

National Transportation Safety Board

Office of Aviation Safety

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WRECKAGE EXAMINATION AND ENGINE RUN REPORT

November 6, 2024

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A. ACCIDENT

Location: Zephyrhills, FL
Date: June 8, 2024
Time: 1016 EDT
1416 UTC
Airplane: Piper PA28-235 Registration: N15363

B. WRECKAGE EXAMINATION AND ENGINE RUN REPORT

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C. SUMMARY

On June 8th, 2024, at 1016 eastern daylight time, a Piper PA28-235, N15363, was substantially damaged when it was involved in an accident near Zephyrhills, Florida. The pilot and the flight instructor were not injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 instructional flight.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination



Photograph 1: Airplane overview



Photograph 2: Airplane overview



Photograph 3: Airplane overview



Photograph 4: Airplane overview

1.1 Fuselage

The fuselage displayed impact damage toward the empennage; the fuselage displayed buckling and there was a large-sized hole on the right side of the top fuselage.

1.2 Empennage

The empennage remained attached to the fuselage and displayed impact damage signatures. There was buckling just forward of the tail cone installation point, and the right stabilator tip had partially fractured. Flight control continuity for the stabilator, rudder, and stabilator trim was verified by moving the cockpit controls and observing flight control movement.



Photograph 5: Damage to fuselage (covered by tape)



Photograph 6: Damage to empennage

1.3 Wings

Both wings remained attached to the fuselage and displayed impact damage signatures. The left-wing displayed the most damage, there was a large dent consistent with an impact with a fence post midspan of the wing. The left-wing tip, where the left aux fuel tank is located, displayed impact damage. According to the FAA, the fuel tank was noted to be leaking fuel after the accident. The right-wing displayed a medium-sized dent about midspan of the wing, the impact area also displayed buckling of the wing skin aft of the impact point. The right aileron displayed impact damage to the bottom forward portion of the aileron. Flight control continuity for the ailerons was verified by moving the cockpit controls and observing aileron movement.



Photograph 7: Right wing with damage



Photograph 8: Left wing with damage

1.4 Landing Gear

The main landing gear remained secured to their installation points and appeared to be undamaged. The nose landing gear remained attached to its installation point; however, the landing gear displayed impact damage and was bent to the left.



Photograph 9: Nose landing gear

1.5 Cockpit

The cockpit was undamaged and all flight controls, switches, and the throttle and mixture controls operated normally. The propeller control was seized and could not be moved more than ½" from the full RPM position.

1.6 Avionics

The airplane was equipped with a Dynon SV-HDX1100 (P/N: 503273-000, S/N: 24040) primary flight display. The Dynon unit is capable of storing multiple parameters and exporting them to a USB flash drive. The stored data was exported to a USB flash drive prior to the engine test run and then again after the engine test run was completed. Additional details regarding the downloaded data can be found in section 4.0 NVM Data.

1.7 Fuel/Fuel System

According to the pilot, he had selected the left auxiliary fuel tank during the accident takeoff. The left auxiliary fuel tank was breached and was devoid of fuel. The left auxiliary fuel tank was removed, and the fuel pickup screen was removed from the fuel tank. The fuel pickup screen was clear of any contamination and was unobstructed. The left main fuel tank was undamaged, and there were no visible signs of fuel leaks around the fuel tank. The fuel cap was secured to the fuel tank, the

fuel cap was removed and the fuel tank was noted to be close to full with fuel that had the color and odor consistent with 100LL Avgas. The right main fuel tank was undamaged and there were no signs of fuel leaks around the fuel tank and the fuel cap was secured to the fuel tank. The fuel cap was removed, and the fuel tank was noted to be close to full with fuel that had the color and odor consistent with 100LL Avgas. The right auxiliary fuel tank displayed minor impact damage to the fuel tank quick drain, and the fuel cap was secured to the fuel tank. The fuel cap was removed, and the fuel tank was devoid of fuel. The fuel selector in the cockpit was rotated to each position and was noted to have a normal detent for each position. The fuel selector was positioned to the left tip tank position, and low-pressure air was blown through the fuel strainer outlet; the left tip tank fuel lines were unobstructed, and there were no signs of breaks in the lines. During the engine test run, the left main fuel tank and right main fuel tank were selected, and the engine ran on either of the main fuel tanks normally. After the engine test run, the fuel strainer bowl was removed, and the screen was examined. The fuel strainer bowl had a large piece of debris inside the fuel bowl, and the fuel screen had debris contamination in the screen; however, the screen was not obstructed.



Photograph 10: Left aux tank pickup screen



Photograph 11: Fuel strainer bowl with debris in fuel



Photograph 12: Fuel strainer screen with debris in screen



Photograph 13: Fuel strainer screen with debris in screen

2.0 Engine Examination and Test Run

The engine remained attached to the airframe through the engine mounts, cables, wires, and hoses. The top spark plugs were removed, and the crankshaft was rotated manually. Continuity was established between the crankshaft, camshaft, connecting rods, and associated components. During crankshaft rotation, all six cylinders had good thumb compression and suction. The top spark plug electrodes were examined and displayed normal operating and wear signatures compared to the Tempest Aviation Spark Plugs Installation and Maintenance Manual 1710A. The spark plugs and ignition leads were reinstalled to facilitate an engine test run. The carburetor drain plug was removed, and a fuel sample was taken from the carburetor. The fuel sample was clear of debris, and the fuel had the odor and color consistency of 100LL avgas.

In preparation for an engine test run, approximately 2" of one of the propeller blades was cut off for balancing purposes. The fuel system was first primed using the airframe electrical boost pump, and the engine was then primed utilizing the manual primer. After priming, the engine started without hesitation or stumbling. The engine was operated at low RPM until the oil temperature and cylinder head temperatures (CHT) reached normal operating temperatures. The engine was operated at multiple different RPM settings ranging from idle to full power.

During the engine run, a magneto drop check was performed, the magneto drop was found to be acceptable with reference to Lycoming Service Instruction 1132B. The engine was operated for several minutes on the left main fuel tank, the fuel selector was then switched to the right main fuel tank, and the engine operated normally for several minutes on the right main fuel tank. Several throttle bursts were performed, where the engine throttle would be quickly advanced from idle to full power. The engine accelerated from idle to full power smoothly and without any stumbling for all the throttle bursts. Due to the seized propeller control, the governor operation could not be fully tested; however, the governor operated normally at full power and maintained RPM when the throttle was advanced to full. The engine was operated for a total of approximately 25 minutes; the engine operated normally, without any roughness, stumbling, hesitation, or loss of power for the entire engine test run.

After the engine was shut down, the rocker box covers were removed, and the overhead components (valves, springs, and rocker arms) were visually examined. The overhead components displayed normal operating and lubrication signatures. The fuel pump, carburetor, and fuel lines were examined for signs of fuel leaks; no fuel leaks were noted around any of the engine fuel components. The carburetor inlet screen was removed, and it was unobstructed, and there were no contaminants within the screen. The propeller control cable rod end was removed from the propeller governor, and the governor control arm was capable of normal movement. The propeller control cable remained seized, and the control cable rod end was severely corroded. The engine-driven fuel pump and the carburetor were removed from the engine to be sent out for additional testing.



Photograph 14: Engine overview



Photograph 15: No. 1, 3, and 5 top spark plugs



Photograph 16: No. 2, 4, and 6 top spark plugs



Photograph 17: Carburetor fuel inlet screen



Photograph 18: Propeller governor



Photograph 19: Propeller governor control cable end (corroded)

3.0 Propeller Examination

The two-bladed, constant-speed propeller remained attached to the crankshaft and displayed impact damage to one of the propeller blades. Approximately 2" of one of the propeller blades had separated from the rest of the propeller, the damage was consistent with impact damage. The other propeller blade was undamaged. To ensure the propeller was balanced during the engine run, approximately 2" of the undamaged propeller blade was cut off.



Photograph 20: Undamaged propeller blade



Photograph 21: Impact damaged propeller blade

4.0 Maintenance Record Review

According to the logbooks, the last annual inspection was performed on March 1, 2024, at a tachometer time of 1753.0. The annual inspection coincided with a significant avionics upgrade, with multiple instruments and avionic equipment being replaced with more advanced avionics. During the avionics upgrade, the following sensors were installed/replaced on the engine: oil temperature, oil pressure, fuel flow, manifold pressure, ammeter shunt, fuel pressure sensor, and the EGT/CHT harness and probes.

The previous annual inspection was performed on January 24, 2023, at a tachometer time of 1651.28. During the inspection, the airframe's electrically driven fuel pump had been replaced, and all of the fuel lines had been cleaned and flushed.

During the annual inspection on October 20, 2021, and a tachometer time of 1558.2, the carburetor had been removed, disassembled, the bowl and inlet screen were cleaned, the gasket was replaced, and the carburetor was reinstalled. The fuel lines going to both aux tanks, the fuel senders for the aux tanks, the fuel selector, and the airframe electrically driven fuel pump were replaced with serviceable parts. All the fuel caps had new gaskets installed, and the fuel system was cleaned and flushed.

The last time the carburetor was overhauled was on January 20, 2014, at a tachometer time of 1525.06. The last engine overhaul was performed on March 9, 1992, at a tachometer time of 932.6. The overhaul included installing an overhauled

fuel pump and an overhauled carburetor. According to Lycoming Service Instruction 1009BE, the O-540-B4B5 engine should be overhauled every 2,000 hours, or every 12 calendar years, whichever occurs first.

Submitted by:

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