

National Transportation Safety Board

Office of Aviation Safety

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N8225N - AIRFRAME AND ENGINE EXAMINATION REPORT

July 15, 2023

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A. ACCIDENT

Location: Osage Beach, Missouri
Date: July 13, 2023
Time: 1213 Central Time
Airplane: N8225N, Piper PA-28-140 (Cherokee B)

B. N8225N - AIRFRAME AND ENGINE EXAMINATION REPORT

IIC	Mike Hodges, aviation accident investigator National Transportation Safety Board Aurora, Colorado
Party Coordinator	Tom Davis, aviation safety inspector (airworthiness) Federal Aviation Administration Kansas City, Missouri
Party Coordinator	Jon Hirsch, senior air safety investigator Piper Aircraft Vero Beach, Florida
Party Coordinator	Mike Childers, senior air safety investigator Lycoming Engines Williamsport, Pennsylvania

C. DETAILS OF THE EXAMINATION

1.0 Accident Site

The accident site was a heavily wooded area, on private property. The multiple pine trees at the accident site were about 50 ft tall.

The initial impact point at the accident site was a large pine tree. The tree was about 50 ft tall. Multiple branches at the top of the tree were impacted by the airplane. The airplane impacted the tree on about a 062-degree heading. The elevation of the initial impact point was about 810 ft above msl.

The distance between the initial impact point and the final impact point was about 80 ft on about a 062-degree heading.

The final impact point was a large pine tree about 70 ft tall. There were multiple impact marks located about halfway up the tree. The airplane came to rest on a heading of about 022 degrees. The final impact point was about 810 ft above msl.

There was no fire. There were no signs of snarge in the wreckage. There were no ground injuries.

The accident site was about 0.55 miles to the northwest of the departure end of runway 32 at the Grand Glaize Airport (K15), Osage Beach, Missouri.

The wreckage was recovered by AMF Aviation on July 14, 2023, and was transported to their facilities in Springfield, Tennessee.

2.0 Airframe Examination (Piper PA-28-140, serial number 28-25430)

The marketing name for the airplane is a Cherokee B.

All four corners of the airplane were accounted for at the accident site. The airplane sustained substantial damage to both wings, the fuselage, and the empennage.

Observed on scene, the aircraft was upright with the engine slightly buried in the terrain. The left wing against a tree and the empennage was rising in the air. The nose landing gear wheel assembly was separated and laying in the debris field amongst several large tree branches which appeared to have been freshly broken off. The windshield was fractured and separated from the fuselage. The roof of the cabin was torn and fragmented exposing the interior of the cockpit and cabin. All four seats remained in the aircraft. Seat #1 was impact damaged on the left side and partially separated from its seat tracks. Seat belts at each seat appeared intact and undamaged. The buckles were all found unbuckled and functioned normally when tested. All four seats had lap belts installed.

The left side wall of the cockpit was impact damaged and torn. The fuel selector valve remained partially attached to the fuselage structure but was separated from both the left and right fuel lines from the wings as well as the supply line to the engine. The fuel selector handle remained attached to the fuel selector valve shaft and was located between the left tank and off position. Low pressure air was applied to the fuel selector valve at the engine supply port it was unable to pass through the valve. The valve handle was rotated through all four detent positions, and it appeared to function normally.

The fuel strainer bowl was impact damaged and partially separated from its mount. No fuel was observed in the bowl and the strainer screen appeared free from blockage. Electrical power was applied to the fuel boost pump, and it was heard to operate. The fuel boost pump filter screen was removed for examination, and it appeared free from blockage. The fuel pump switch on the instrument panel was observed to be in the "on" position.

The fuel primer plunger on the instrument panel was intact and observed to be in the stowed and locked position.

The flap selector handle was in the down/stowed position (flaps up) and the cable remained attached to the flap torque tube.

The forward aileron cable chain segment was displaced from the control column sprockets. The turnbuckle was intact, and the cables remained attached to the ends of the chain. One of the rudder cable arms on the rudder pedal torque tubes was separated with the cable remaining attached to the arm.

All the flight control cables were continuous from the cockpit to the respective control surfaces. Flight control continuity was established for the airframe.

Observed on scene, the left wing remained attached to the fuselage and exhibited impact damage consistent with tree strikes. The fuel tank was crushed and torn. No fuel was observed in the remains of the fuel tank. The fuel tank finger screen appeared free from blockage. The fuel filler cap remained in the filler neck opening.

The aileron and flap remained attached by their hinges. The landing gear remained attached to the wing. The pitot mast was displaced by impact forces but remained attached to the wing. The lift detector was intact, and the switch was heard to make an audible "click" when actuated. When activated, the lift director illuminates a light on the left side of the cockpit (the light was not observed due to the extensive damage sustained on the left side of the cockpit).

Observed on scene, the right wing remained partially attached to the fuselage and exhibited impact damage consistent with tree strikes. The fuel tank was crushed at the leading edge and a small opening was observed. A small amount of fuel remained in the tank and blue stains were observed around the impact damaged opening in the leading edge. The fuel tank finger screen appeared free from blockage. The fuel filler cap remained in the filler neck opening.

The aileron and flap remained attached by their hinges. The landing gear remained attached to the wing.

Observed on scene, the empennage exhibited impact damage consistent with tree strikes. The stabilator remained attached to the tailcone and the trim tab remained attached by its hinges. The trim tab jackscrew was extended above the drum with about 17 threads exposed (approximately 1-3/4") which corresponds to a full aircraft nose up trim setting.

The vertical stabilizer remained attached to the tailcone and the rudder remained attached by its hinges.

Airframe to engine control continuity was established.

There were no onboard recording devices found for the airframe. An Apple iPad was found inside of a small bag. The Apple iPad was off. An Apple iPhone was found beneath the pilot's rudder pedals and the phone was on.

There were no signs of any preimpact mechanical malfunctions or failures with the airframe that would have precluded normal operation.

3.0 Engine Examination (Lycoming O-320-E2A, serial number L-24727-27A)

The engine was found oriented about 80 degrees nose down in the initial impact crater.

The propeller, spinner and starter ring gear were observed about 10 feet forward of the engine. The fuselage was cut behind the instrument panel and moved to a flatbed trailer for further examination. The engine remained attached to the firewall through the tubular engine mount. The mount was impact damaged. The mount, wires, exhaust tubing and control cables were cut, and the firewall separated from the engine. The carburetor was impact separated from the engine. The exhaust system was unobstructed. The induction air filter was unobstructed.

The engine crankshaft was rotated by turning the crankshaft propeller mounting flange and continuity of the crankshaft to the rear gears and to the valve train observed. Compression and suction were observed from all four cylinders. The interiors of the cylinders were observed using a lighted borescope and no anomalies noted.

The carburetor (Precision Airmotive, MA4-SPA, serial number 10-36778-32) was fractured across the throttle bore and separated from the engine. The throttle control was impact separated. The mixture control was impact damaged. The carburetor was partially disassembled and about a teaspoon of blue liquid with an odor consistent with aviation gasoline observed in the bowl. The liquid was checked using Kolor Kut water finding paste and no indication of water observed. One of the brass floats exhibited hydraulic crushing. The carburetor fuel inlet screen was unobstructed.

The engine driven fuel pump remained attached to the engine and no damage was noted. The pump was removed and produced pressure at the outlet port when operated by hand. About a tablespoon of blue liquid with an odor consistent with aviation gasoline drained from the pump when it was tilted. The liquid was checked using Kolor Kut water finding paste and no indication of water observed. The pump was partially disassembled and no damage to the rubber diaphragms or internal check valves observed.

Both magnetos remained securely attached to the engine and no damage was noted. Both produced spark from all ignition towers when rotated manually.

The condition of the various spark plugs is as follows:

Manufacturer: Champion		Type: REM40E		SI 1042 Approved? ☒ Yes ☐ No	
Spark Plug Condition (per Champion Aviation Check-A-Plug Card AV-27)					
1 Top	Undamaged Electrode/Normal		1 Bottom	Undamaged Electrode/Oil Soaked	
2 Top	Undamaged Electrode/Normal		2 Bottom	Undamaged Electrode/Normal	
3 Top	Undamaged Electrode/Normal		3 Bottom	Undamaged Electrode/Normal	
4 Top	Undamaged Electrode/Normal		4 Bottom	Undamaged Electrode/Normal	
5 Top			5 Bottom		
6 Top			6 Bottom		
7 Top			7 Bottom		
8 Top			8 Bottom		

There was no damaged observed to the ignition harness.

The alternator remained attached to the engine. No damage was noted, and it was not removed.

The starter remained attached to the engine and was impact damaged. The alternator belt was present, broken and wrapped around the crankshaft. The starter ring gear support was impact separated.

The vacuum pump remained attached to the engine and no damage was noted. It was removed and partially disassembled. The composite drive assembly, carbon rotor and carbon vanes were observed intact.

The oil suction screen was unobstructed. A few slivers of metal about the thickness of a hair and about 3/8 inch long were observed in the screen. No debris was observed on the oil filter media.

There were no onboard recording devices found for the engine.

There were no signs of any preimpact mechanical malfunctions or failures with the engine that would have precluded normal operation.

4.0 Propeller Examination (Sensenich 74DM6-0-58, serial number A60478)

The two-blade aluminum propeller was found separated from the engine. The propeller bolts were found broken, and the propeller and starter ring gear separated from the engine crankshaft flange.

The propeller showed some chordwise scratching on both blades, on both the forward and aft faces. One blade was found with slight aft bending and the other blade was bent, about $\frac{3}{4}$ span from the root, rearward about 80 degrees. The spinner was found attached to the propeller and was dented.

There were no signs of any preimpact mechanical malfunctions or failures with the propeller that would have precluded normal operation.

5.0 Maintenance Records Review

The FAA retrieved all the maintenance records from the airplane owner on July 15, 2023, at the owner's residence in Carrollton, Missouri. The airplane maintenance records were reviewed. There were no outstanding mechanical anomalies noted in the maintenance records.

The historical FAA airworthiness and registration records were retrieved and were reviewed.

Submitted by:

Michael J. Hodges
Investigator-In-Charge