

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

AJ-4
Log 1418

ISSUED: March 11, 1982

Forwarded to:

Honorable J. Lynn Helms
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-82-26

On September 5, 1981, a Piper aircraft model PA-25, N86336, was involved in a fatal accident about 7 miles southwest of Sandston, Virginia. Investigation of the accident disclosed that the left wing separated in flight when the front spar fractured. Detailed metallurgical examination of the front spar fracture disclosed that a fatigue crack had occurred through approximately 90 percent of the fractured cross sectional area of the front spar. (See attached Metallurgical Laboratory Report No. 82-17.) The fatigue cracking originated in an area of the 6061-T6 aluminum alloy spar that had been welded, apparently in an attempt to repair previous damage to the spar.

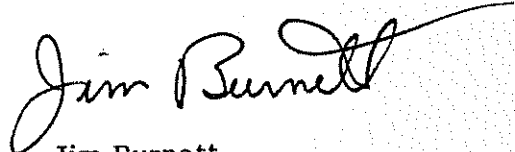
On October 18, 1973, at Post, Texas, a PA-25-235, N4990Y, crashed as a result of an in-flight wing separation. Metallurgical examination of the front spar showed that the spar had failed as a result of extensive fatigue cracking originating in an area of an unauthorized spar repair. (See attached Metallurgical Laboratory Report No. 74-36.) The area of the repair had been softened by heat and weakened to approximately half of its original tensile strength.

The Safety Board is concerned that these accidents may indicate a possible widespread lack of appreciation for the potential effect of a repair of an aircraft structural element on the stress-carrying and fatigue properties of that element by general aviation repair personnel. The Board believes that the FAA should take action to inform operators of the consequences of unauthorized repairs.

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

Issue a General Aviation Airworthiness Alert (Advisory Circular No. 43-16) highlighting the aforementioned accidents to emphasize the importance of following established repair procedures, especially on major structural items such as wing spars. The Airworthiness Alert should reiterate the importance of not subjecting critical heat-treated aluminum alloy parts to extensive heat by welding or any other means for any reason, since heat will produce locally a change in internal microstructure which is detrimental to mechanical and fatigue properties. (Class II, Priority Action) (A-82-26)

BURNETT, Acting Chairman, and McADAMS, GOLDMAN, and BURSLEY, Members,
concurred in this recommendation.

A handwritten signature in cursive script that reads "Jim Burnett". The signature is written in black ink and is positioned above the typed name and title.

By: Jim Burnett
Acting Chairman

Attachments (FAA only)