

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR22LA166

POST-ACCIDENT ENGINE EXAMINATION SUMMARY

August 19, 2022

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A. ACCIDENT

Location: Ravensdale, Washington
Date: April 23, 2022
Time: 1820 Pacific daylight time
0120 coordinated universal time
Airplane: N4398B Cessna 170B

B. POST-ACCIDENT ENGINE EXAMINATION SUMMARY

IIC Eleazar Nepomuceno
NTSB
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C. SUMMARY

The pilot reported that he departed Arlington Municipal Airport (KAWO), about 0900 for a cross-country flight, with multiple intermediate legs and a return destination to AWO. About 1 hour and 30 minutes into the accident leg, as the airplane passed Stampede Pass, Washington, about 3,000 ft above the ground, the engine lost all power. The pilot immediately verified that the mixture and throttle control settings were advanced and switched the fuel selector lever from BOTH to the right tank then to the left tank, but the engine restarted for only about 30 seconds until it again lost all power. The pilot then maneuvered the airplane towards a road for a forced landing, but the airplane impacted treetops. The airplane came to rest upright on a riverbank. The airplane was recovered to a secured facility for further examination.

Postaccident examination of the engine did not reveal any preimpact mechanical anomalies. The fuel system was traced from each wing tank to the carburetor at the engine through the fuel selector, which rotated normally and was unobstructed. The fuel lines that had not been damaged from impact or removed to transport the airplane were secure.

Mechanical continuity was established throughout the rotating group, valve train and accessory section as the crankshaft was manually rotated at the propeller by hand. Thumb compression was achieved at all four cylinders and the valves displayed normal lift when the crankshaft was rotated. Examination of the cylinders combustion chamber interior components using a lighted borescope revealed normal piston face and valve signatures, and no indications of catastrophic engine failure.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane came to rest upright on a riverbank, about 10 nm east of WA77. The wings, fuselage, engine, and empennage were impact damaged.

First responders reported no evident of a fuel spill and by removing the fuel caps, observed fuel odor in the right-wing fuel tank had fluid in it consistent with aviation gas; they were not able to confirm if the left- wing tank had fuel. The fuel selector was documented in the OFF position. The pilot added that he switched the fuel valve lever to the OFF position prior to egressing.

Recovery of the airplane revealed that less than a gallon of fuel was recovered from the fuel tanks.

2.0 Engine Examination



Figure 1. View of accident engine

The airplane was equipped with a Lycoming O-360-A1A (figure 1), engine serial no. RL-34474-36E. The engine examination took place on August 17, 2022 at Avtech Services, LLC.

The engine remained attached to its engine mounts, which were connected to the engine firewall. All four cylinders and the accessories and accessory case were unremarkable. The intake and exhaust tubes sustained impact damage. The engine oil case remained intact and secured and had 6 quarts of oil.

The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated residue was seen in all cylinders. All intake and exhaust valve springs were in place and visually appeared to be undamaged. The upper spark plugs were removed, and the examination of the cylinders combustion chamber interior components using a lighted borescope revealed normal piston face and valve signatures, and no indications of catastrophic engine failure. 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.

Mechanical continuity was established throughout the rotating group, valve train and accessory section as the crankshaft was manually rotated at the propeller by hand. Thumb compression was achieved at all four cylinders and the valves displayed normal lift when the crankshaft was rotated. The magneto to engine timing was 25° before top dead center cylinder number one for both the right and left magneto. The top engine spark plugs were removed from the engine, and they were the massive electrode type. The sparkplugs exhibited black deposits within the electrode area. All of spark plugs exhibited signatures consistent with NORMAL when compared to the Champion Check-A-Plug comparison chart.

The carburetor was impact damage at its mounting point. The throttle and mixture control cable remained attached to the servo and was unremarkable. The throttle and mixture control moved the available length. The bowl was removed and was void of fuel.

3.0 Propeller Examination

Both propeller blades remained attached to the propeller hub and flange, which was connected to the crankshaft. Minimal damage was observed to both blades.

4.0 Fuel Planning Calculations - Table 1

Each leg was calculated using direct course headings (figure 2). The pilot reported that he fueled the airplane with about 34-36 gallons and believed that he had about 3 hours of flight time, as the engine burned about 12 gallons of 100 LL per hour. The accident airplane was equipped with 2-20 gallon wing fuel tanks.

The wind direction and speed were taken from the Temperature and Winds Aloft report based out of Seattle International Airport (SEA), Seattle, Washington. At the time of departure from AWO, the reported winds aloft at 3,000 ft msl were 270° at

8 knots. After the passenger was picked up, the same station reported winds at 9,000 ft msl were 240° at 7 knots. At the time of departure from R49, the winds aloft reported winds were 230° at 7 knots. The fuel calculations revealed that at the time of the engine power loss event, the airplane was flying for a total of about 2.8 hours and would have consumed about 42 gallons of fuel. The pilot was requested to provide his fuel calculations, but it was not provided to the investigator. The accident airplane was not refueled at R49.

Table 1. Fuel Planning Calculations

Leg	Direct Course & TAS	Wind direction & Speed (knots)	Distance (nautical miles)	Flight time (minutes)	Fuel per hour (per pilot)	Approximate enroute required fuel (gallons)	Approximate Takeoff & landing fuel consumption(gallons)
AWO to W10	233° at 110 knots	0 at 0 knots	14	8	12	2	1.5 & 1.5
W10 to R49	73° at 110 knots	240° at 8 knots	157	80	12	16	1.5 & 1.5
R49 to Stampede Pass, WA (power loss event)	233° at 110 knots	230° at 7 knots	137	80	12	16	1.5 (takeoff only)
R49 to WA77	233° at 110 knots	230° at 7 knots	164	96	12	20	1.5 & 1.5
Total fuel consumption for AWO-R49-Stampede Pass							About 42 gallons total fuel consumption
Total fuel consumption for AWO-R49-WA77							About 47 gallons total fuel consumption

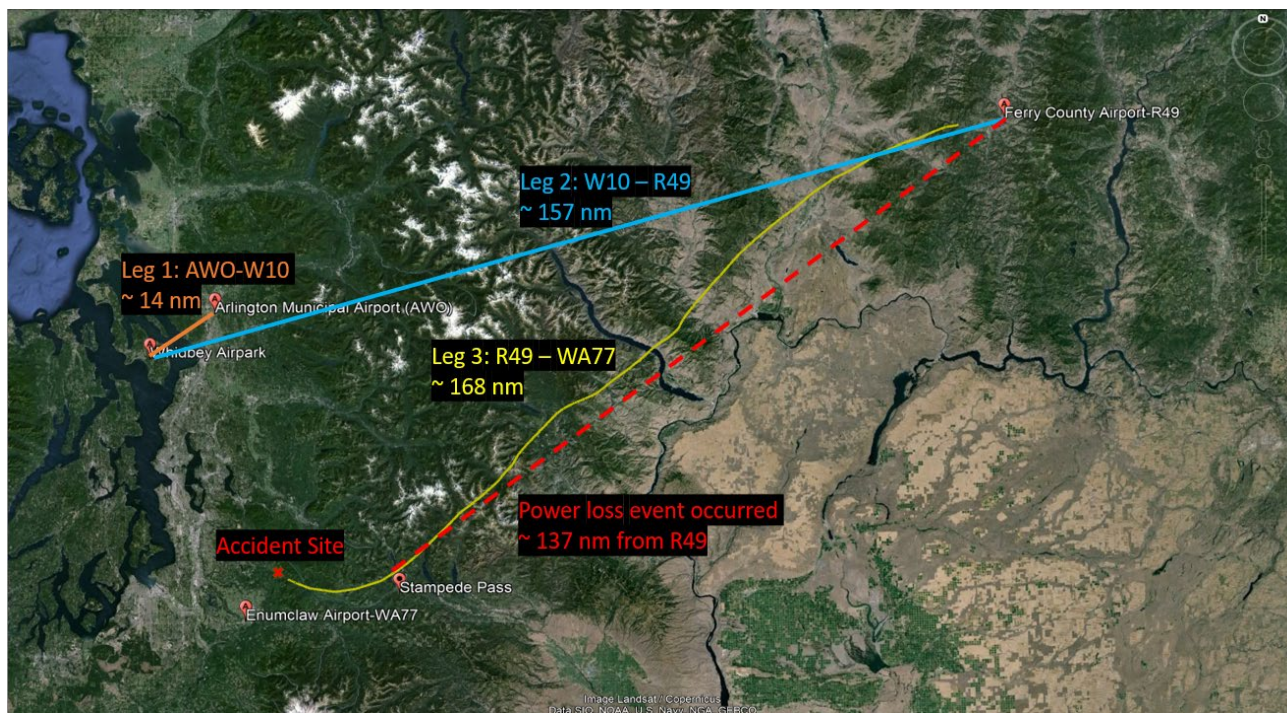


Figure 2. Google Earth map depicting flight route of accident airplane.

Submitted by:

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