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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: March 26, 1981

Forwarded to:

Mr. Charles E. Weithoner
Acting Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-81-30 and -31

On February 18, 1980, a Piper PA-22-150 Tri-Pacer aircraft crashed in a rural area near Clear Spring, Maryland. Witnesses observed the aircraft in erratic flight and saw it enter into a steep right bank before crashing into trees. The pilot died of acute carbon monoxide intoxication and multiple injuries.

The Safety Board's investigation of the accident did not disclose any evidence of a structural, control, or engine malfunction. However, two cracks were found in the exhaust muffler assembly, one of which was located along a welded seam. The seam crack allowed exhaust gases to impinge upon and stain the inner surface of the muffler shroud assembly and escape from the confines of the exhaust system. The path which the exhaust gas stain followed indicated that the crack was not impact-related. It was also evident that this crack was not recent, nor the result of the accident. The other crack was in one of the other exhaust stacks. The exhaust muffler cracks would have allowed escaping exhaust gas to enter the cabin through open air vents and cause the pilot to become incapacitated.

Airworthiness Directive (AD) 68-05-01, effective March 31, 1968, and revised March 5, 1969, requires that exhaust mufflers on certain Piper aircraft models with less than 950 hours time in service be inspected for cracks and other deficiencies at intervals not to exceed 100 hours until reaching 950 hours time in service. At and beyond 950 hours, the repetitive inspections are to be conducted at 50-hour intervals.

The accident aircraft's records indicated that the exhaust muffler assembly had been installed during June 1967, the muffler had been last inspected in accordance with the provisions of AD 68-05-01 during October 1971, and the aircraft had been operated for 269 hours between June 1967 and October 1971. The aircraft was operated an additional 159 hours between October 1971 and October 1979. The maintenance logs of the aircraft also indicated that its exhaust system had been "checked" during several annual inspections, including the last annual inspection conducted 10 hours before the accident; however, the exhaust system cracks were not detected.

The Safety Board recognizes that the operator of the accident aircraft did not maintain the aircraft in accordance with AD 68-05-01. However, we believe that this accident points to a particular problem to which aircraft with low utilization rates are prone, and which is not addressed by the AD. Although the apparent intent of the AD is to insure routine detailed inspections of the exhaust systems, the requirement for a detailed inspection in aircraft with utilization rates as low as that of the accident aircraft could be triggered only once in 5 years. The muffler assembly had been in service for 13 years and had 438 hours of operation when the accident occurred.

AD 68-05-01 is based on hours of operation. However, corrosion (one of the key factors in muffler degradation) occurs continuously, even when the aircraft is not being operated. In fact, mufflers that are used only occasionally tend to corrode more rapidly than those with higher utilization rates. It does not appear that this fact was fully considered during the preparation of AD 68-05-01.

If the inspection requirements in AD 68-05-01 were extended to require also inspections at a prescribed calendar interval, such as during the aircraft's annual inspections, exhaust muffler assembly cracks would be more likely to be detected, particularly on aircraft with low utilization rates.

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

> Amend Airworthiness Directive (AD) 68-05-01 to require that an inspection of the muffler and exhaust systems meeting the requirements of the AD be performed during the aircraft's annual inspection if a detailed inspection of the system has not been made during the preceding year on the basis of the time-in-service requirements of the AD. (Class II, Priority Action) (A-81-30)
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> Pending amendment of Airworthiness Directive (AD) 68-05-01, as an interim measure, issue an Airworthiness Alert to all owners/operators of Piper aircraft listed in the AD describing the circumstances of the failure of the muffler which caused this accident. (Class II, Priority Action) (A-81-31)

KING, Chairman, DRIVER, Vice Chairman, and McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

By: James B. King
Chairman