National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594

WPR22LA238

AIRFRAME AND ENGINE EXAMINATION

October 18, 2022

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A. ACCIDENT

Location: Challis, Idaho
Date: June 26, 2022
Airplane: Piper, PA-20-135, N1231C

B. AIRFRAME AND ENGINE EXAMINATION

1.0 Participants

IIC	Eric M. Gutierrez National Transportation Safety Board Federal Way, Washington
Air Safety Investigator	Kristyn Blocher National Transportation Safety Board Federal Way, Washington
Party Coordinator	Kathryn Whitaker Piper Aircraft Inc. Vero Beach, Florida
Party Coordinator	Troy R. Helgeson Lycoming Engines Williamsport, Pennsylvania

C. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

Examination of the recovered wreckage revealed that the cockpit, both wings, and fuselage structure was mostly destroyed by thermal and impact damage. The instrument panel was consumed by fire. Multiple instruments were separated from the instrument panel and exhibited thermal and impact damage. The left main landing gear was separated from the fuselage and was impact and thermal damaged. The right main landing gear remained attached to the fuselage and was impact and thermal damaged.

Flight control continuity was unable to be established due to multiple separations, consistent with impact, and thermal damage. The cockpit flight controls were separated and exhibited thermal and impact damage throughout. The rudder pedals were observed in the cockpit area with heavy impact and thermal damage. All areas of separation were consistent with overload or were cut by recovery personnel.

Figure 1: View of airplane cockpit area with impact and thermal damage.

The right wing was separated from the fuselage at the wing root, was impact and thermal damaged. The wing was cut into numerous sections by recovery personnel. A center section of right wing aileron remained attached to the wing attachment point. The wing flap was separated from the wing and was thermal and impact damaged.

Figure 2: View of right wing thermal damage.

The left wing was separated from the fuselage at the wing root, was impact and thermal damaged. The wing was cut into numerous sections by recovery personnel. A

center section of left wing aileron remained attached to the wing attachment point. The wing flap was separated from the wing and was thermal and impact damaged.

Figure 3: View of left wing thermal damage.

The empennage was separated from the fuselage and was cut into several sections by recovery personnel. The elevator and rudder remained attached to their respective mounts. The top section, about 1 ft of the rudder and vertical stabilizer was cut off by recovery personnel. The left and right horizontal stabilizers and elevators were cut off near the roots. The rudder and elevator flight control cables remained attached to their respective mounts.

2.0 Engine Examination

Engine Manufacturer: Lycoming
Engine Model Number: O-320
Engine Serial Number: 1315-27

Examination of the recovered engine revealed that the engine remained attached to the engine mounts, impact and thermal damage was observed. The engine mount was cut by recovery personnel. Impact damage was observed to the number 1, 2, & 3 cylinder rocker box covers. A crack was observed on the engine crank case, near the propeller seal, consistent with impact damage. No evidence of any internal mechanical damage was observed to the engine crankcase. All four cylinders remained attached. Extensive thermal damage was observed to the engine accessories case. The carburetor separated, impact damaged, was deformed, consistent with thermal damage. All fuel lines near the engine's accessories case were thermal damaged and various fuel lines were loose.

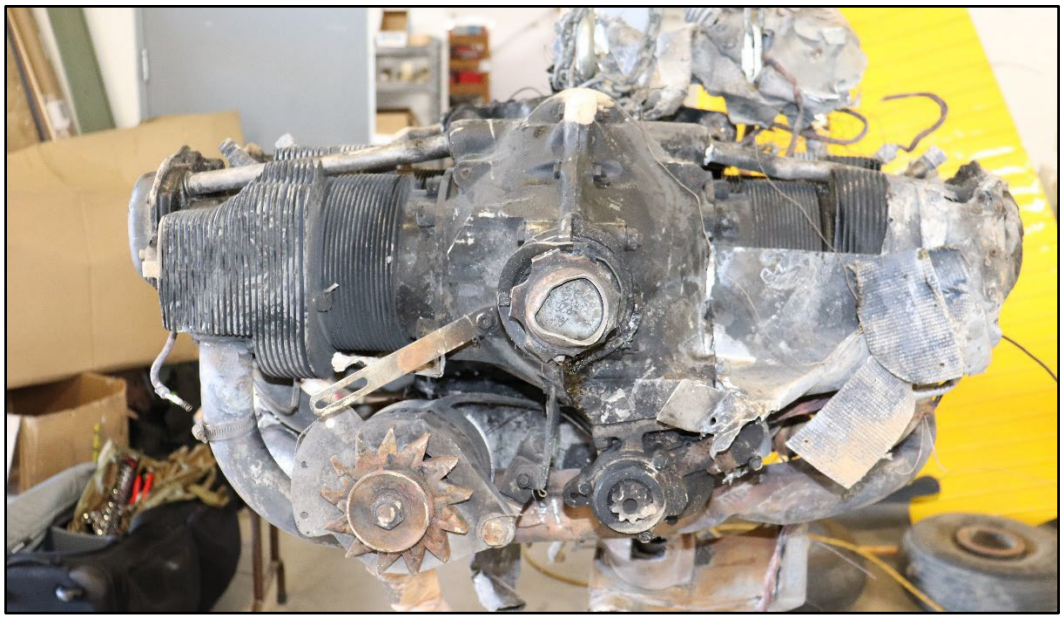

Figure 4: Front view of engine.

The upper spark plugs were removed, and all four cylinders were examined internally using a lighted borescope. A normal amount of combustion deposits was observed within the combustion dome of each cylinder and piston face. The crankshaft was rotated by hand using a hand tool on the crank shaft. Rotational continuity was established throughout the engine and valve train. The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated on all cylinders. The number 1, 2 & 3 cylinders intake and exhaust valve springs were in place and visually appeared to be undamaged. Thumb compression and suction was obtained on the number 1, 2 & 3 cylinders. The number 4 cylinder intake and exhaust valve springs were in place, however; the intake valve spring remained compressed. The exhaust push rod was bent, consistent with impact damage. The number 4 cylinder was removed and dissembled; the compressed valve spring was consistent with thermal damage.

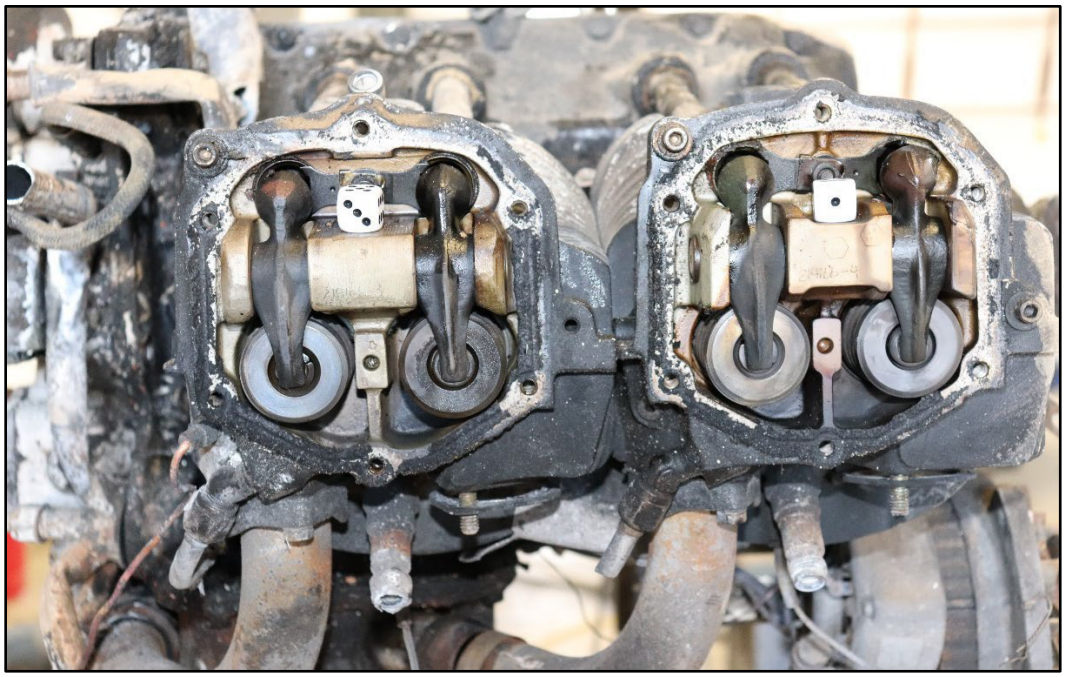

Figure 5: View of the right side of the engine.

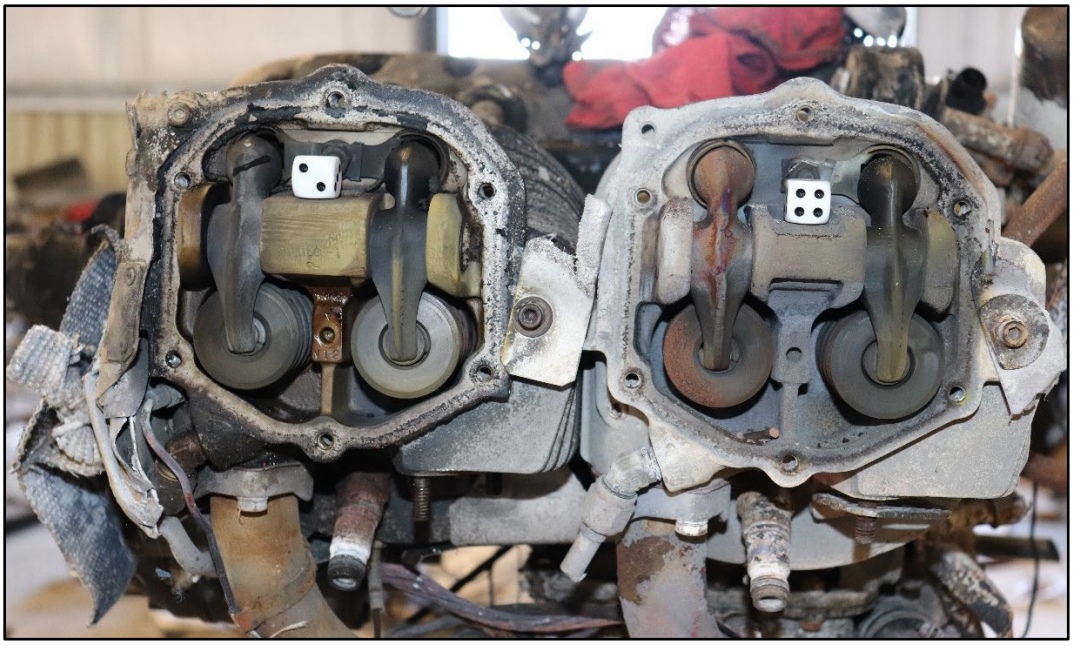

Figure 6: View of the left side of the engine.

The engine spark plugs were removed from the engine, and they were the fine-wire electrode type. The sparkplugs exhibited black deposits within the electrode area. All of spark plugs exhibited signatures consistent with NORMAL when compared to the Champion Check-A-Plug comparison chart. Cylinder 2 & 4, top spark plugs were, Tempest, UREM 38S. All remaining spark plugs were Smiths, RSE 23-3R (AU57).

The left magneto separated from the engine accessories case. The right magneto remained attached to the engine accessory case, thermal damage was observed to both magnetos. Due to extensive thermal damage, a functional test could not be performed.

The oil pickup screen was removed, and no debris was observed.

The intake and exhaust system remained secure to the cylinders, bending and crushing was observed throughout. The exhaust system was examined internally using a lighted borescope, no anomalies or blockage noted.

3.0 Propeller Examination

Propeller Manufacturer: Sensenich
Propeller Serial Number: M74DM-0-55

The airplane was equipped with a two blade Sensenich propeller. The propeller separated from the engine at the crankshaft. Both propeller blades remained attached to the propeller hub. Propeller blade A exhibited polishing along the leading edge with unidirectional striations on the cambered side of the blade. Propeller blade B exhibited bending forward, about mid span with unidirectional striations on the cambered side of the blade.

Figure 7: View of propeller.

Submitted by:

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