

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24FA190

AIRFRAME AND ENGINE EXAM SUMMARY REPORT

July 23, 2024

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A. ACCIDENT

Location: Elk River, Idaho
Date: June 12, 2024
Time: 10:06 Pacific daylight time
Airplane: N34903, Cessna 177B

B. AIRFRAME AND ENGINE EXAM SUMMARY REPORT

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Party Coordinator	Troy Helgeson Lycoming Engines Williamsport, Pennsylvania
Party Coordinator	Casey Love Textron Aviation Wichita, Kansas

C. SUMMARY

Airframe and engine exam was conducted on July 23, 2024, at the facilities of Inter-State Aviation, Pullman, Washington. No mechanical anomalies were noted that would have precluded normal operation.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe

N34903, 1974 Cessna 177B
SR#: 1770277
Hobbs:
Tach:

The fuselage was thermally destroyed.

Both carry through spars were thermally damaged and burnt away from the upper fuselage.

The inboard 6 ft of the left wing was thermally damaged. It displayed bending and crushing throughout. The outboard 3 ft of the left wing, and the left aileron were

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separated from the wing, consistent with a tree strike. The left aileron remained attached to the separated outboard section of left wing, and displayed bending, midspan. The left flap remained attached to the wing at its attachment points and displayed trailing edge bending and crushing. (see figure 1)

The inboard half of the right wing was thermally damaged. It displayed various dents, and areas of crushing, throughout. The right aileron and flap remained attached at their attachment points. (see figure 2)



Figure 1. Left wing.



Figure 2. Right wing.

The empennage displayed thermal damage. The vertical stabilizer, rudder, and horizontal stabilator, remained attached to the empennage; all displayed denting, crushing and buckling throughout. The left side of the horizontal stabilator displayed upward bending and crushing, midspan. The outboard 12 inches of the right side of the horizontal stabilator displayed thermal erosion. The stabilator trim tab remained attached to the horizontal stabilator. (see figure 3)



Figure 3. Empennage.

Flight control cable continuity was confirmed for both ailerons, rudder, and stabilator.

The flap actuator mechanism screw drive extension dimension indicated that the flaps were extended to approximately 30° based on the measurement of approximately .30 in. from the jackscrew motor to the jackscrew carrier. (see figure 4)



Figure 4. Measurement between the jackscrew motor and jackscrew carrier (Courtesy of Textron)

Both main landing gear were separated from the fuselage, consistent with thermal damage. The nose landing gear assembly remained attached at the firewall.

The carburetor heat control arm was found attached to the airbox, and the heat door was observed in the open position. The carburetor heat control cable was attached to the control arm. The airbox displayed crush damage. (see figure 5)



Figure 5. Carburetor heat control arm and airbox (Courtesy of Textron)

The fuel selector valve was observed with 2 inch segments of thermally separated fuel lines attached. The valve was in the BOTH position. The fuel strainer bowl and screen were observed free of debris.

The cabin and instrument panel were thermally destroyed.

Instrument Panel / Cockpit Documentation:

Instruments: unreliable

Throttle: forward

Mixture: forward

Propeller: forward

Carburetor heat: unreliable

2.0 Engine

Engine Manufacturer: Lycoming

Engine Model Number: O-360-A1F6D

Engine Serial Number: L-25286-36A

Tach: unreliable

Engine Total Time: 1441.2 SMOH

The engine was thermally damaged and remained attached to the firewall. The firewall was thermally separated from the fuselage. (see figure 6)



Figure 6. View of engine.

The single drive, dual magneto displayed thermal damage. Due to the damage, it was unable to be tested or rotated. (see figures 7 and 8)

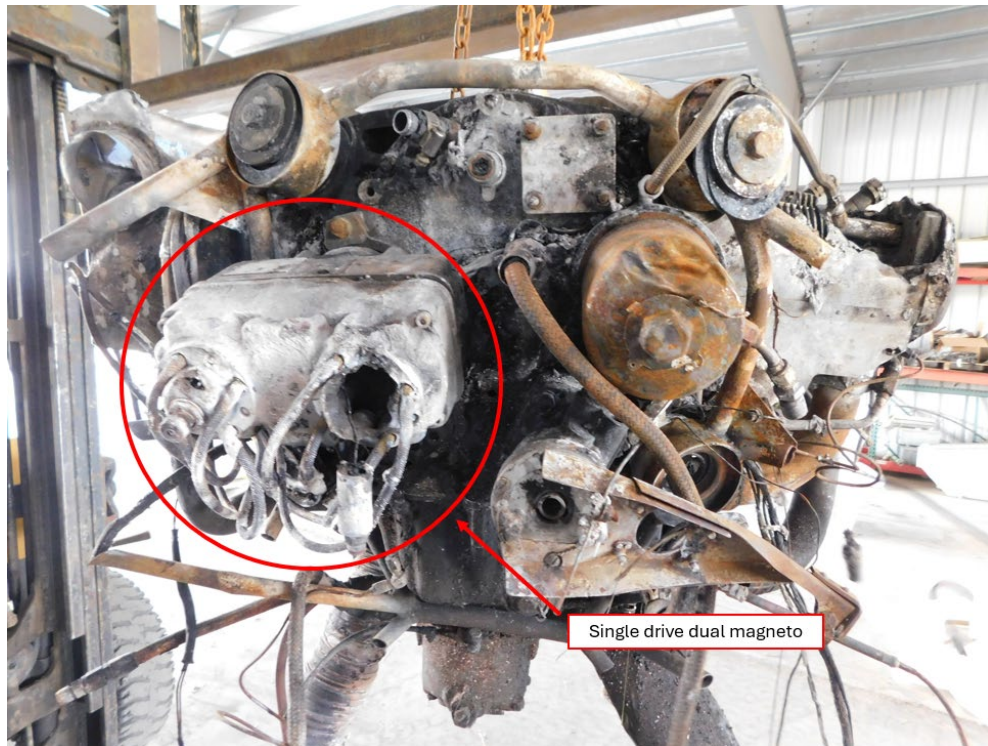


Figure 7. Single drive dual magneto before removal from engine.



Figure 8. Single drive dual magneto after removal from engine.

The fuel pump was separated from the flange and was thermally damaged. Due to impact and thermal damage, the fuel pump was unable to be tested. (see figure 9)



Figure 9. Fuel pump.

The oil suction screen was free of debris. The oil filter was removed and displayed thermal damage.

The top and bottom spark plugs were removed. All of the spark plugs were observed to be consistent with "worn severe", when referencing the Champion Aviation Check-A-Plug Chart AV-27. (see figures 10 and 11)



Figure 10. Top spark plugs.



Figure 11. Bottom spark plugs.

The cockpit mixture and throttle controls were found in the full forward position. Mixture and throttle control cables were attached to the control arms (engine side).

Mixture and throttle control cable continuity was confirmed through the firewall, to the cockpit controls.

The crankshaft was unable to be rotated by hand and thumb compression could not be confirmed. The cylinders were removed, and no anomalies were noted. The connecting rods could be individually rotated. The camshaft could be manually rotated. The accessory case was disassembled. (see figure 12) The oil pump could be manually rotated. The engine case was disassembled. The flange was separated from the forward end of the crankshaft. No other anomalies were noted.

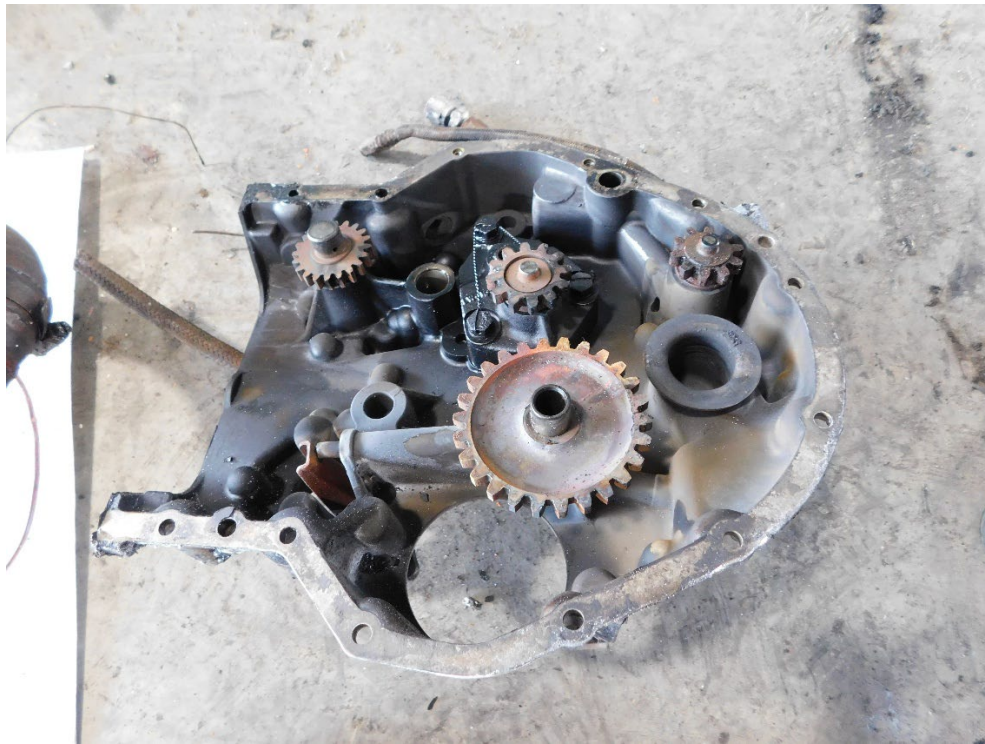


Figure 12. Accessory case.

The carburetor was observed partially separated at the flange. It was disassembled and found to be thermally damaged. One float was separated from the float assembly. Melted solder was noted. (see figure 13)



Figure 13. Disassembled carburetor (courtesy of Lycoming)

3.0 Propeller

Manufacturer: McCauley
Model Number: B2D34C208
Serial Number: 738967

The engine's propeller assembly separated from the crankshaft at the aft side of the crankshaft flange. The flange and both blades remained attached to the hub. Blades A and B displayed forward bending and leading edge scraping on the outboard half of the blades. (see figures 14-17)



Figure 14. View of propeller assembly.



Figure 15. Blade A forward bending.



Figure 16. Blade B forward bending.



Figure 17. Aft view of propeller hub assembly and aft side of crankshaft flange.

The propeller governor was removed. The control arm and post were separated from the governor, consistent with impact damage. The control cable was attached to the

arm and control cable continuity was confirmed through the firewall, to the cockpit control. (see figure 18) The propeller governor oil screen free of debris.

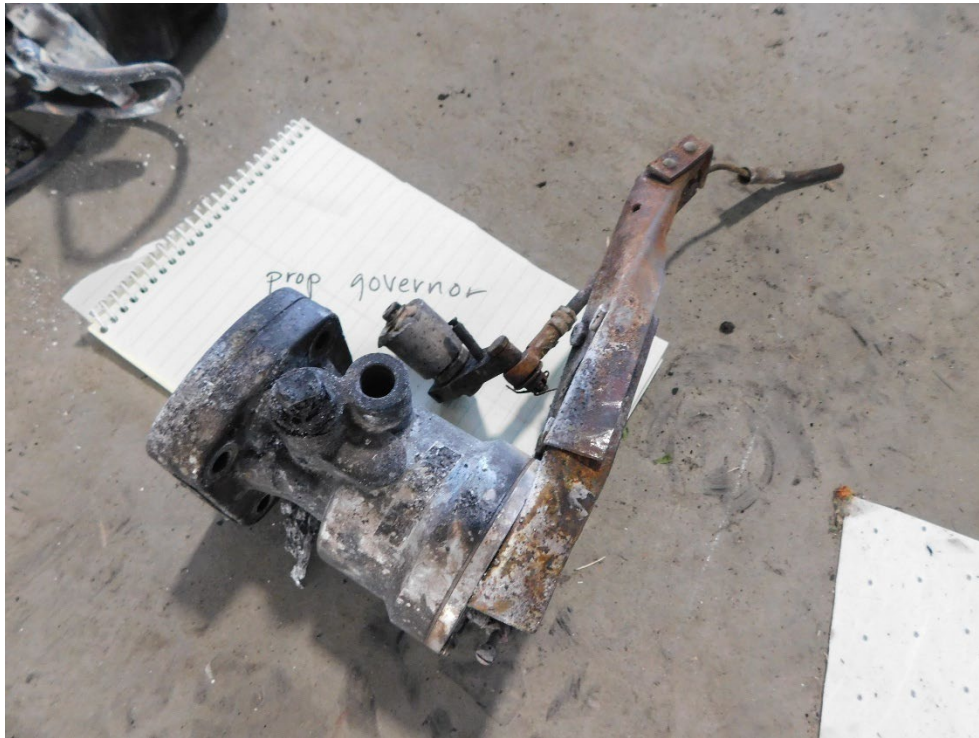


Figure 18. Propeller governor.

Submitted by:

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