade adjacent to the butt fillet blend. Additional areas of severe corrosive attack were found on the shank and fillet, and dried oil sludge and rusted rollers were found on the roller bearing from this area. The metallurgical examination indicated that the separated blade met engineering drawing requirements for the fillet radius, material hardness, microstructure, and chemical composition.

Aircraft logbook entries indicated the failed blade was previously installed on a propeller of a different aircraft which had accumulated less than 1,000 hours of service between 1971 and 1978. The Safety Board believes that the corrosive attack of the blade began within this time, most likely during an extended idle period when the corrosion protection provided by the oil in the hub may have been lost.

In addition to the above blade failure, the Federal Aviation Administration's (FAA) service difficulty report file revealed that, in the last 5 years, at least six instances of corrosion-related damage to the shank or fillet of Hamilton Standard Hydromatic propeller blades have been reported.

The aircraft industry has recognized the problem of corrosion damage to propeller components for many years. Hamilton Standard Service Bulletins No. 329, issued November 18, 1954, and No. 329A, issued September 15, 1960, recommended that blades be visually examined at least every 18 months. Currently, however, there are no Federal regulations that require blades to be inspected at any specific calendar interval. Hamilton Standard personnel have estimated that a visual examination would take 4 to 6 man-hours per propeller.

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

> Make compliance with Hamilton Standard Service Bulletins No. 329 and 329A mandatory. (Class II, Priority Action) (A-80-111)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

By: James B. King
Chairman