

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA361

EXAMINATION SUMMARY

November 20, 2024

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A. ACCIDENT

Location: Lynchburg, VA
Date: August 29, 2024
Time: 1724 Local
Airplane: N734SY, Cessna 172N, Serial Number 17269088

B. EXAMINATION SUMMARY

Group Member	Ryan Enders National Transportation Safety Board Washington, D.C.
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Party Coordinator	Mark Jennings Federal Aviation Administration Richmond, VA

C. SUMMARY

On August 29, 2024, about 1717 eastern daylight time, a Cessna 172N, N734SY, was substantially damaged when it was involved in an accident near Lynchburg, Virginia. The pilot received minor injuries. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 test flight.

According to the pilot, the preflight inspection was normal, oil and fuel was at capacity, and the flight controls were free and correct. The preflight engine run was normal with the oil pressure indicating 60psi, oil temperature was in the green arc, the magneto checks at 1,700 rpm showed normal rpm drops, and the carburetor heat check showed a normal rpm drop.

He then taxied to runway 10 at Falwell Airport (W24), Lynchburg, Virginia for takeoff. All systems were normal. He added power for takeoff, the airspeed came alive, and the tachometer read about 2,200 rpm. He then established an indicated airspeed of 80 knots during the initial climb. All systems were normal and indicated in the green arc. The oil pressure reading was above the middle of the green arc. Upon reaching approximately 1,300 feet above mean sea level, the engine incurred a complete power loss and seized, with the propeller stopping within 3 seconds. He then turned left (back in the direction of the airport), as he had seen a couple of open areas over his left shoulder.

At this time, he was communicating on the common traffic advisory frequency, and he made "Mayday" distress calls that were heard by employees at W24, and he

picked an open area behind a hotel. His flight path was over the back yards of houses. As he approached the open area the left wing impacted a tree which yawed the airplane 90 degrees. The airplane then impacted the ground, bounced, hit the ground again, and then slid to a stop. The pilot then egressed through the right passenger door.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

As first viewed, the airplane fuselage, empennage, and engine remained attached to each other and were positioned on wood blocks for the examination. The wings, rudder, and elevator were removed by recovery personnel to facilitate transport of the airplane. The wings, rudder, and elevator were positioned next to the airplane for the course of the examination. The main landing gear and nose landing gear were sheared from the airplane and were stored within the fuselage of the airplane.



Left Side of the Airplane



Right Side of the Airplane

1.1 Fuselage

The fuselage was intact with buckling and wrinkling on the right side, aft of the passenger door and below the passenger door. The front seats had been removed and were stored in the back of the fuselage with the rear seats. The carpet had been removed prior to the examination. The front windscreen was broken in several places.



Right Side Fuselage Wrinkling



Shattered Windscreen



Airplane Interior as Observed

1.2 Empennage

The empennage was mostly undamaged. The rudder and elevator were removed by recovery personnel for transport. The rudder and elevator were undamaged. Control cable continuity from the rudder and elevator were established to the cockpit.



Empennage Structure



Rudder and Elevator

1.3 Wings

Both wings had been removed by recovery personnel for transportation. Control cable continuity was visually established from both wings to the cockpit. The flaps were observed in the full down position.

The right wing had impact damage to the outboard portion of the aileron, but the aileron moved freely. Skin buckling from impact forces was apparent on the wing on the outboard forward, bottom surface. According to the FAA, the right wing held fuel that the pilot was draining from the wing when he arrived on scene. The fuel lines and vents from the right wing to the fuselage were plugged by recovery personnel with wood to prevent fuel leakage during recovery.



Right Wing

The left wing was substantially damaged from impact to the leading edge. The wing was wrinkled and bent in several locations. Crush damage to the leading edge was apparent over most of the wing. The left aileron was substantially damaged from the impact. The left flap was damaged. The left-wing fuel lines and vents were not plugged and were exposed to the elements during storage.



Left Wing

1.4 Landing Gear

The nose landing gear had sheered during the impact. The remaining strut structure was pushed upwards and aft towards the engine firewall. The left and right main landing gear were sheared and stored within the wreckage.

1.5 Cockpit

The cockpit was mostly undamaged. The airplane was equipped with two manual fuel level gauges that read "E". The engine tachometer read "0". The airspeed indicator read "0". The suction gauge was off the scale to the right. The altimeter reading was 350 with an altimeter setting of 30.15. The vertical speed indicator read "0". The navigational gauges appeared undamaged. The primer was in and locked. The master power switch was in the "off" position. The ignition was in the "off" position. There were no popped circuit breakers observed. The parking brake was in the off position. The pitot head, landing light, and navigation light switches were in the "off" position. The beacon light and strobe light were in the "on" position. The carburetor heat lever was in the off position. The throttle and mixture control levers were observed in an idle and idle-cutoff position, respectively. The flap lever was in the full down position. The fuel selector was in the "off" position. The communication equipment and Garmin GNC 300XL appeared undamaged. The Stratus transponder appeared undamaged. The cabin heat and cabin air control levers were in the "off" position. The tachometer hours reading was "0709.6". The Hobbs meter reading was "0954.7". The cockpit had a ACK ELT control panel.



Cockpit

1.6 Survivability

The front seats were equipped with 3-point seat belts. The airplane was equipped with an ACK ELT. The pilot and co-pilot seat rails were undamaged.

1.7 Fuel/Fuel System

Both fuel tanks had been drained of fuel prior to the examination. It is unknown how much fuel was in each fuel tank. The fuel tank venting system appeared to be blocked by organic matter above the fuselage. The airplane was stored outside at the

recovery location and exposed to the environment; therefore, the blockages are likely from insects.



Plugged Left Wing Vent

The airplane utilizes a gravity system that feeds from the high wing fuel tanks, through the fuel selector, to the airframe fuel strainer, then directly to the engine carburetor. Compressed air was blown through the fuel selector in the off, right, left, and both positions and no discrepancies were noted. The fuel strainer contained a fine, sandy material in the bottom of the bowl that had a red tint in color. Fuel remained in the fuel strainer. The remaining fuel was tested with a water finding paste and no water was present. The inlet to the carburetor was clean. The carburetor was secured to the bottom of the engine sump housing and was undamaged. The carburetor was opened for further investigation. Minor debris was found in the bottom of the carburetor bowl. The main jet was clear. The plastic floats were undamaged.

The two-bladed metal propeller was not removed during the examination. One blade remained straight and undamaged. The second propeller blade was slightly bent aft. There were no rotational signatures observed.



Remaining Liquid and Debris from Fuel Strainer



Fuel Strainer Bowl with Debris



Debris in the Carburetor Bowl



Debris in the Fuel Filter

The right-wing vent and fuel lines were plugged by recovery personnel with tree sticks to prevent fuel leakage during the recovery operations. The left-wing vent and fuel lines were not capped during storage. Both wing tanks were examined with a lighted borescope and no debris was noted.



Plugged Fuel Lines from Recovery Personnel

2.0 Engine Examination

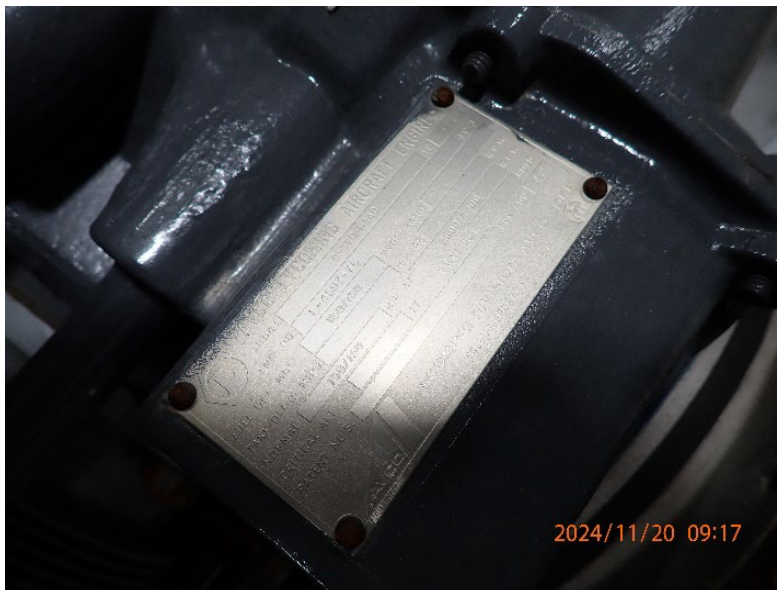
The engine is a Lycoming O-320-H2AD engine. It is a four-cylinder, air cooled, direct drive, horizontally opposed, naturally aspirated, carbureted powerplant.

The engine rotated 720° when force was applied to the crankshaft flange. Thumb compressions and valve action movement was observed on all cylinder assemblies. Continuity of the crankshaft to the camshaft was confirmed throughout the engine. The cylinders were examined with a lighted borescope and no anomalies were noted.

All spark plugs remained installed in their respective cylinder heads and were undamaged. The top spark plugs were a combination of massive electrodes and fine wire electrodes. The bottom spark plugs were all fine wire electrodes. The spark plugs displayed coloration consistent with normal engine operation and had normal wear when compared to the Champion Aviation AV-27 check-a-plug chart. The engine was equipped with a dual magneto with an impulse coupling. The impulse coupling produced spark at all leads when actuated. The timing of the dual magneto was checked and found at 25°.

The cylinder induction pipes remained attached to their respective cylinder heads and to the engine sump housing with no damage noted. The engine air bracket filter was crush damaged but was clean. The flexible induction hose from the bracket air filter to the carburetor was crushed from impact forces. The exhaust pipes of each cylinder remained attached. Crush damage was noted to the heater muff. The exhaust muffler was inspected with a lighted borescope and no blockages were observed.

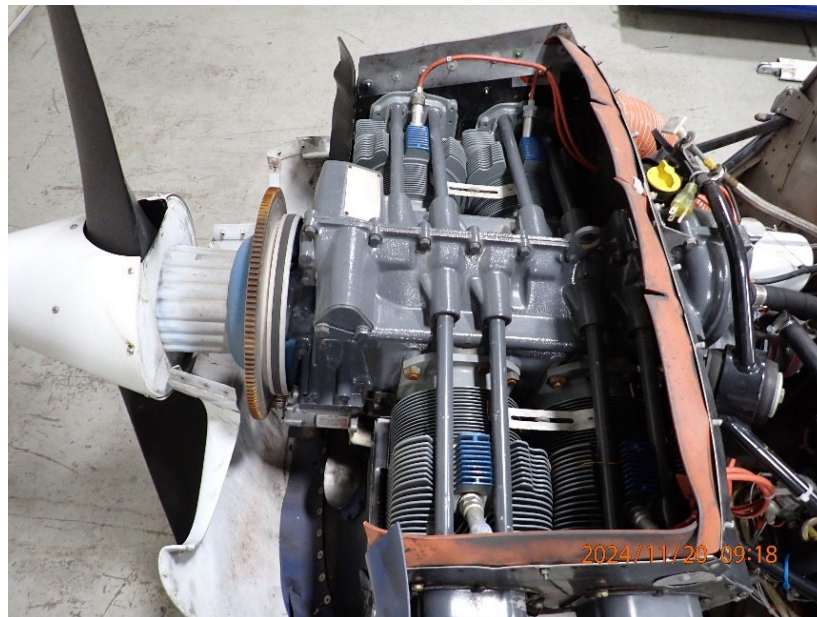
The oil filter remained secured to the accessory housing and was removed for further examination. The filter contained a large quantity of viscous oil, similar to engine assembly oil. A small quantity of ferrous and non-ferrous metal material was observed and was a likely result of the engine break-in period from the recent engine overhaul. The oil suction screen was not present within the oil sump. The oil pump was removed for examination with no discrepancies noted. With the oil pump, oil filter housing, and oil pressure relief valve removed, the oil passages were checked for blockages with safety wire, but no blockages were observed. The oil pressure relief valve was clean with no nicks or indents on the ball or the seat. The oil cooler bypass valve was removed and a uniform witness mark from seating was observed. The engine oil sump contained 5 quarts of clean engine oil when measured on the oil level gauge.



Engine Data Plate



Back of the Engine Prior to the Examination



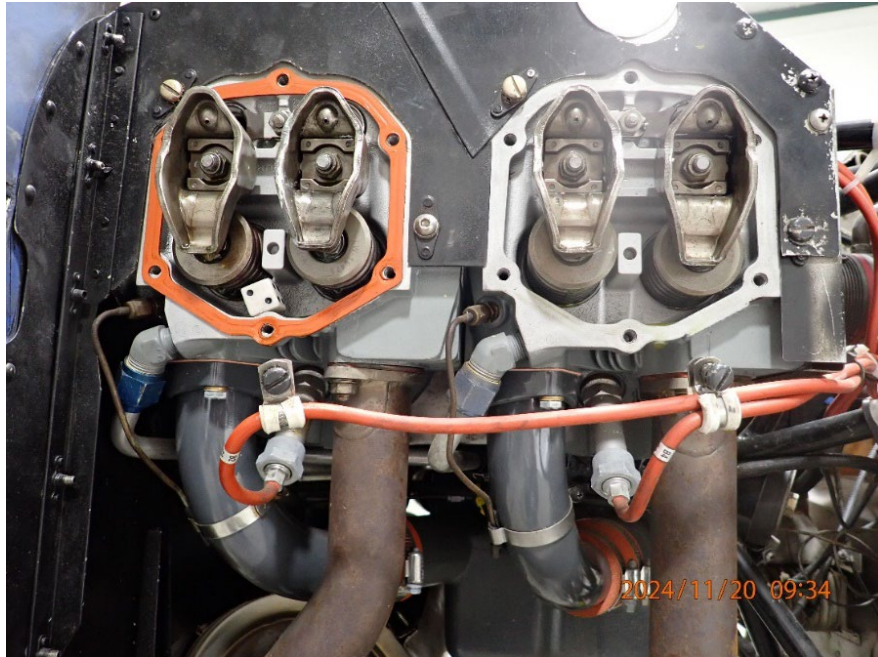
Top of the Engine Prior to the Examination



Spark Plugs as Removed



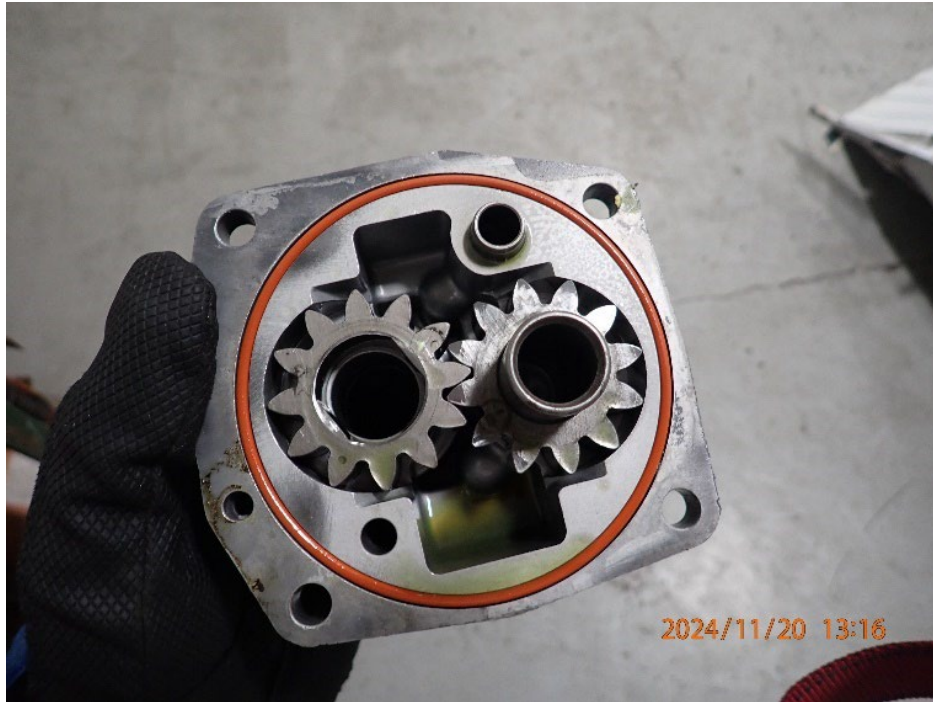
Cylinders 1 (right) and 3 (left) with the Induction Pipes, Exhaust Pipes, and Lower Leads Attached



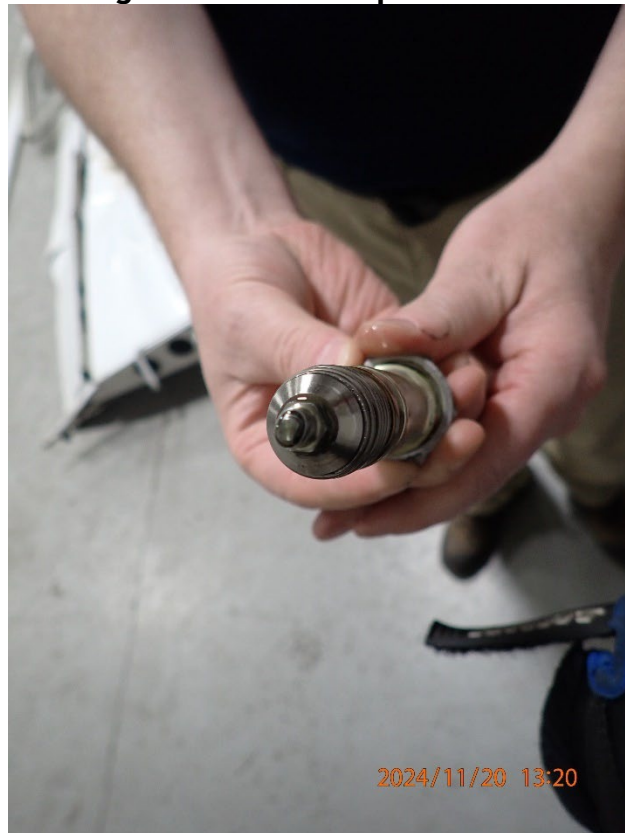
Cylinders 2 (left) and 4 (right) with the Induction Pipes, Exhaust Pipes, and Lower Leads Attached



Oil Filter Element with Visible Assembly Lubrication



Engine Driven Oil Pump as Removed



Oil Cooler Bypass Valve with Uniform Contact Marking



Visible Assembly Lubrication Oil Present on Rocker Arms

3.0 Aircraft Information

The airplane is a Cessna 172N, serial number 17269088. Both wings and the fuselage sustained substantial damage during the accident sequence.



Airplane Door Data Plate

Submitted by:

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Aviation Accident Investigator