



**NATIONAL TRANSPORTATION SAFETY BOARD**

**Office of Aviation Safety**

**Eastern Region**

**AIRFRAME AND ENGINE EXAMINATION**

**CASE NUMBER:** ERA22FA058

**AIRCRAFT:** Cessna 172S, N90559

**EXAMINATION PARTICIPANTS:**

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## **SUMMARY**

Examination of the recovered airframe and engine was conducted on 12/11/2022 at the U.S. Forest Service Facility on Aeroflex-Andover Airport, Andover, New Jersey. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

## **DETAILS OF THE INVESTIGATION**

The airplane came to rest on a heading 330° and all major components of the airplane was located at the accident site. A cursory examination of the engine revealed impact damage. An examination of the propeller revealed that it chordwise scoring and bending. The airplane was recovered for further examination.

### **Airframe Examination**

The fuselage from the firewall to the empennage revealed accordion crush and impact damage. The instrument panel and cockpit were destroyed by impact damage. Both wings were separated from the fuselage and displayed crush and impact damage. The horizontal and vertical stabilizers were partially separated from the empennage but displayed impact damage. Flight control continuity was observed from the flight control surfaces to the flight controls within the cockpit. The flight instruments and flight controls within the cockpit were destroyed by impact damage. Both wings remained partially attached to the fuselage, and the ailerons and flaps were impact damaged. Flight control surface cable continuity was observed from the flight surfaces to the cockpit controls. The horizontal stabilizers and vertical stabilizer remained attached to the empennage; however, they displayed damage consistent with impact. Both elevators were impact damaged and remained partially attached to the horizontal stabilizers. The rudder remained attached to the vertical stabilizer and displayed impact damage. Both fuel tanks were breached, and the odor of fuel was present at the accident site. The fuel caps remained locked on the filler ports.

The propeller remained attached to the engine and displayed chordwise scoring and aft bending. Tree branches at the accident site displayed fresh cuts consistent with propeller slash marks were noted on several trees at the accident site.

### **Engine Examination**

Examination of the engine revealed that crankshaft and valvetrain continuity were confirmed when the crankshaft was rotated using a tool inserted into the vacuum pump drive pad. Compression and suction were attained from all four cylinders. The interiors of the cylinders were examined using a lighted borescope and no anomalies were noted. The carburetor was impact separated, fragmented, and the fuel inlet screen was absent of debris.

Examination of the engine revealed that the engine remained partially attached to the airframe, and the propeller remained attached to the crankshaft flange. The engine firewall was crushed up against the engine. Examination of the engine accessories revealed they were impact damaged. The bottom of the engine crankcase and cylinders revealed they were packed with mud throughout the cooling fins. The top spark plugs were removed, and the engine rocker box covers were removed to enable engine rotation. The cylinders were borescope inspected with no discrepancies noted. The crankshaft was rotated via the propeller. Thumb compressions, valvetrain movement, and continuity of crankshaft was confirmed throughout the engine. The induction tubes remained attached to the cylinder heads and displayed impact damage.

No anomalies were noted with the fuel injectors, both magnetos, oil filter, vacuum pump, and fuel pump during the examination. No anomalies were found that would have precluded normal engine operation.