

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ANC23FA074

ENGINE EXAMINATION

January 23, 2025

A. ACCIDENT

Location: St Marys, Alaska
Date: September 12, 2023
Time: 2047 LCL

Airplane: Piper PA18-150, Reg: N109T

B. ENGINE EXAMINATION

IIC	Elliott Simpson NTSB
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Party Coordinator	Jon Hirsch Piper Aircraft
Party Coordinator	Dave Harsanyi Lycoming Engines

C. SUMMARY

The engine was examined and disassembled at the facilities of Alaska Claims Services, Inc., in Palmer, Alaska on January 22 and 23, 2025. Examination did not reveal any anomalies with the engine that would have precluded normal operation.

D. DETAILS OF THE EXAMINATION

1.0 Engine

Model: O-320-B2B
Serial: L-19762-39A

The engine sustained minimal damage during the accident and remained partially attached to the firewall by its bent and fractured mount. An initial engine examination was performed at the accident site, which included a review of the magnetos, spark plugs, carburetor, and propeller.

The engine was intact and showed minimal signs of impact damage (see figure 1). The crankshaft could be rotated smoothly by hand at the crankshaft flange. There was

no evidence of crankcase perforation or catastrophic internal failure. The alternator, starter motor and forward oil cooler all sustained crush damage and were removed, along with the engine baffling.

The exhaust tubes sustained crush damage but remained attached to their respective cylinder heads. The muffler was removed and internally inspected, and there was no evidence of either internal gas path blockage or exhaust gas leakage, and the inner surfaces were coated in light grey deposits consistent with normal operation (see figure 2). The induction tubes were intact and remained firmly attached to both the cylinder heads, and their lower their flexible couplings at the sump.

Each cylinder head assembly was then removed and disassembled. The pushrods were all straight, and their tubes and seals appeared undamaged. All four cylinder head crowns were coated in light grey deposits and there was no evidence of piston head to valve contact.

All the exhaust and inlet valve faces displayed dark to light deposits, all in concentric patterns, with no evidence of hot spots, chips, or material loss (see figure 3).

All valves were removed; there was no evidence of deposit buildup or gouging to any of the stem-to-guide contact surfaces. All valve springs were intact, and the rocker arms and shafts were removed. The shafts were coated in oil and free of gouges. The contact areas for the rocker arms were shiny and free of damage.

The lifters were removed and examined. Their internal springs were intact, and all plungers moved freely within the lifter bodies. With the seat outflow end held closed, the plungers remained firm as designed. The lifter from exhaust valve of cylinder one was arbitrarily chosen and disassembled; There was no evidence of internal damage or contamination to the check valve ball or seat.

The pistons and their associated connecting rod assemblies were removed from the crankshaft. All bearing surfaces were intact and clean with no evidence of thermal damage (see figure 4). The cylinder bores were bright and displayed light crosshatching signatures.

The accessory case was removed; all timing gears were intact and undamaged. The oil pump input shaft could be rotated freely by hand. The pump gears were undamaged and coated in a light sheen of oil. The pump cavity walls were free of gouges (see figure 5). The oil filter was removed and opened, the paper element was coated in oil and free of debris (see figure 6).

The crankcase was opened and the crankshaft, camshaft, tappets and associated bearing surfaces were examined. The tappets moved smoothly within their bores,

and the faces were smooth to the touch, with no evidence of spalling or wavy patterns (see figure 7).

The camshaft bearing surfaces were smooth and the lifting surfaces were smooth to the touch, with no spalling (see figure 8).

2.0 Photographs



Figure 1- Engine before disassembly



Figure 2 - Exhaust muffler gas path



Figure 3 - Cylinder head crowns



Figure 4 - Crankshaft

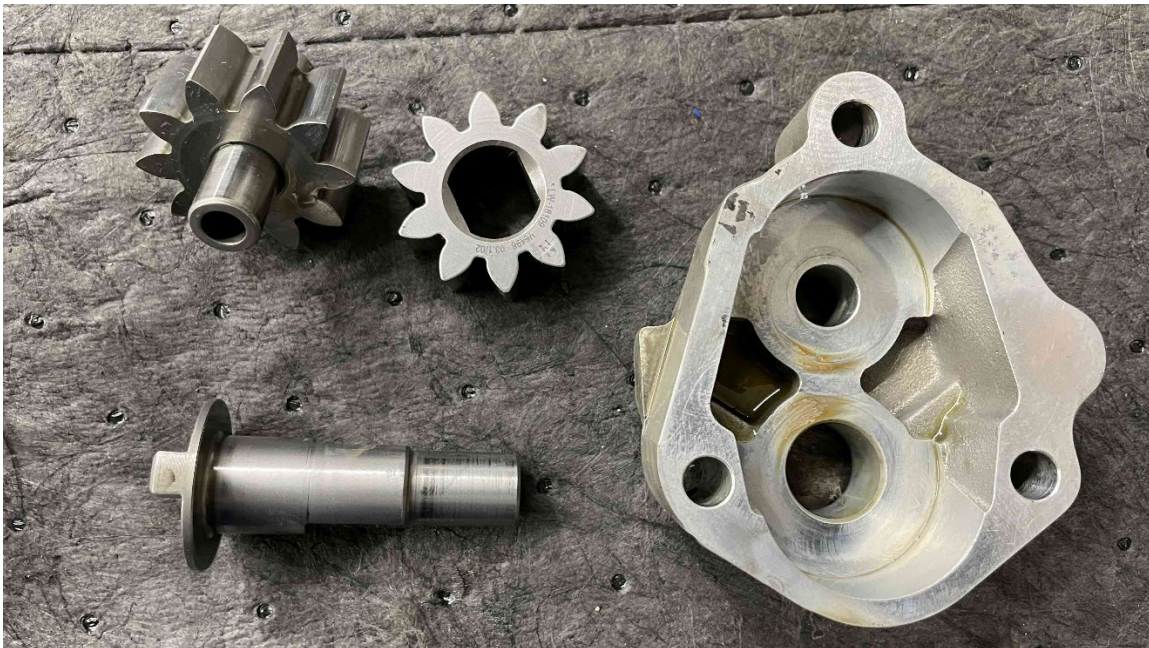


Figure 5- Oil pump



Figure 6 - Oil filter element



Figure 7 - Engine cylinder head assemblies



Figure 8 - Camshaft

Submitted by:

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