

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA230

ACCIDENT INVESTIGATION EXAMINATION REPORT

May 30, 2024

A. ACCIDENT

Location: Hope Mills, North Carolina ; Grays Creek Airport (2GC),
Date: May 26, 2024
Time: 1100
1500 UTC
Airplane: Piper PA-28-151, N33563

B. ACCIDENT INVESTIGATION EXAMINATION REPORT

IIC Aaron McCarter
NTSB IIC
Eastern Region

Piper: Sean Holloway

Lycoming: Russell Gait

C. SUMMARY

On May 26, 2024, at 1100 eastern daylight time, a Piper PA-28-151, N33563, was substantially damaged when it was involved in an accident near Hope Mills, North Carolina. The private pilot sustained minor injuries, and the two passengers were seriously injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight. The non-instrument rated, private pilot received minor injuries, and his 2 passengers received serious injuries.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane impacted heavily wooded terrain consisting of 50 to 75 ft tall pine trees about 3/4 mile from the departure end of runway 35. There was substantial damage to the airframe; the fuselage was consumed by fire. Both wings and the empennage were separated from the fuselage. The metal two-bladed fixed pitch propeller remained attached to the engine's crankshaft propeller flange. The propeller blades exhibited varying degrees of leading-edge damage, and chordwise scratching with torsional twisting and s-bending on both blades. The engine was subjected to postimpact fire, and the exterior was damaged by thermal forces and impact. (Figure 1)



Figure 1; Propeller.

2.0 Airframe Examination

The instrument panel and all associated instrumentation, gauges and electronic devices were destroyed by fire.

Flight control continuity was established from all primary flight control surfaces to the location of their respective controls in the forward cabin. The rudder and stabilator cables were traced from the rudder pedal bar assembly and tee bar to the respective control surface attachments in the empennage. The left aileron drive control cable displayed a cable separation about 12 inches from the interconnect chain. The separated end had a “broom straw” appearance indicative of overload separation. The aileron balance cable exhibited features consistent with overload. A portion of the aileron balance cable was noted in the cabin floor; the turnbuckle had been separated by impact forces. The flap handle was separated and fire damaged. The setting could not be determined.

The fuel selector valve was damaged by fire. The handle was consumed. The fuel selector valve assembly was destroyed by fire and the position of the valve was not able to be determined. The fuel lines remained attached to their respective ports on the fuel selector valve. The valve assembly was tested with low air pressure; it did not function due to severe thermal damage. The fuel strainer and gascolator assembly was fire damaged. The gascolator was removed and the assembly was observed to be fire damaged internally. The electric fuel pump was fire damaged and was unable to be operated.

2.1 Empennage

The empennage separated from the aft fuselage. Fire damaged the tail section and lower forward section of the vertical stabilizer. The vertical stabilizer remained attached to the empennage. The rudder remained attached to the vertical stabilizer at all hinges. The vertical stabilizer displayed leading edge damage along the entire span. The stabilator remained attached to the aft fuselage at all hinges. The left side leading edge of the horizontal stabilator had slight impact and fire damage. The stabilator trim surface remained attached to the stabilator at all hinges. The stabilator balance weight remained attached to the stabilator control tube. The stabilator trim actuator shaft measured 1.5 inches of extension on the top portion above the drum with 14 threads visible. This equates to nose up trim. (Figure 2)



Figure 2; Empennage.

2.2 Wings

The left wing had been separated from the fuselage by impact forces and displayed impact damage throughout its structure. The left main fuel tank received impact damage and was breached. The left flap outboard hinge was detached from the flap but remained attached to the wing.

The flap was attached to the wing at the inboard and center hinges. The left flap control rod was torn from the flap attachment end. The left flap was impact damaged. The aileron remained attached to the wing at the center and outboard hinges.

The left aileron bell crank was torn from its mounting location. The left aileron control rod was broken at the aileron attachment rod end. Both aileron control cables remained attached to the bell crank.

The left fuel tank fuel cap was in-place. The gasket appeared intact and pliable.

The right wing was separated at the wing root by impact and post-impact fire. The right wing displayed impact damage throughout its structure. The aft inboard section of the wing and the inboard half of the right fuel tank were consumed by fire. The right flap was destroyed by fire. The right aileron was attached to the wing at all three hinges. The right aileron bell crank was torn from its mounting location. The right aileron control rod was broken at the aileron attachment rod end. Both aileron control cables remained attached to the bell crank.

2.3 Fuel/Fuel System

The carburetor was fragmented by impact forces. The floats were severely damaged. The carburetor fuel supply line remained secured to the inlet of the carburetor. The mixture control link remained secured to the mixture arm via castle nut and cotter pin, and the throttle cable link remained secured to the throttle arm via castle nut and cotter pin.

The throttle arm was $\frac{1}{4}$ inch from the full throttle stop, and the mixture arm was approximately halfway between full rich and idle cut-off.

The diaphragm style engine driven fuel pump was destroyed due to impact forces and exposure to thermal forces. Ignition Systems

The left-hand magneto was severely damaged due to thermal and impact forces and was not able to be functionally tested. The right-hand magneto was impact separated from its mounting flange on the engine's accessory housing. The assembly was severely damaged due to thermal and impact forces. Due to the overall condition of the unit, a timing check and spark test was not performed.

All sparkplugs remained secured in the cylinders. The sparkplugs were removed and photo documented. The following was noted in reference to the champion aerospace aviation check-a-plug with the spark plugs: (Figure 3)

- Top 1 – carbon fouled. (Significant)
- Bottom 1 – carbon fouled. (Significant)
- Top 2 – carbon fouled.
- Bottom 2 – oil soaked.

- Top 3 – normal, gray in color.
- Bottom 3 – normal, gray in color.
- Top 4 – Oil fouled.
- Bottom 4 – oil soaked.

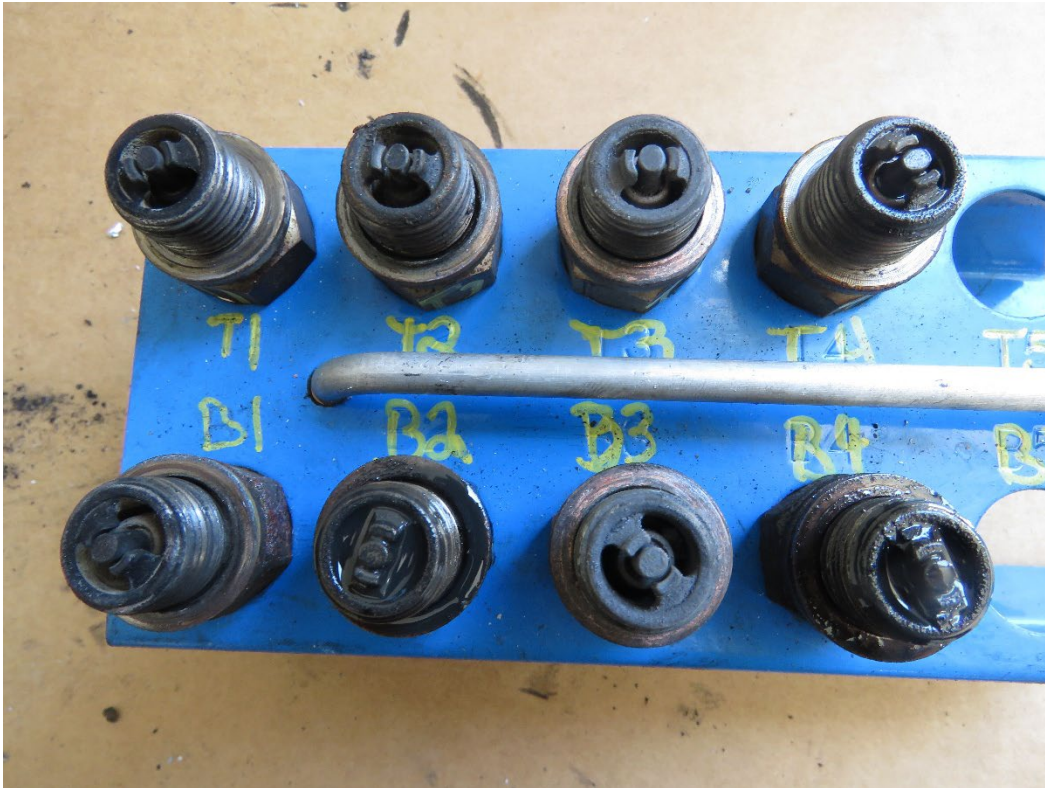


Figure 3; Spark Plugs

The ignition leads were destroyed due to exposure to impact and thermal forces.

2.4 Engine Exam

The engine's crankshaft would not rotate. The propeller and fragmented starter ring gear were removed, the crankshaft would not rotate in either direction when applying hand pressure to the crankshaft flange. The right-hand idler gear was freed from its idler shaft; the crankshaft rotated manual hand pressure through several 720° of rotation.



Figure 4; Engine; The Nos 2 and 4 Side

The left-hand magneto, vacuum pump, remnants of the engine driven fuel pump were removed and then the accessory housing was removed.

Thumb compression and suction were observed on cylinders Nos. 1,2, and 4. The No. 4 compression and suction was weaker than the other cylinders. No thumb compression or suction was observed on No. 3. The crankshaft gear remained secured with the appropriate bolt and locking tab and the crankshaft gear dowel pin was not sheared. The oil pump body remained secured to its mounting flange in the accessory house and was safety tied with safety wire, the oil pump body nuts were removed but the housing was seized on its studs, likely from corrosion that formed due to exposure to thermal forces and firefighting efforts.

All four cylinders were removed. Impact damage was noted on the No. 3 cylinder, the cylinder's intake shroud tube and pushrod, and the rocker box cover. In addition, the No. 3 cylinder was exposed to high thermal forces.

A light was shone under the intake valve and light was noted going past the intake valve's seat, indicating it was not fully seating and likely the cause of the lack of compression and suction observed on the No. 3 cylinder. The exhaust valve and intake valve were examined; the exhaust valve came free of the guide with gravity alone. The intake valve moved with hand pressure until the stem tip enter the valve guide, which then required significant hand pressure to pull the intake valve free of the intake valve guide. The intake valve guide was rolled along the edge of the table and in v-blocks, it was not bent and rotated smoothly (Figure 5)



Figure 5; No 3 Cylinder and intake valve.

The crankcase was disassembled, the faces of each flat tappet appeared whole and undamaged, no corrosion or pitting was noted. The camshaft was whole and undamaged, no excessive wear was noted on any of the lobes. (Figure 6)



Figure 6; Crankshaft.

There were no signs of oil starvation.

The oil sump assembly was impact damaged and a portion of the oil suction screen was visible through the impact damage. No contamination or blockages were observed on the suction screen. The oil filter was impact separated from the oil filter adapter and was blackened, charred, and partially melted due to exposure to thermal forces. The main bearings showed signs of in-service wear and had fresh scoring marks, likely from when the engine was being manually rotated during the exam.

3.0 Pilot Information

The pilot's logbook recorded 99.8 hours of total flight time, 16.3 hours of time-in-type, and 14.1 hours in the accident aircraft prior to the accident flight. The pilot held a private pilot certificate with an airplane single-engine land rating issued on March 7, 2023. The pilot began flight training on September 9, 2022 and received his private pilot certificate on March 7, 2023. No flights were logged between March 19, 2023, and September 15, 2023. The logbook entry for the September 15, 2023, flight included the statement "First Flight Back". The pilot held a third-class airman medical certificate issued September 8, 2022, with limitations for lenses required for distant and glasses required for near vision.

4.0 Aircraft Information

Year: 1975
Make: Piper
Model: PA-28-151
Serial number: 28-7515346
Registration: N33563
Lycoming O-320-E3D

100-hour Inspection: March 6, 2024 @ 9,048 hours TT 1,335 TTSMOH

5.0 Meteorological Information

METAR KFAY 261653Z VRB05KT 10SM SCT035 30/21 A2990 RMK AO2 SLP120
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METAR KFAY 261553Z 18005KT 10SM FEW028 29/22 A2991 RMK AO2 SLP121
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Accident 1500 UTC

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METAR KFAY 261353Z 09004KT 10SM CLR 26/21 A2990 RMK AO2 SLP118 T02560206=

Submitted by:

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