

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA198

WRECKAGE EXAMINATION

May 16, 2024

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A. ACCIDENT

Location: Palatka, FL
Date: April 29, 2024
Time: 1645 EDT
2045 UTC
Airplane: N99442; Cessna 172P

B. WRECKAGE EXAMINATION

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C. SUMMARY

On April 29, 2024, about 1645 eastern daylight time, a Cessna 172P, N99442, was substantially damaged when it was involved in an accident near Palatka, Florida. The pilot was not injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

As first seen at the recovery facility the wings had been separated from the fuselage to facilitate recovery of the airplane. The nose of the airplane was on the ground and the tail was in the air due to damage sustained by the nose landing gear.



Photo 1: View of the airplane as first seen at the salvage yard.

1.1 Fuselage

The fuselage remained intact with wrinkling and buckling to the forward fuselage.

1.2 Empennage

The empennage remained attached to the fuselage and sustained no damage. The rudder remained attached to the vertical stabilizer at all attachment points and was undamaged. Continuity was confirmed from the rudder to the flight controls in the cockpit. The elevator remained attached to the horizontal stabilizer at all attachment points and was undamaged. Control continuity was confirmed from the flight control surface to the flight controls in the cockpit. The elevator trim tab remained attached to the elevator at all attachment points and was undamaged.

1.3 Aircraft Wings

Both wings were removed from the fuselage by recovery personnel to facilitate recovery of the airplane. Both lift struts were removed by recovery personnel to facilitate recovery.

The right wing remained intact and was undamaged. The right aileron remained attached to the wing at all attachment points. Control continuity was confirmed from the flight control surface to the flight controls in the cockpit through cuts made for recovery. The right flap remained attached at all attachment points.

The left wing remained intact and was undamaged. The left aileron remained attached to the wing at all attachment points. Control continuity was confirmed from the flight control surface to the flight controls in the cockpit through cuts made for recovery. The left flap remained attached at all attachment points.



Photo 2: View of the wings at the recovery facility.



Photo 3: View of the wings at the recovery facility.

1.4 Landing Gear

The nose landing gear wheel assembly had been sheared from the airplane below the lower torque link attachment. The nose landing gear strut remained attached to the firewall.

The main landing gear remained attached to the fuselage and was undamaged.

1.5 Cockpit

Upon first inspection at the recovery facility the flap handle was in the fully up position. The carburetor heat control was in the fully aft position and when operated by hand moved from stop to stop on the carburetor. The throttle control was in the fully aft position and when operated by hand moved from stop to stop on the carburetor. The mixture control was in the fully aft position and when operated by hand moved from stop to stop on the carburetor. The rudder trim was set slightly to the right of center indicating nose right trim. The elevator trim was set about halfway from the takeoff position to the nose down stop indicating nose down trim. One exhaust gas temperature gauge was installed, and the sensor was on the No. 4 cylinder exhaust pipe. The ignition key was not in the ignition and was set to the OFF

position. None of the circuit breakers were popped out. The following switch positions were observed:

- Master: OFF
- Avionics Master: OFF
- Pitot Heat: OFF
- NAV LT: OFF
- BEACON LT: OFF
- Strobe LT: ON
- Taxi LT: OFF
- Land LT: OFF

Hobbs Meter: 9257.3 hours

Tach Time: 4413.2 hours



Photo 4: View of the cockpit.

1.6 Fuel/Fuel System

Both wings had been removed from the airplane and the fuel caps were seated and locked on their respective wings. The fuel selector was set to left. The fuel strainer screen was removed and examined and showed minimal organic debris.



Photo 5: View of the fuel selector.

2.0 Engine Examination

The engine as first observed remained attached to the fuselage through the tubular engine mount with the cowling still attached. The cowling was removed. Oil was observed on the upper and lower surfaces of the engine crankcase and on the forward surface of the forward engine baffles. Oil was observed on the interior surface of the lower cowling. Epoxy sealing material was observed smeared in the upper area where the two crankcase halves meet. Oil was observed on the crankcase nose in the area behind the starter ring gear support. Compression and suction were confirmed on all cylinders when the crankshaft was rotated through multiple 360° of rotation by hand using the propeller. Continuity of the crankshaft to the rear gears and valvetrain was established by rotating the crankshaft through multiple 360° of rotation by hand using the propeller. It was observed that some valves lifted considerably less than others, upon further examination it was found the camshaft lobes had been severely worn. The Nos. 2 and 4 intake pushrod tubes were dented. The propeller was removed and the crankcase nose oil seal protruding about 3/8 inch from its recess in the crankcase nose. Sealing material was observed smeared on the forward surface of the seal. The crankcase was split to facilitate further examination of the engine. The cylinders and pistons were removed. No damage to the cylinders, pistons, piston pins, valves or valve springs was observed. The connecting rods were rotated freely by hand on their respective crankshaft rod

journals. The crankcase halves were separated, and the crankshaft and camshaft removed. The faces of all four hydraulic tappet bodies in the right crankcase half exhibited significant corrosion pitting. The faces of three of the four hydraulic tappet bodies in the left crankcase half exhibited significant corrosion pitting. Three of the six camshaft lobes exhibited significant wear. The crankshaft main journals and rod journals exhibited light scoring. The crankshaft main bearings and the rod bearings also exhibited light scoring.



Photo 6: Overview of engine still attached to airframe.



Photo 7: View of sealant on the spine of the crankcase.



Photo 8: Oil behind the starter ring gear support.



Photo 9: Oil pooled in the back of the starter gear ring.



Photo 10: View of the crankcase nose oil seal as first observed.

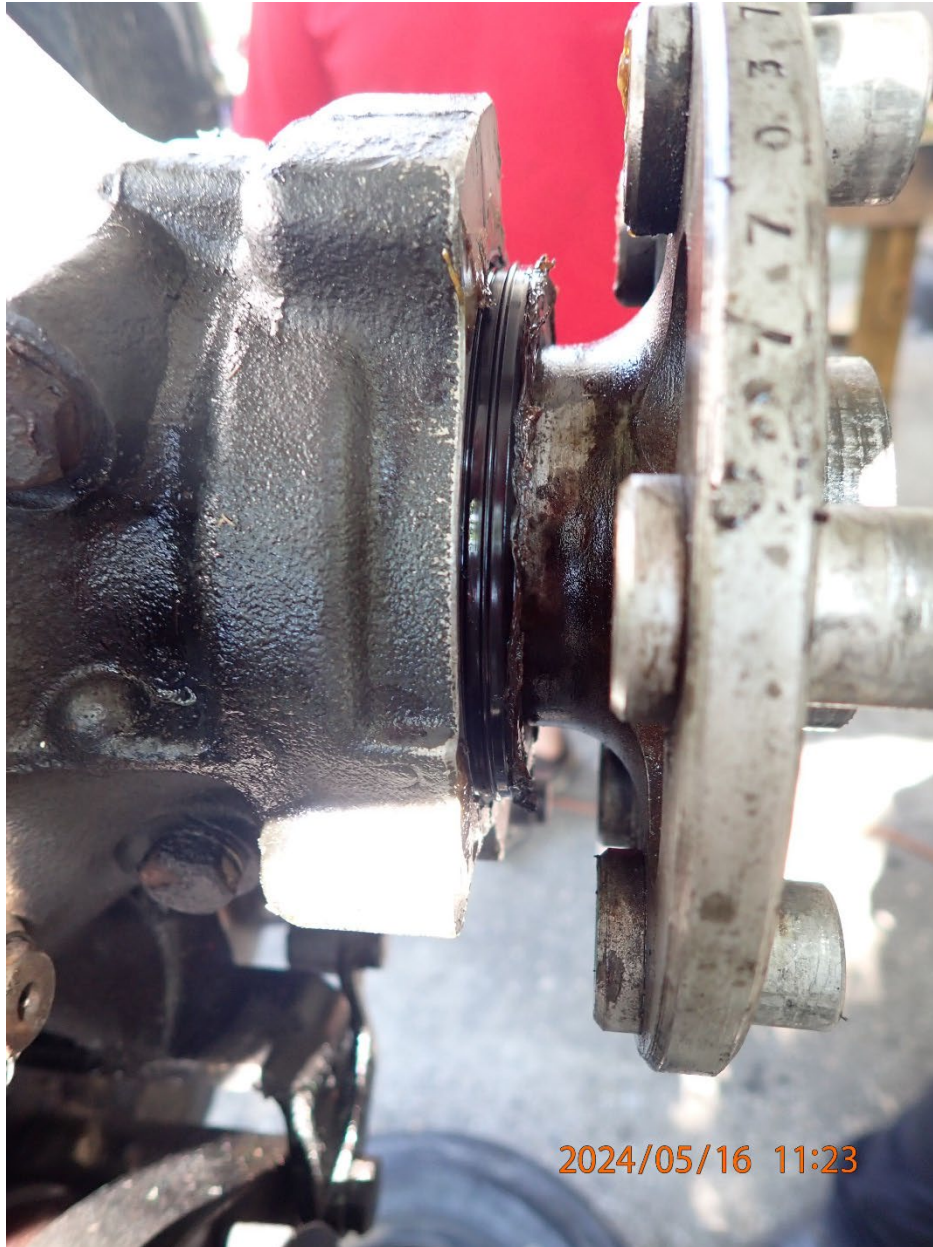


Photo 11: View of the crankcase nose oil seal as first observed.



Photo 12: View of the right crankcase half.



Photo 13: View of the left crankcase half.



Photo 14: View of the forward camshaft lobes.



Photo 15: View of the aft camshaft lobes.



Photo 16: View of the crankshaft.



Photo 17: View of the crankshaft bearings.



Photo 18: View of the disassembled connecting rods.

2.1 Induction and Exhaust System

The air intake filter remained in the cowling and had minimal organic debris. The passageway from the air filter to the carburetor was unobstructed. The engine exhaust system was removed. The Nos. 1 and 3 exhaust flanges were observed cracked. The exhaust muffler was not obstructed.



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Photo 19: View of the air intake filter.



Photo 20: View of the No. 1 exhaust flange. (Lycoming Photo)



Photo 21: View of the No. 3 exhaust flange. (Lycoming Photo)

2.2 Magnetos

Both the left and right magneto remained attached to the engine at all attachment points. A review of maintenance records found the right magneto had been replaced on April 11, 2024, 17 days prior to the accident. The right magneto did not have the ground wire attached and did not have an impulse coupling. The right magneto sparked on all leads when the drive gear was rotated by hand. The left magneto was equipped with an impulse coupling and sparked from all leads when the drive gear was rotated by hand.



Photo 22: View of the magnetos installed on the engine.

2.3 Ignition System

The spark plugs remained installed in their respective cylinder heads and were undamaged. All spark plugs were removed and exhibited worn normal wear when compared to the Champion Aviation AV-27 Check-A-Plug chart.



Photo 23: View of the top sparkplugs.



Photo 24: View of the bottom sparkplugs.

2.4 Fuel System

Fuel was found in the lines between the fuel strainer and the carburetor. The fuel line from the fuel strainer to the carburetor was wrapped with tape consistent with black electrical tape. The carburetor remained attached to the engine. The cockpit throttle control cable knob was observed in an aft position. The cable remained attached to the carburetor throttle control arm and the arm was positioned about 1/8 inch from the idle stop. The cockpit mixture control cable knob was observed in an aft position. The cable remained attached to the carburetor mixture control arm and the arm was positioned at the idle cut-off stop. The cockpit carburetor heat control cable knob was observed in an aft position. The cable remained attached to the induction air box control arm and the arm was positioned fully aft.

The carburetor was removed and partially disassembled. The carburetor float bowl was about half full of blue liquid with an odor consistent with aviation gasoline. No debris was noted in the bowl. No damage to the composite bowl floats or other internal carburetor parts was noted. The carburetor fuel inlet screen was unobstructed.



Photo 25: View of the fuel line from the fuel strainer to the carburetor.

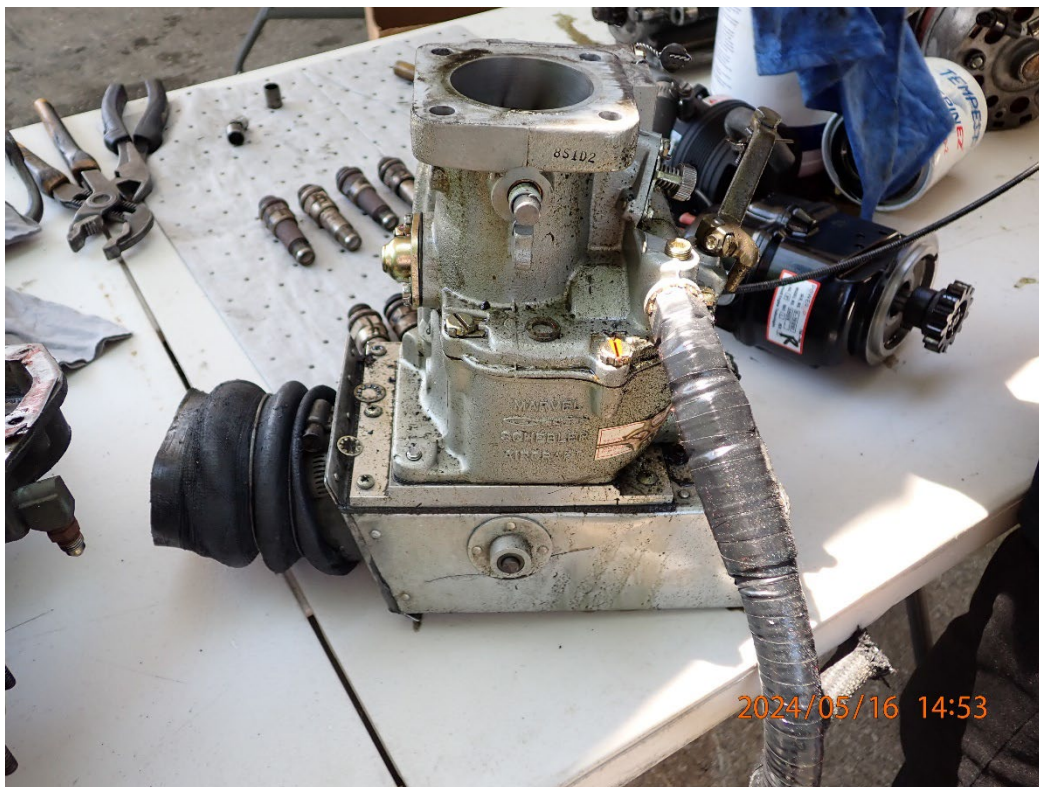


Photo 26: View of the carburetor removed from the engine.



Photo 27: View of fuel in the carburetor float bowl.

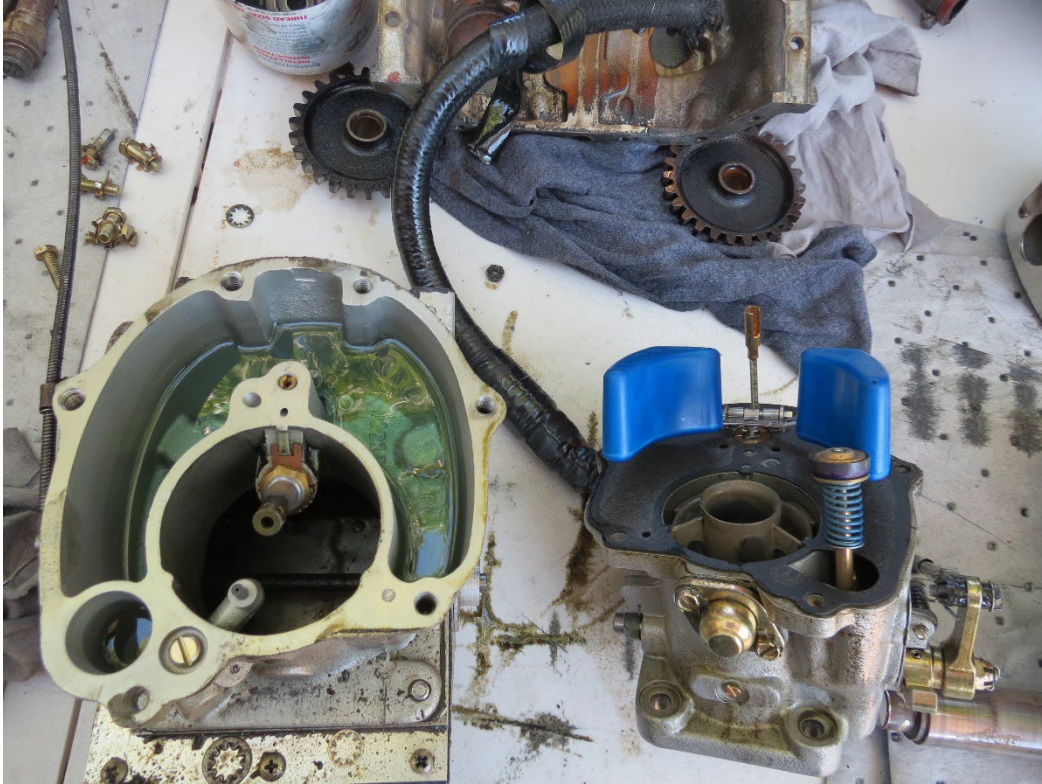


Photo 28: View of the disassembled carburetor. (Lycoming Photo)

2.5 Lubrication System

Upon initial inspection of the engine oil was seen streaked on the exterior of the crankcase. The quick drain oil plug remained secured and was opened to facilitate the draining of any oil that remained in the engine. About 2 quarts of oil were drained from the engine. The oil suction screen was unobstructed. The oil filter was removed and cut open and contained a small amount of metallic debris. The oil pump produced oil when the oil pump was rotated by hand in the accessory case. The pump was disassembled and no damage to the gears observed. Light scoring was observed on the oil pump cavity walls. Oil was observed pooled on the back of the starter gear ring.



Photo 29: View of the oil suction screen.



Photo 30: View of the oil filter pleats.



Photo 31: View of the disassembled oil pump. (Lycoming Photo)

2.6 Vacuum Pump/System

The vacuum pump was removed, and the shear drive gear remained intact. The pump sucked and pumped air when the drive gear was rotated by hand. The pump was disassembled and found all the carbon veins and core were undamaged and intact.

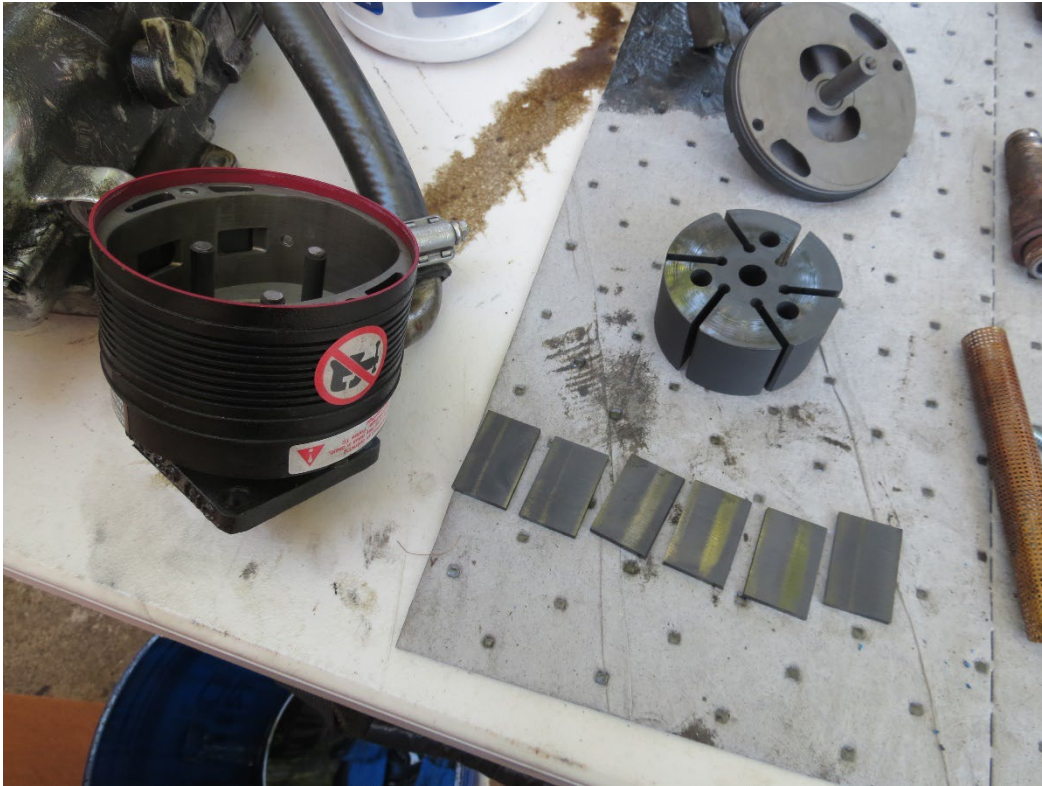


Photo 32: View of the disassembled vacuum pump. (Lycoming Photo)

3.0 Propeller Examination

The propeller was a single piece aluminum 76 inch Sensenich 76EM8S5-0-60 with a fixed pitch. One blade of the propeller was bent aft about 45° about the midspan. The other blade was undamaged.



Photo 33: Overview of the propeller. (Lycoming Photo)

Submitted by:

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