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NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

ISSUED: January 12, 1982

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-81-157 through -160

About 1328 e.d.t., on August 14, 1980, a Piper Model PA-30, twin Comanche N7094Y, crashed in visual meteorological conditions at Cutchogue, New York, shortly after the pilot had executed a missed approach to Mattituck Airport, Mattituck, New York. The pilot was killed. There was no postcrash fire.

A witness to the accident stated that he heard a power reduction and saw the aircraft roll left and spin to the ground. The first person to reach the scene reported that there was no gasoline on the ground nor was there any odor of gasoline.

Shortly before departing Lake Placid Airport, Lake Placid, New York, at 1147 the pilot had refueled the aircraft. The flight to Mattituck was in accordance with an instrument flight rules clearance with an estimated time en route of 1 hour, 40 minutes. The pilot's flight plan indicated that 5 hours' fuel was aboard the aircraft. According to the operator of the Lake Placid Airport, the purpose of the flight was to have engine maintenance performed at Mattituck; the pilot had complained that one engine was using almost "twice as much fuel as normal."

During the investigation, inspections and tests were conducted by the Safety Board at Mattituck Airbase Incorporated. Examination of the wing bladder fuel cells revealed that three of the four fuel cells had been destroyed. The only fuel found, about 4 gallons, was stored in the right main (inboard) fuel cell.

Both aircraft engines were inspected and tested and operated normally. However, the left and right fuel selector valves including the filter, bowl, and drain valve assemblies were contaminated with water-gel particulate, fine reddish brown material in suspension, and other solid particles and foreign material, much of which appeared to be microbial growth.

During functional tests of the fuel selector valves, contamination caused the left fuel selector drain valve to remain in an open or drain position when the drain handle was released—a condition that results in continuous fuel leakage from the drain located beneath the fuselage. Since the spring force acting on the drain plunger valve is relatively light, the drain valve would not return to the spring-loaded, normally closed position until physical pressure was applied to the drain handle. A stiffer spring probably would have resulted in positive closure under the same

The drain spring retaining washer in the right drain valve assembly was corroded extensively. Although the right fuel drain system was functional, loss of this retaining washer was imminent. Under the circumstances, there would have been no spring force available to hold the drain valve in the closed position and excessive fuel leakage would have occurred.

In Piper Service Spares Letter No. SP-282, issued in 1968, the Piper Aircraft Corporation announced the availability of an improved-design fuel selector valve housing for PA-30 aircraft to improve drainage of moisture and sediment from the fuel system. In Service Letter No. 589, issued in 1971, Piper reiterated the availability of this product improvement because only about 25 percent of PA-30 owners had responded to the aforementioned Service Spares Letter.

Fuel contamination may adversely affect not only fuel system drains but fuel valve porting functions as well. In fuel selectors which incorporate ball check valves, such as those in N7094Y and Piper Models PA-24-400 and PA-39, contaminants may lodge between the ball check valve and valve seat, resulting in a leaking intake port (interport leakage). This condition may cause an unwanted transfer of fuel between tanks and depletion of the available fuel supply.

The Federal Aviation Administration (FAA) issued Airworthiness Directive 79-12-08, applicable to Piper Models PA-24-400, PA-30, and PA-39, in June 1979, to instruct operators on how to detect interport leakage. The fuel selector valves in N7094Y had been tested in compliance with the directive 4 months before the accident at the last annual inspection and they were inspected following the accident, as part of the postcrash investigation. No leakage was found during either inspection. The Safety Board believes, however, that such leakage may occur sporadically and that an absence of interport leakage at any given time is not necessarily an indication of a lack of contamination or that such interport leakage is not imminent. To prevent interport leakage caused by contamination, the entire fuel system should be flushed and cleaned whenever direct inspection discloses evidence of significant contamination.

Between 1975 and 1979, the Piper PA-30 was involved in 20 engine failure/malfunction accidents. Faulty fuel selector valves caused two of the accidents, while three of the accidents were caused by undetermined reasons. Comments taken from small aircraft malfunction/defect report data from the FAA's Maintenance Analysis Center reflect conditions similar to those referred to above or found in the fuel selector valves of N7094Y. For example: "tube in lower section of fuel selector valve corroded; foreign material found under auxiliary tank ball check valve; failure of the retainer would allow the fuel load to drain overboard; fuel valve leaking internally, probable cause--valve stuck in open position; and excessive rust and water in fuel selector drains causing damage to seats and leaking."

In 1971, the Piper Aircraft Corporation issued an airplane flight manual supplement regarding fuel system preflight procedures applicable to Models PA-28-235, PA-32-260, PA-32-300, and PA-32S-300. The supplement contained details directing the pilot's attention to quantity of drainage necessary, examination of drainage for water and sediment, and instructions for assuring that the quick drain was completely closed and not leaking. The Safety Board believes that a similar flight manual supplement is necessary for Models PA-24-400, PA-30, and PA-39.

FAA eastern region personnel assisted in the investigation of the August 14, 1980, accident and later participated in discussions with Safety Board staff regarding necessary remedial actions. We are aware that the FAA Flight Standards Division has recently advised the Piper Aircraft Corporation of its intent to take appropriate corrective action.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

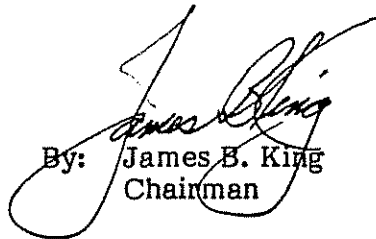
Issue an Airworthiness Directive requiring an inspection of the fuel selector drain valves installed on Piper Models PA-24-400, PA-30, and PA-39 aircraft for evidence of contamination, and instruct operators to flush fuel tanks and selector valves and clean filter assemblies if contamination is found. (Class II, Priority Action) (A-81-157)

Issue an Airworthiness Directive requiring installation of improved-design fuel drain bowls on Piper Model PA-30 aircraft in accordance with Piper Service Letter No. 589. (Class II, Priority Action) (A-81-158)

Issue an Airworthiness Directive requiring installation of stiffer drain valve plunger springs on Piper Models PA-24-400, PA-30, and PA-39 aircraft so that degradation of positive closure of the valve due to the effects of corrosion and contamination is less likely. (Class II, Priority Action) (A-81-159)

Issue a supplement to the aircraft flight manuals applicable to Piper Models PA-24-400, PA-30, and PA-39, outlining the fuel drainage procedures necessary to avoid the accumulation of water or sediment. (Class II, Priority Action) (A-81-160)

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


By: James B. King
Chairman