

UNITED STATES OF AMERICA  
NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

  
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ISSUED: November 30, 1971

Adopted by the NATIONAL TRANSPORTATION SAFETY BOARD  
at its office in Washington, D. C.  
on the 29th day of November 1971

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FORWARDED TO: )  
Honorable John H. Shaffer )  
Administrator )  
Federal Aviation Administration )  
Washington, D. C. 20590 )  
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SAFETY RECOMMENDATION A-71-65 thru 67

Our investigation of the Frontier Airlines Beech 99A, N21FW, accident near Cheyenne, Wyoming, on November 24, 1971, involving an in-flight failure of a propeller blade indicates the need for immediate corrective action.

The propeller blade involved was a Hartzell Model T10173E-8, installed in a Hartzell Model HCB3TN-3B propeller hub assembly. The failed blade, S/N B-68489, had accumulated 1770:22 hours in service since new.

This blade of the right propeller assembly failed approximately 6-1/4 inches outboard of the butt end and the outer 36-inch portion of the blade penetrated the fuselage. Due to the mass unbalance caused by the blade failure, the entire number 2 powerplant assembly was torn from the aircraft in flight. Fortunately, the aircraft, with its crew and six passengers, was safely landed at Denver, Colorado.

Our initial examination of the failed propeller blade showed the presence of a fatigue failure starting in the hole wall near the bottom of the balance hole and extended through to the camber side of the blade. The fatigue area consisted of approximately 75 percent of the blade material prior to instantaneous failure.

Our preliminary examination of the fatigue area revealed a single fatigue origin in a deep tool mark close to the bottom of the blade balance hole.

Detailed metallurgical examination of the failed blade is now in progress, and we shall keep you and your staff advised of any additional findings.

Honorable John H. Shaffer

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As a result of these preliminary findings, our Bureau of Aviation Safety staff on November 27, 1971, discussed the failure with your Director of Flight Standards Service and his engineering and manufacturing staff personnel as to the need for requiring an accelerated inspection of all similar model propellers presently in service.

Of particular concern to us is the nature of this blade failure. We are aware that this one is the first in-flight failure involving this particular model blade; however, we are also aware of four additional failures of blades of the same basic design of which three resulted in accidents. In these cases, the blades failed due to fatigue at the same location and in the same manner as the one now under investigation. The causes in these other failures were related to corrosion pits and/or detrimental tool marks.

In a letter to you on December 18, 1969, as a result of a failure of another model Hartzell propeller blade, we recommended the following action: (1) require an accelerated inspection of Model 10L76 blades now in service for cracks, detrimental tool marks, and rolling coverage in the area of the internal fillet, approximately 4 inches from the butt face of the blade; (2) establish minimum acceptable wall thickness values; and (3) require measurements for compliance on blades now in service and on new blades before they are placed in service.

In view of our findings to date, the National Transportation Safety Board recommends that:

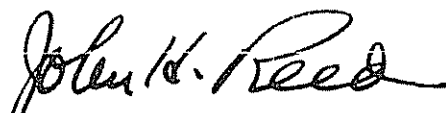
1. The Federal Aviation Administration require an accelerated inspection of all Hartzell propeller blades, Model T-10L73E-8, in service for the presence of cracks and detrimental tool marks in the propeller balance weight hole.
2. Conduct an accelerated inspection of other similarly designed blades since service experience indicates that other Hartzell propellers are subject to this type of failure.
3. Review the design criteria, quality control practices, and overhaul instructions in order to assure airworthiness standards.

Our technical staff is available for any further information or assistance they may be able to provide on this problem.

These recommendations will be released to the public on the issue date shown above.

Honorable John H. Shaffer (3)

Reed, Chairman; Laurel, McAdams, and Thayer, Members, concurred in the above recommendations. Burgess, Member, was absent not voting.

  
By: John H. Reed  
Chairman