



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

October 25, 2022

AIRFRAME AND ENGINE EXAMINATION

WPR22LA296

This document contains 10 embedded photos.

A. ACCIDENT

Location: Corona, California
Date: August 9, 2022
Aircraft: Piper, PA-32-300, N841AD
NTSB Investigator-in-Charge: Eric M. Gutierrez

B. PARTICIPANTS

Eric M. Gutierrez
Air Safety Investigator
National Transportation Safety Board
Federal Way, Washington

Kathryn Whitaker
Air Safety Investigator
Piper Aircraft Inc.
Vero Beach, Florida

C. DETAILS OF THE INVESTIGATION

1.0 Aircraft Examination

Examination of the recovered wreckage revealed that the cockpit, fuselage structure was mostly destroyed by thermal and impact damage. The recovery organization had removed the left wing and the right wing impact separated at the wing root. The engine, engine mount, firewall, nose landing gear, instrument panel and flight controls remained attached. All instruments and instrument panel and exhibited thermal damaged.



Figure 1: View of airplane during examination

The left wing was separated from the fuselage near the wing root. Various degrees of impact and thermal damage was observed throughout the wing. The left wing aileron was separated and not observed with the wreckage. The flap remained attached to its respective attachment points and was impact damaged. The airplane was equipped with aluminum fuel tanks and composite auxiliary tanks. Both main wing tanks were examined internally using a lighted borescope, no obstructions or debris was observed. The left wing auxiliary tank was impact separated and remnants of the fuel tank was observed in the wreckage. The left main fuel cap was separated and not observed with the wreckage. The left main filler port was normal and unremarkable.



Figure 2: View of left wing during examination

The right wing was separated from the fuselage near the wing root. Various degrees of impact and thermal damage was observed throughout the wing. The right wing aileron and flap remained attached to their respective attachment points and was impact and thermal damaged. The right wing auxiliary tank was impact separated and remnants of the fuel tank was observed in the wreckage. Visual inspection of the right fuel cap revealed that the rubber seal appeared normal and unremarkable. The right main filler port was normal and unremarkable.



Figure 3: View of right wing during examination

The empennage and aft section of the fuselage was separated and mostly destroyed by fire. The left stabilator remained attached but was mostly destroyed by fire. The right stabilator remained attached and was impact damaged. The rudder remained attached to the vertical stabilizer by the attachment points and thermal damaged.

Throttle and mixture control continuity was established from the cockpit controls to the fuel servo and moved from stop to stop when actuated by hand.

Propeller control continuity was established from the cockpit controls to the propeller governor and moved from stop to stop when actuated by hand.

A visual inspection was conducted of the fuel system. Continuity was established from the wing roots to the fuel injectors. Various breaks in the wing fuel lines were observed in both wings, consistent with cuts by recovery personnel and/or impact damage. The fuel selector handle was observed in a position, consistent with OFF. The fuel selector valve was observed in the near off position. A torsional twist (kink) was observed in the fuel line from the engine driven fuel pump to the servo. No visible impact damage was observed to the airframe or engine that would account for the torsional twist in the fuel line.



Figure 4: View of fuel line

The fuel line from the engine driven fuel pump to the servo was disconnected and air was applied to the fuel selector valve; a blue liquid consistent with 100 Low Lead fuel was observed in the fuel line. The fuel selector valve was removed and disassembled; the fuel strainer assembly was free of debris. A blue liquid consistent with 100 Low Lead fuel was observed in the fuel strainer assembly. The blue liquid was tested for water using a water finding paste, a small amount of water was observed. The position of the auxiliary fuel pump switch could not be determined due to fire damage. External power was applied to the electric fuel boost pump and noise was heard emitting from the pump.

2.0 Engine Examination

Engine Manufacturer: Lycoming
Engine Model Number: IO-540 K1A5
Engine Serial Number: L-10435-48

Examination of the recovered engine revealed that the engine remained attached to the airframe via the engine mounts. All six cylinders and all engine accessories remained attached. All fuel and oil lines that were removed were tight. No evidence of any mechanical damage was observed to the engine crankcase.

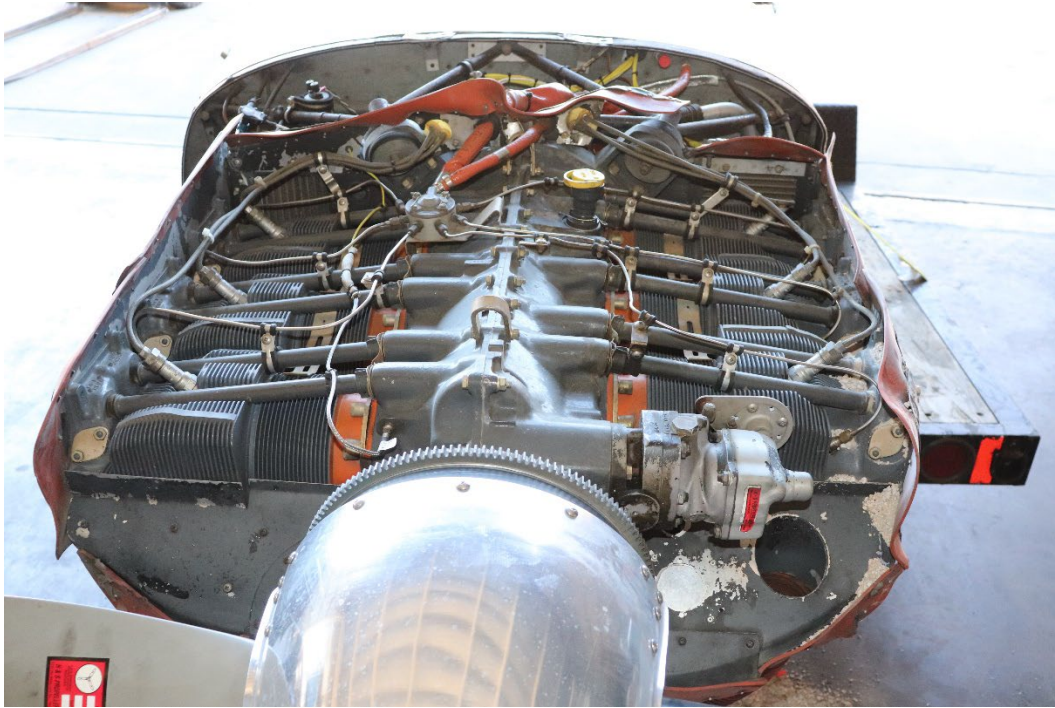


Figure 5: View of engine during examination

The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated on all cylinders. All intake and exhaust valve springs were in place and visually appeared to be undamaged. The upper spark plugs were removed, and all six 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. All of the intake and exhaust valves were unremarkable. The crankshaft was rotated by hand using the propeller. Rotational continuity was established throughout the engine and valve train. Thumb compression and suction was obtained on all six cylinders.



Figure 6: View of left side of the engine

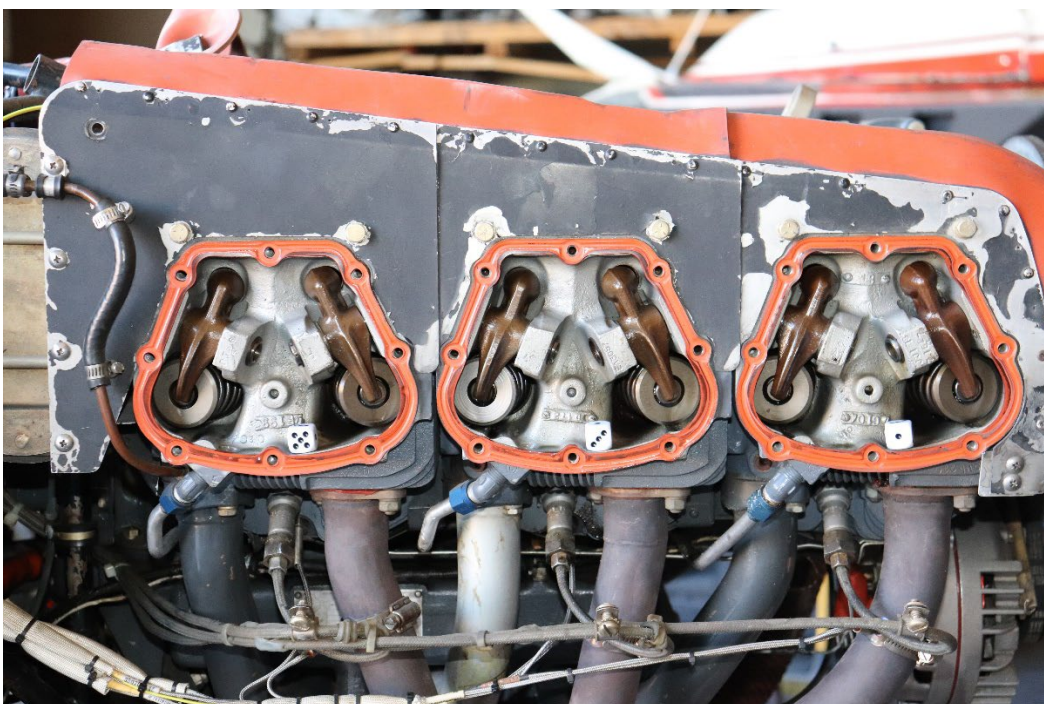


Figure 7: View of right side of the engine

The top engine spark plugs were removed from the engine, and they were the massive electrode type. The sparkplugs were light gray in color and exhibited dark deposits within the electrode area. All of spark plugs exhibited signatures consistent with NORMAL when compared to the Champion Check-A-Plug comparison chart.



Figure 8: View of top engine spark plugs

The fuel servo remained attached to the engine and was unremarkable. The throttle and mixture control cable remained attached to the servo and unremarkable. The throttle and mixture control moved the available length. The fuel servo inlet screen was removed, and no debris was observed.



Figure 9: View of fuel servo

The air induction body remained attached and was impact damaged. The air induction conduit was clear of obstructions and debris.

The fuel flow divider was intact, undamaged, and disassembled. The spring and diaphragm were intact and undamaged. All fuel lines were removed from the fuel injector, low pressure air was applied to the fuel divider, and air was felt at the fuel line tips. The fuel lines were then reattached to the fuel injectors for engine run.

The engine driven fuel pump remained attached to the engine and was unremarkable. The fuel pump was removed and rotated by hand. The fuel pump rotated freely without binding. All fuel fittings removed were tight.

The exhaust system remained secure to the cylinders. No evidence of any exhaust leaks around the cylinder attach points were observed. The exhaust system was examined internally using a lighted borescope, no anomalies or blockage noted.

The propeller control cable remained attached to the propeller governor and was unremarkable. The propeller control moved the available length.

An external fuel tank was attached to the engine driven fuel pump inlet line. External power was applied to the engine starter. During an initial attempt to start the engine, the engine rotated at a very low RPM. An alternate power source was utilized for an additional attempt to start the engine, with negative results. The fuel line from the fuel servo to the fuel divider was disconnected, and external power was applied to the starter to rotate the engine. Small amounts of fuel was observed coming from the fuel line. The fuel line was reattached, and the right magneto ignition leads were disconnected. External power was applied to the starter to rotate the engine and no spark was observed on six ignition leads.

The left and right magnetos remained attached to the engine accessory case with no external damage noted. The right engine to magneto timing was verified at 20°. The right magneto was removed, and rotated with a hand tool, spark was produced on six ignition leads. The left magneto was equipped with an electric ignition system.

3.0 Propeller Examination

Propeller Manufacturer: Hartzell
Propeller Model: HC-C2YK-1BF
Propeller Serial Number: CH35573

The airplane was equipped with a 2 blade, constant speed Hartzell propeller. The propeller blades remained attached to the propeller hub, with aft bending near the propeller tips. The blades exhibited various striations on the cambered side of the blade near the propeller tips.



Figure 10: View of propeller

The fuel servo, engine driven fuel pump, left electric ignition system magneto, JPI 830FF engine monitor were retained for further examination.

Submitted by: Eric M. Gutierrez