

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24LA155

EXAMINATION SUMMARY

September 10, 2024

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A. ACCIDENT

Location: Sullivan, Missouri
Date: April 11, 2024
Time: 0825 central daylight time
Airplane: Piper PA-32, N651ED

B. EXAMINATION SUMMARY

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Investigator	Cory Maxon NTSB Denver, Colorado
Party Member	David Harsanyi Lycoming Engines Williamsport, Pennsylvania

C. SUMMARY

On April 11, 2024, about 0825 central daylight time, a Piper PA-32, N651ED, was substantially damaged when it was involved in an accident near Sullivan, Missouri. The passenger sustained minor injuries and the pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* part 91 personal flight.

According to the pilot, about 0600, the flight departed Rochester International Airport, Rochester, Minnesota, after a preflight check and normal engine runup. The flight then continued enroute towards Kirk Field Airport, Paragould, Arkansas. About 2 hours after takeoff, the pilot noticed a slight drop in rpm. He troubleshot the engine issue by turning on the auxiliary fuel pump, switching fuel tanks, and adjusting the fuel mixture. The pilot was unable to restore engine power and, about 2 minutes after the pilot noticed the initial drop in rpm, the engine surged and then lost all power.

The pilot told the air traffic controller that the airplane had a loss of engine power and prepared for a forced landing to a field. During the landing roll, the airplane impacted trees at the edge of the down sloping and wet field. The airplane came to rest upright and sustained substantial damage to the stabilator, fuselage, and both wings.

A postaccident review of the airplane's engine monitor data revealed an increase in oil temperature and a decrease in oil pressure before the total loss of engine rpm, as shown in figure 1.

An initial engine examination revealed a bent No. 3 cylinder intake valve pushrod tube and a crack in the engine case.

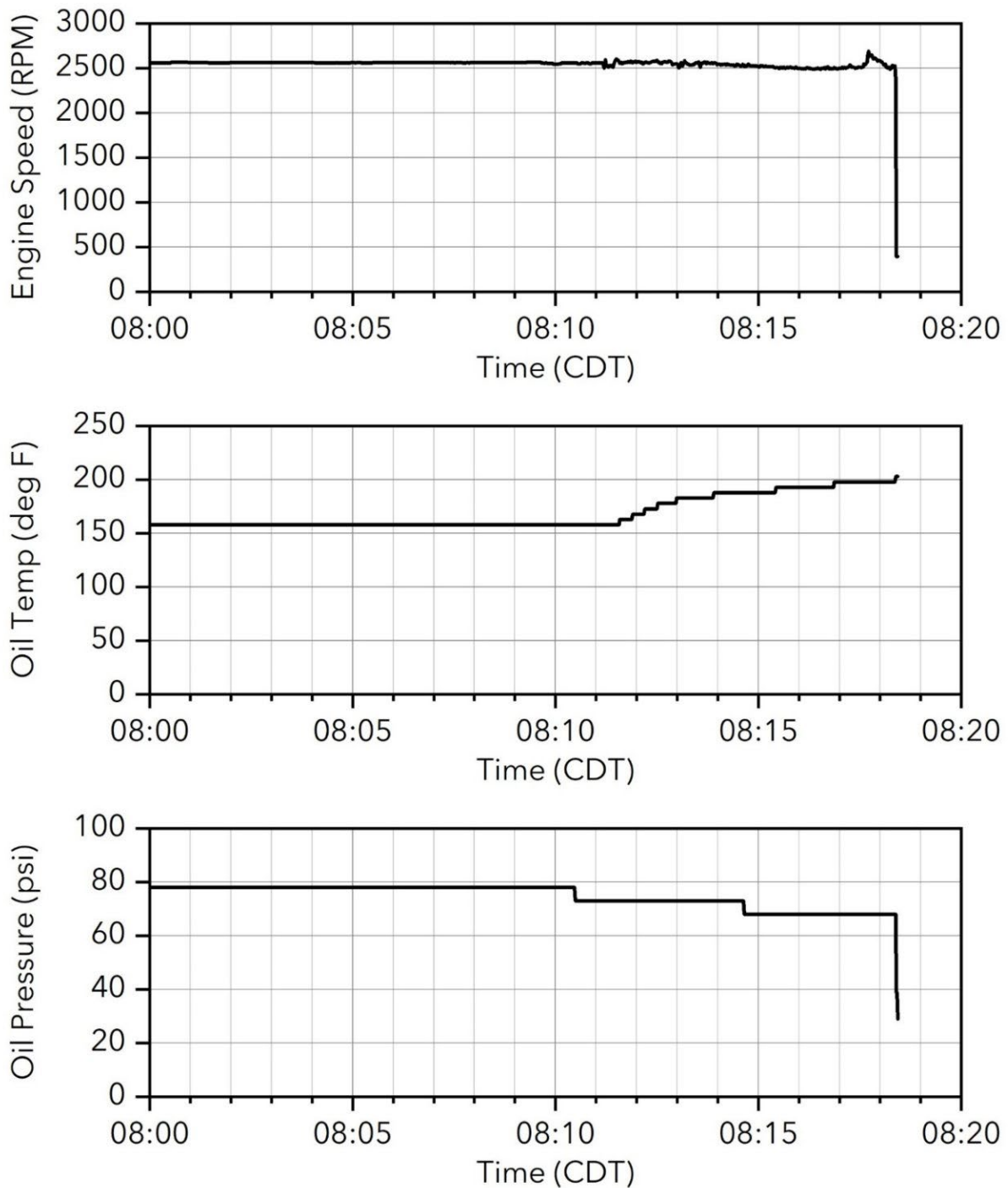


Figure 1: Plots of recorded engine data (engine speed, oil temperature, oil pressure)

1.0 Airframe Examination

The engine was examined at AMF Aviation in Springfield, Tennessee. As first viewed, the engine remained attached to the accident aircraft fuselage via its respective engine mount. Both wings appear to have been removed from the fuselage during the accident sequence. Both the left and right horizontal stabilizers had been cut from the wreckage for transportation purposes.

2.0 Engine Examination

Little to no impact damage was noted to the engine or its accessories except for a crack in the engine case above the number 3 cylinder on the right hand engine case half and bent pushrods on cylinder number 3. The engine mount suffered minor impact damage from the collapsing of the nose gear during the accident sequence. The 3-bladed propellor was found attached to the engines crankshaft with one of the three blades having a small bend towards the tip (Figure 2). The other two blades remained undamaged.



Figure 2. Propeller, engine and fuselage as presented for examination.

The engine was cut from its engine mount and hung from an engine hoist for examination. Both left and right hand magnetos were found tightly installed to the rear accessory section of the engine. The left-hand magneto was of the electronic type while the right-hand magneto was conventional. Both magnetos were removed and examined. The left-hand magneto had 20 volts applied and verified to be internally timed and sparked at all points when manually rotated by hand. The right-hand magneto was rotated using an electric drill and spark was produced at all points.

Top spark plugs were found tightly installed to each cylinder and removed. The engine was rotated manually by pulling the propellor, but no thumb compression or valve movement was noted on any cylinder. The remaining engine components such as fuel pump, fuel injector, fuel manifold, starter, and alternator were removed and set aside for examination.

The oil suction screen was found tightly installed to the oil sump with safety wire installed, no leakage noted. The suction screen was removed and found to be contaminated with metallic debris. The oil filter was found attached to the accessory section with safety wire installed. The filter was removed and cut open to examine the

filter element. Metallic particles were noted throughout the filter. A date of 8/14/23 was written on the filter can with a hours total of 3426.7 listed.

All cylinders were found tightly installed to the engine case and removed for examination. Cylinders number 1, 2, and 6 were removed with minor resistance once attaching hardware was removed. Cylinders 3, 4, and 5 were met with resistance during the removal process due to internal engine damage but eventually removed from the case halves. The case halves were split by removing all thru studs. The engines crankshaft was found to be fractured in two different areas (Figure 3). The crankshaft was sent to the NTSB materials laboratory for further analysis. Metal shavings were found inside the case (Figure 4). The center portion of crankshaft containing the journals for cylinder numbers 3 and 4 were fractured and punctured a hole through the bottom the engine case halves into the oil sump. The connecting rod for cylinder number 4 remained attached to the crankshaft but was found fractured near the piston pin end of the rod. The connecting rod for cylinder number 3 was found attached to the crankshaft and piston pin but was twisted along its axis. The camshaft was intact with no observed fractures. All lobes were undamaged and did not show signs of wear or corrosion. Damage was noted along its overall length in the form of gouges and bends from rotating components coming into contact during the accident sequence only. Tappets for the intake side of cylinder number 3 and 4 were noted to be fractured along each shaft but present within the engine at time of the exam. These fractures appear consistent with rotation damage caused during the accident sequence.



Figure 3. Crankshaft

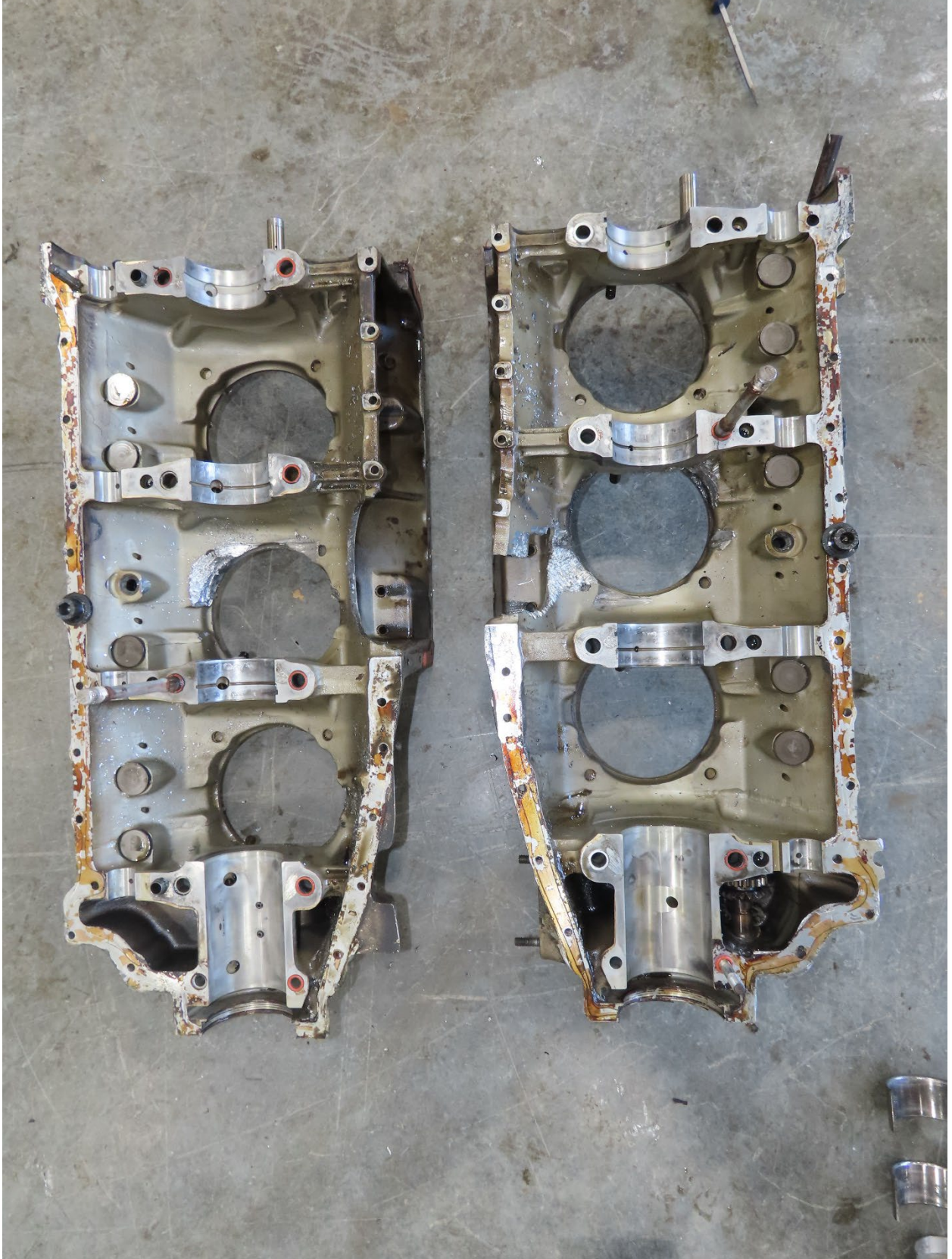


Figure 4. Engine case

The fuel servo was removed from the lower side of the engine with both the throttle and mixture arms attached. Full range of motion was noted on both arms and the throttle plate moved freely with not noted issues. The fuel inlet screen was removed and found free and clear of any debris. Both diaphragms were inspected and found free and clear of debris or tears. The fuel manifold was tightly installed to the top of the engine with all injector lines attached. The manifold was removed and examined. No tears or debris were observed on the diaphragm. All injectors were found tightly installed to each cylinder with no debris or blockages observed.

All intake and exhaust pipes were found free and clear of any blockages or debris.

All sparkplugs showed normal wear pattern and coloration consistent with normal engine operation. The Champion REM38E sparkplugs were of the massive electrode type with not observed damage to the electrodes noted.

Submitted by:

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NTSB