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

December 18, 1969

A69-33

Honorable John H. Shaffer  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20590

Dear Mr. Shaffer:

Our investigation of a recent incident involving the failure of a propeller blade on a Beech, Volpar, Super Turbo 18, N340V, operated by Ransome Airlines, indicates the need for corrective action to prevent similar failures in the future.

The propeller blade involved was a Hartzell Model T10L76H-3, Serial Number B17049, with 818 hours total service time. It failed on October 20, 1969, during an approach to Philadelphia International Airport.

One blade of the right propeller broke near the hub. The portion of the blade outboard of the break separated from the aircraft and was not recovered. Fortunately, the aircraft landed safely with only minor damage to the engine, engine mounts, and cowling.

Examination of the recovered portion of the broken blade showed that the failure was caused by a fatigue fracture. The fatigue origin was located at an internal undercut fillet on the camber side, 3.90 inches from the butt face. This location is in the hollow section of the blade in the area of minimum wall thickness. Our investigation of the failure is not complete, but preliminary results indicate that the wall thickness of the failed blade in the fracture area may be less than that of other blades with the same model number. There is also a possibility that a fillet rolling operation may have been omitted on the failed blade. According to information received from the manufacturer, the fillet should be rolled in this type of blade, although the rolling operation is not specified on the manufacturing drawing. A representative of the manufacturer also informed us that the rolling is done primarily to eliminate tool marks in the fillet. No evidence of rolling was found in the failed blade on the part of the fillet that was available for examination.

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The manufacturer does not specify, or make any direct measurement of, the wall thickness in the area where the fracture occurred. Some control is provided by other dimensional requirements of the manufacturing specification, but this control does not appear to be adequate for such a critical location, where the minimum wall thickness occurs at a point of stress concentration adjacent to an internal shoulder. Manufacturing tolerances and handwork on the outside surface allow appreciable variation in this area.

It is our recommendation that the Federal Aviation Administration take action to (1) require accelerated inspection of Model 10176 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.

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

Sincerely yours,

A handwritten signature in cursive script that reads "John H. Reed". The signature is written in dark ink and is positioned above the printed name and title.

John H. Reed  
Chairman