



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

Accident DATE: April 30, 2020

AIRFRAME AND ENGINE EXAMINATION

WPR20LA135

This document contains 14 embedded photos.

ACCIDENT

Location: Hemet, CA.
Date: April 30, 2020
Aircraft: N6521Y, PA-23-250
NTSB IIC: Fabian Salazar

EXAMINATION PARTICIPANTS:

Name: Elliott Simpson
Duty Position: NTSB ASI
National Transportation Safety Board
Federal Way, WA 98003

Name: Mark Platt
Duty Position: Air Safety Investigator
Organization: Lycoming Engines
City, State: Phoenix, AZ.

Name: Kathryn Whitaker
Duty Position: Air Safety Investigator
Organization: Piper Aircraft
City, State: Phoenix, AZ.

SUMMARY

Examination of the airframe was conducted by the representative from Piper Aircraft, at the accident site near Hemet, CA. on May 1, 2020, and a during a follow up examination of the airframe at a secure facility. The right propeller was not found at the accident site. Upon examination at the secured facility, evidence of a fractured aileron control cable was discovered. The fractured end of the right propeller shaft, and the aileron control cable were shipped the NTSB Materials Laboratory for further examination. The IIC did not travel to the accident site nor the secure facility during the follow up exam. This was due to COVID-19 risk mitigation procedures.

DETAILS OF THE INVESTIGATION

Airframe Examination

The airplane was substantially damaged by impact with terrain and post-crash fire. A debris path about 240 ft long extended away from the wreckage. Large amounts of airplane components, and sheet metal were strewn throughout the debris path. A post-crash fire damaged the cabin area,

Cockpit Documentation. The right-side door had separated from the fuselage and was damaged throughout its structure. The door appeared to have been closed and latched. The acrylic windscreen was absent. A section of the right-side fuselage and aft door jamb was thermally damaged, but the adjacent right-side door exhibited minor thermal damage. The cockpit was heavily damaged, and thermally damaged. Two seats from the cockpit were separated from the seat rails. The instrument panel was separated from the mounts and all flight instruments were

separated from the instrument panel. The circuit breaker panel was fractured into several pieces with many circuit breakers damaged or separated.

Wings. Both wings separated from the fuselage at the wing roots.

The left-wing inboard section including the engine nacelle came to rest near the end of the debris path. Sections of the underside were found in the debris path. The left flap separated from the wing and came to rest about midway down the debris path. A fragment of the left wing, with a section of the aileron came to rest near a large boulder.

The right wing was fractured into sections. The right inboard section, along with the right aileron, a fragment of the right flap, and aileron bell crank was found near the large boulder.

The empennage remained attached to the aft fuselage and exhibited substantial damage throughout the assembly. The left and right sides of the stabilator were separated from the empennage. The rudder and vertical stabilizer were separated from the empennage, and exhibited substantial damage

Propeller Governor: Model: F-6-5A, Serial Number: B5817T. Overhaul July 29, 2016.

Left engine. The left engine separated from the engine nacelle and was thermally damaged. Left Engine: Model: IO-540-C4B5, Serial number: L-3784-48. 1906.3 hours since a field overhaul. October 30, 2015. Annual Inspection November 21, 2019. Tach Time: 6401.3, SMOH: 1516.3

Left propeller. The left propeller remained attached to the left engine and exhibited leading edge gouging, aft bending, and twisting. Left Propeller: Model: Serial number: HC-E2YR-2RBSF/F8465B-7R, Serial Number: BP3023, July 29, 2020 Overhauled. Annual Inspection: November 21, 2019, Tach Time: 6401.3, ACTT: 9148.0, PTSMOH: 1516.3. Blade serial numbers: C87356, E18986.

Right engine. The right engine, engine mount and nacelle separated from the wing, and came to rest near the end of the debris path. The propeller and propeller flange separated from the engine and were not recovered. The oil pump separated from the engine and was recovered. Right Engine: Model: IO-540-C4B5. Serial Number: RL-1664-48. 1906.3 hours since a field overhaul. October 23, 2015. Annual Inspection: November 21, 2019. Tach Time: 7248.0, SMOH: 1516.3

Right Propeller: The right propeller was not found at the accident site. Examination of the fracture site was consistent with overload separation. The remaining fractured surface was sent to the NTSB Materials Laboratory for further examination. Right propeller, model number: HC-E2YR-2RBSF/F8465B-7R, Serial Number: BP5949. July 29, 2016 overhauled. Annual Inspection November 21, 2019. Tach time: 72480.0, ACTT: 9148.0, PTSMOH: 1516.3. Blade serial numbers: F38129 and F38139.

Fuselage. The fuselage exhibited substantial damage throughout its entirety. The nose of the airplane was crushed inwards and aft, with the top of the cabin crushed downwards over the nose. All windscreens and windshields were shattered and missing. The right side of the fuselage exhibited missing sections near the cabin area, exposing the cabin interior. The right-side aft fuselage was crushed inwards. The right-side stabilator was absent. The vertical stabilizer,

rudder, and rudder trim tab separated from the empennage. Examination of the vertical stabilizer, rudder and rudder trim exhibited damage to the top and leading edge of the vertical stabilizer and dents, gouging, and crushing throughout. The left-side of the stabilator remained attached to the empennage, as did the left-side trim tab. The left-side aft fuselage exhibited inward crushing, with damage to the top of the aft fuselage, running aft to the top of the empennage. The left-side forward fuselage, from the cabin area to the nose exhibited the most severe of the damage with crushing, gouging, and missing sheet metal.

Flight control continuity. The flight controls, and subcomponents were heavily impact and thermally damaged, and fragmented into multiple pieces.

The control cables for the ailerons exhibited three fractures. One break occurred on the right side of the cable assembly and broomstraw features. The other break exhibited signatures not consistent with broomstraw features and warranted further examination. This section of the control cable was shipped to the NTSB for further examination. The balance cable for the ailerons a break with broomstraw features. Several wire fractures were observed protruding from the cable near the control yokes, and on the balance cable nearest the right aileron bellcrank.

The rudder pedal assemblies separated from the cabin floor and were fractured into several pieces. The right-side rudder control cable exhibited broom straw separation from the rudder horn. The two stabilator control cables exhibited broom straw separation from the stabilator.

Main Landing Gear (MLG).

LEFT ENGINE EXAM. The left engine had separated from the left wing. The engine was examined by the party member from Lycoming Engines at the recovery facility. During the exam, the engine rotated freely. Thumb compression was confirmed. The valve train exhibited normal operation except for the number 1 cylinder due to damage to the exhaust valve push rod from impact. Clean oil was present at all rocker box areas. Mechanical continuity was confirmed at the valve train and the accessory section. The cylinders and lower spark plugs were examined via borescope and exhibited normal appearance with no foreign debris in the cylinders. The intake and exhaust valves exhibited normal appearance.

The separation of the engine from the wing compromised the fuel system. The fuel servo was fractured. The throttle control cable was attached to the throttle arm. The injector fuel screen was clear with no blockage. The mixture control arm was separated from servo from overload. The servo inlet screen was secure and clear. The flow divider remained attached to the top of the engine and was thermally damaged. The two-piece injector nozzles were unobstructed. The fuel pump remained attached to the engine with the fuel lines separated. The fuel pump exhibited no mechanical malfunctions or obstructions. The diaphragm exhibited some thermal damage.

The left and right magnetos remained attached to the engine at the mounts but were both destroyed and could not be examined further.

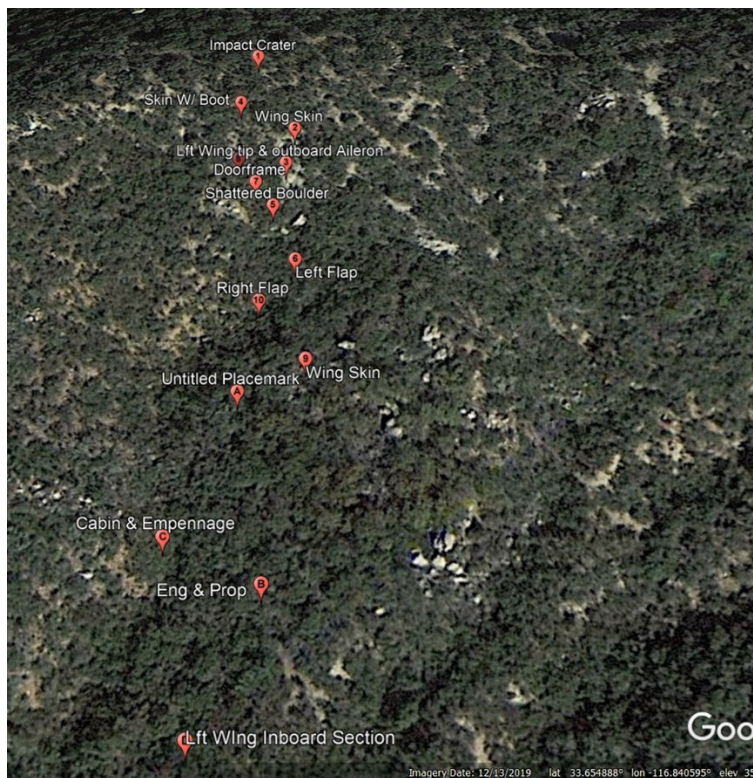
The top spark plugs were undamaged and exhibited normal appearance. The number 1,2, and 3 bottom spark plugs were damaged. The number 4,5, and 6 bottom spark plugs were undamaged.

and exhibited normal appearance. All leads were thermally damaged but attached to the spark plugs and the magnetos.

The starter, and the alternator were displaced from the engine and destroyed. The vacuum pump remained attached to the mounting pad.

The oil system did not exhibit any malfunctions that would have precluded normal operation. The oil filter was crushed and not opened. The oil suction screen was clear.

PHOTO EXHIBIT



1. First point of probable impact
2. Wing Skin
3. Door Frame
4. Skin with Boot
5. Shattered boulder
6. Left Flap
7. Door Frame
8. Left Wing Tip & outboard Aileron
9. Wing Skin
10. Right Flap
- A.
- B. Engine and Propeller
- C. Cabin & Empennage
- D. Left Wing Inboard Section

Figure 1. Overhead view of the accident site showing the location of wreckage items.



Figure 2. Front view of N6521Y. Photo courtesy of Piper Aircraft.



Figure 3. Left-side view of the fuselage. Photo courtesy of Piper Aircraft.



Figure 4. rear view of N6521Y. Photo courtesy of Piper Aircraft.



Figure 5. Right-side view of N6521Y. Photo courtesy of Piper Aircraft.



Figure 6. Right-front view of N6521Y. Photo courtesy of Piper Aircraft.



Figure 7. Right-engine propeller shaft. Photo courtesy of Piper Aircraft.



Figure 8. Vertical stabilizer, rudder., and sheet metal. Photo courtesy of Piper Aircraft.



Figure 9. Left Engine and propeller. Photo courtesy of Piper Aircraft.



Figure 10. Right engine. Photo courtesy of Piper Aircraft.

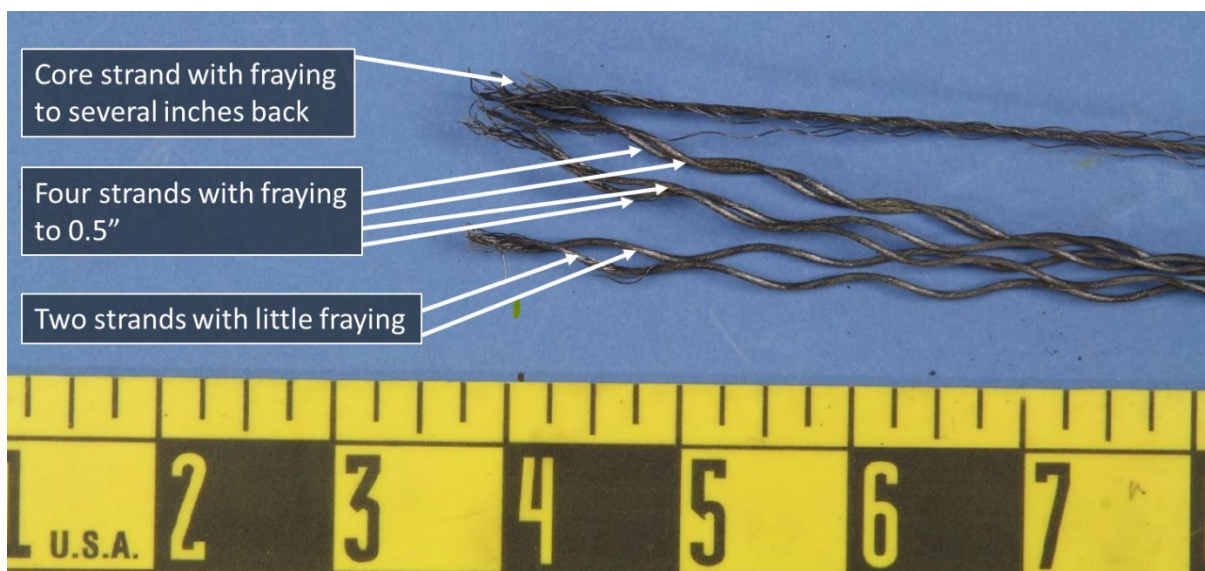


Figure 11. Aileron control cable. Photo NTSB.

Aileron Control Cables

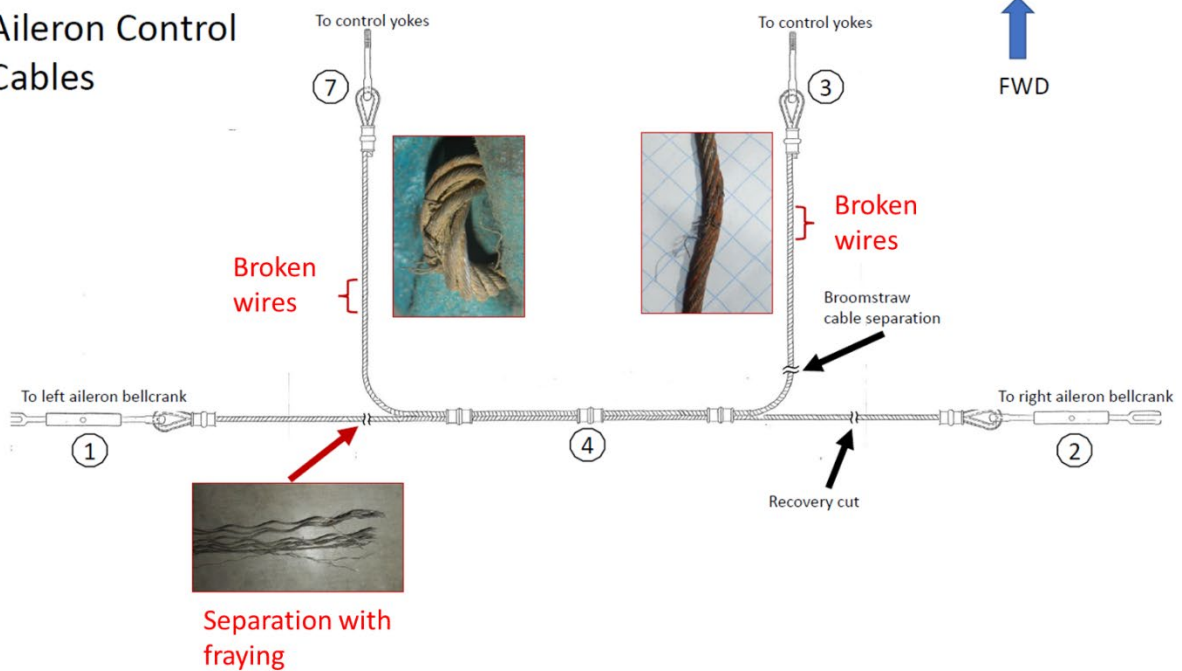


Figure 12. Drawing showing the location of the breaks and broken wires in the aileron control cable. Image courtesy of Piper Aircraft.

Aileron Balance Cables

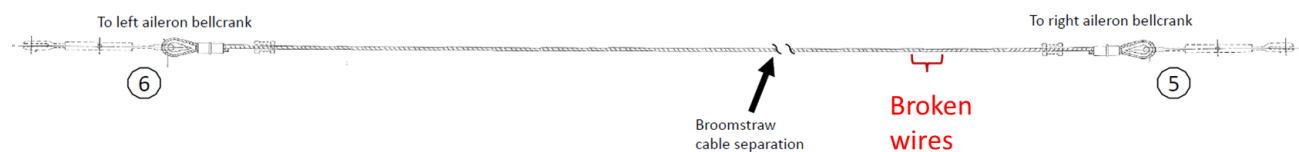


Figure 13. Drawing showing the location of the break and broken wires in the aileron balance cable.



Figure 14. Example of the multiple broken wires found in the aileron control cables. Photo courtesy of Piper Aircraft.