



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

March 16, 2021

AIRFRAME AND ENGINE EXAMINATION

WPR21FA045

This document contains 8 embedded photos.

A. ACCIDENT

Location: Whidbey Airpark (W10), Langley, Washington
Date: November 11, 2020
Aircraft: Cessna 177, N34633
NTSB Investigator-in-Charge: Samantha Link

B. ATTENDEES

Joshua Cawthra National Transportation Safety Board Federal Way, Washington	Eric Gutierrez National Transportation Safety Board Federal Way, Washington
Mark Plat Lycoming Engines Williamsport, Pennsylvania	Casey Love Textron Wichita, Kansas

C. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Examination of the recovered airframe revealed that the wings, cabin roof were separated from the fuselage. The fuselage was separated into multiple pieces.



Figure 1: Recovered engine/cabin area.



Figure 2: View of the recovered wreckage.



Figure 3: View of the recovered wreckage.

Flight control continuity was established throughout. All areas of separation were consistent with overload or cut by recovery personnel.

The gascolator (airframe fuel filter) was disassembled and examined. The gascolator bowl exhibited a slight amount of debris. The screen was clear.



Figure 4: Gascolator bowl

Power was applied to the electric boost pump, and the pump actuated normally. Water was poured into the inlet port, and power was applied to the fuel pump. When the pump was activated, water expelled from the outlet fuel port.

Fuel flow transmitter was removed, and the inlet fittings were removed. No evidence of debris was observed within the fuel flow transmitter.

All fuel lines were found free of debris when compressed air was applied to each fuel line. Both vent lines were free of debris.

Fuel selector valve was in the “right” position. All ports were free of debris.



Figure 5: Fuel selector valve

The fuel shut off valve was in the “on” position.

Fuel filter screens within the wing fuel tanks were free of debris.

Debris/dirt was observed within the right fuel tank, consistent with impact.

An SD memory card was recovered from the wreckage. The card was sent to the investigator-in-charge for further evaluation.

2.0 Engine Examination

Lycoming O-360-A1F6D

S/N: L-23052-36A

Examination of the recovered engine revealed that it remained attached to the fuselage firewall via its mounts. The carburetor was separated from the oil sump. The induction system and exhaust exhibited impact damage.



Figure 6: View of the recovered engine

The exhaust was removed and examined. No evidence of any internal damage or obstruction to flow was observed.

The propeller, upper spark plugs, and fuel pump were removed. The crankshaft was rotated using a hand tool attached to an accessory mounting pad. Thumb compression was obtained on all of the cylinders. Movement of all intake and exhaust rocker arms was observed. All intake and exhaust rocker arms were oil coated. Engine to magneto timing 25° before top dead center, with the right and left side of the magneto synchronized within 1° of one another.

The ignition harness exhibited impact damage to various areas.

The single-drive, dual magneto exhibited some impact damage. The magneto was removed from the engine. When the magneto drive shaft was rotated by hand, spark was produced on all 8 ignition leads.

The upper and lower spark plugs were removed. All 8 spark plugs exhibited severe worn-out signatures. Bottom cylinder spark plugs 1 and 3 exhibited light gray deposits within the electrode area. Bottom cylinder spark plugs 2 and 4 were oil soaked. Upper spark plugs 1, 2, 3, and 4 exhibited gray deposits within the electrode areas.



Figure 7: View of the top spark plugs

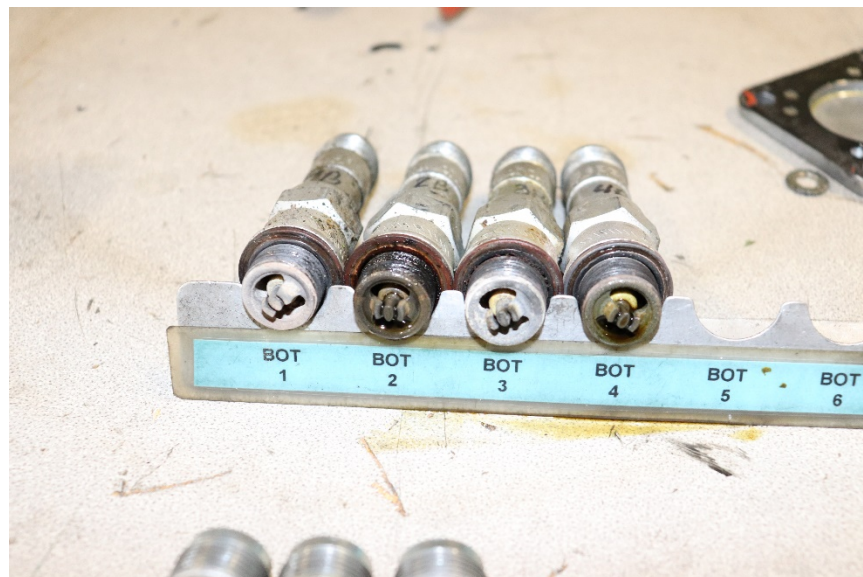


Figure 8: View of the bottom spark plugs

All four cylinders were examined internally using a lighted borescope, all of which exhibited normal operational signatures.

The oil filter remained attached to the engine, however, exhibited impact damage, and exposed some of internal filter element. The filter element and suction screen remained free of visible contaminants.

The carburetor was intact and exhibited impact damage. The fuel inlet screen was free of debris. The throttle was intact and remained secure to the carburetor. When actuated by hand, the throttle arm and plate moved from stop to stop. The mixture arm was separated from the mixture control shaft. The mixture control shaft was bent, consistent with impact damage. The carburetor was disassembled and examined internally. The internal floats were intact and undamaged. The needle valve was intact and undamaged.

The fuel pump was intact. The fuel pump was disassembled and all internal components, including the diaphragm were intact.

The propeller governor was impact damaged. The propeller governor screen and gaskets were intact and free of debris. The propeller governor arm was separated from the governor, however, the control rod remained attached to the arm.

One propeller blade remained attached to the propeller hub and was mostly straight, absent of damage. The opposing blade was partially separated and bent aft slightly. The blade exhibited various striations on the chamber side of the blade.

Submitted by: Joshua Cawthra