

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23LA094 N57355

ENGINE EXAMINATION

August 15, 2023

A. ACCIDENT

Location: Carlsbad, California
Date: January 19, 2023
Time: 0800 LCL
Airplane: Piper PA-28R-200, N57355

B. ENGINE EXAMINATION

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C. DETAILS OF THE EXAMINATION

1.0 Engine Examination

Model Number: IO-360-CIC
Serial Number: L-2608J-51A

An engine teardown was completed on August 15, 2023 at Aircraft Engine Specialists in Phoenix Arizona.

The crankcase halves were disassembled, and the crankshaft main bearings were intact and showed normal operational wear. The crankcase halves showed no signs of fretting or main bearing shift in the bearing saddle areas. The crankcase oil galley plugs were removed, and the oil galleys were free from obstruction. Internal mechanical damage was noted at the No. 3 and 4 cylinder bay areas.

The connecting rods were removed from the crankshaft and the connecting rod bearings were displayed out on an examination table. The No. 1, 2 and 3 connecting rod bearings had thermal discoloration and metal deformation. Fragments of bearing material were found in the oil sump.

The crankshaft oil galleys were clear of obstructions. The crankshaft counterweights moved freely by hand. The camshaft had light impact damage to the area near cylinder No. 4 lifter areas. The camshaft and crankshaft gears were undamaged.

The lifters were removed and several showed pitting on the head surfaces.

The exhaust ports showed signs of water ingestion from exposure to salt water. The cylinder 4 exhaust was unremarkable.

The engine was mostly devoid of oil. The oil return line at cylinder 3 contained oil sludge as did the oil sump, which also exhibited evidence of salt water corrosion. The accessory housing was mostly unremarkable, with exception of the oil pump, which exhibited heavy resistance when rotated by hand. The pump gears and housing contained oil throughout along with non-ferrous fragments, sludge along the track of the gears, and rust on one of the gears. The oil pump turned normally after the gears and housing were cleaned. No obstructions were observed in either of the 2 oil galleys.



Figure 1: Lower oil sump with sludge



Figure 2: Upper section of oil sump with saltwater corrosion



Figure 3: Oil pump gear and driving impeller

The fuel injectors were free of debris and unremarkable.

The cylinder 2 connecting rod was damaged.

The center bearing exhibited evidence of thermal distress and rotational scoring. The cylinder 1 connecting rod bearing was intact. The cylinder 2 connecting rod end bearing was fractured and the connecting rod journal exhibited evidence of thermal damage and a flat spot with significant deformation along the journal circumference. The cylinder 2 bearing had also disintegrated. The cylinder 3 connecting rod bearing displayed some heat distress and rotational scoring.



Figure 4: Center bearing with heat damage and rotational scoring



Figure 5: Cylinder 2 connecting rod end and cylinder 2 crankshaft journal



Figure 6: Cylinder 2 crankshaft journal

The main bearing did not exhibit any signs of heat distress. Most of the push rods remained intact with the exception of the cylinder 2 push rods, which were damaged during the engine's exposure to saltwater after the accident. The intake and exhaust valves for cylinders 2 and 4 could not be inspected due to damage sustained during postaccident exposure to saltwater. Each rocker arm was securely attached at its respective cylinder and to its valve.

Cylinder 4 could not be removed, which precluded further inspection of the cylinder 4 piston face, valve faces, and cylinder walls. The cylinder 4 bearing was also not inspected as the connecting rod could not be separated from the crankshaft.

Submitted by:

Paul Basti, Air Safety Investigator