



MEMORANDUM FOR RECORD

Brian C. Rayner
Senior Air Safety Investigator
Eastern Region

Date: February 21, 2022
Person: David Lewis – FAA
NTSB Accident Number: ERA21LA173 Springfield, Tennessee
Subject: Piper PA23-250 Aztec - N5018Y Wreckage Examinations

Narrative:

Mr. Lewis was the FAA Aviation Safety Inspector who responded to the accident site with two other inspectors. He supervised the on-site examination, the layout examination, and the field examinations of both engines. The left engine examination was supervised by the NTSB.

The following is a summary of the examinations supervised by Mr. Lewis and the NTSB.

The airplane was examined and photographed by two FAA aviation safety inspectors. Examination of the photographs revealed that the cockpit and cabin areas were destroyed by impact and came to rest inverted. The wings were mostly separated but remained attached by cabling and sheet metal. The engines were in their nacelles, and the propeller blades of the left engine appeared undamaged and in what approximated a feathered position. The propeller blades of the right engine displayed similar twisting, bending, leading edge gouging, chordwise scratching and tip curling.

The wreckage was recovered from the accident site back to M91 for further examination. Control continuity was confirmed from the flight controls, through several breaks, to the flight control surfaces. All breaks and fractures displayed features consistent with overstress.

The right engine was suspended from an engine lift and partially disassembled to facilitate examination. The propeller remained attached to the crankshaft flange. The spark plugs and valve rocker covers were removed, and the engine crankshaft was rotated by turning the propeller. Continuity of the crankshaft to the rear gears and to the valve train was observed. Compression and suction were observed from all six cylinders. The interiors of the cylinders were observed using a lighted borescope and no anomalies observed.

Both magnetos remained attached to the engine. No damage was noted and both produced spark from all ignition towers when rotated by hand.

The carburetor displayed impact damage to control arms and cabling, and disassembly revealed trace amounts of fuel and no damage to brass floats or other internal components. The fuel pump operated when actuated by hand.

A cursory examination of the left engine was performed prior to shipment for a test run at the manufacturer's facility. The spark plugs and valve rocker covers were removed, and the engine crankshaft was rotated. Continuity of the crankshaft to the rear gears and to the valve train was observed. Compression and suction were observed from all six cylinders. The interiors of the cylinders were observed using a lighted borescope and no anomalies observed.

The oil suction screen was removed, and no debris observed. The oil pressure screen was removed and about ¼ teaspoon of particulate matter observed in the screen. Some of the matter could be attracted to a magnet. The particulate matter was bagged and left to be shipped to the manufacturer along with the engine. The propeller was removed. The oil suction screen, oil pressure screen, rocker covers, and spark plugs were reinstalled, and the engine set aside for shipment.

Due to the metal contamination, disassembly was performed instead of the engine test run. Removal of the #2, #4, and #6 cylinders revealed the #1 and #2 intake tappets and the #3 exhaust tappet were spalled. The #1 and #2 intake lobes and #3 exhaust lobe of the camshaft were severely spalled.

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The most recent engine field overhauls were completed on 12/09/1997, more than 23 years before the date of the accident. Lycoming Service Instruction No. 1009BE States:

“All engine models are to be overhauled within twelve (12) calendar years of the date they first entered service or of last overhaul. This calendar year time period TBO is to mitigate engine deterioration that occurs with age, including corrosion of metallic components and degradation of non-metallic components such as gaskets, seals, flexible hoses and fuel pump diaphragms.

CAUTION CALENDAR YEAR TBO IS BASED ON ACCELERATED TESTING AND OVERALL FLEET SERVICE DATA. LOCAL CLIMATE CONDITIONS, STORAGE CONDITIONS, FREQUENT EXTENDED PERIODS OF INACTIVITY, PRESERVATION TECHNIQUES USED DURING INACTIVE PERIODS, AND FREQUENCY OF OIL CHANGES CAN AFFECT CORROSION OF METALS AND DEGRADATION OF NON-METALS. For FAA Part 91 or EASA Part NCO (non-commercial) or equivalent operations, only an appropriately rated and

qualified maintenance person (or international equivalent) can allow the twelve (12) calendar year TBO to be exceeded with concurrence from the controlling civil aviation authority to verify agreement with this provision and after thoroughly examining the engine for corrosion and degradation in accordance with 14 CFR 43 Appendix D (or international equivalent) and determining that the engine remains in an airworthy condition. This inspection is to be repeated annually or as necessary to ensure continued airworthiness. The twelve (12) calendar year TBO must not be exceeded if the engine is affected by AD 2012-19-01 and not in compliance with AD 2012-19-01.”

Damage and impact signatures to the left propeller were consistent with the left propeller at or near the feathered position, with no power and little or no rotation at impact. The left propeller governor appeared intact and undamaged. It was bench tested and met all factory specifications except for the low RPM setting which did not prevent normal operation.

There were no discrepancies noted on the propeller components examined that would have prevented normal operation.

The most recent propeller overhauls were performed December 13, 1999.

According to Hartzell Propeller, Inc. Service Letter HC-SL-61-61Y, the overhaul periods and service life limits for this propeller installation was 2000 flight hours or 60 calendar months.

Airframe examination revealed the position of the main and nose landing gear, and their respective actuators were consistent with the gear in the “down” position. The landing gear handle was in the “down” position.

The right wing tank appeared intact, the thermos-style fuel cap was secure in its receptacle, and the tank contained about 15-20 gallons of fuel. The fuel pick-up was clear of obstruction and its filter screen was intact.

The right-side gascolator contained debris, and the filter screen was obstructed with rust and other materials. No fuel was noted in the left gascolator, its filter screen was not installed; and the gascolator securement was not safety wired. Examination of the aluminum gascolator bowl revealed deep, corrosive pitting. The pitted areas displayed fresh scribe marks consistent with recent cleaning of oxidized material from the pitted areas.

The left wing inboard fuel tank was breached, contained trace amounts of fuel, and the thermos-style fuel cap fit loosely in its fuel port. Once removed, the ribbed, expandable rubber gasket of the cap was uniformly coated with a white, adhesive residue. A 12-inch length of white adhesive duct tape was observed loose inside the tank. Once removed, the adhesive side of the tape revealed a rubbery residue consistent with that of the fuel cap gasket. The adhesive-coated area of the rubber gasket matched the dimension of the tape strip. The fuel pickup was clear of obstruction, but its filter screen was not installed.

Fuel system continuity was confirmed visually and with low-pressure compressed air.