



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

December 8, 2021

ENGINE EXAMINATION SUMMARY

WPR21LA151

A. ACCIDENT

Location:	Yacolt, Washington
Date:	March 29, 2021
Aircraft:	N655FL
NTSB IIC	Albert Nixon

B. PARTICIPANTS

Albert Nixon	Eleazar Nepomuceno
Senior Aviation Accident Investigator	Aviation Accident Investigator
Western Pacific Region	Western Pacific Region
Federal Way, WA	Federal Way, WA

C. SUMMARY

Examination of the wreckage was conducted at the facilities of AvTech Services LLC, at the Auburn Municipal Airport (S50), Auburn, Washington. The postaccident examination of the engine revealed that the cylinders had a build-up of carbon deposits on the pistons and valve head guides, faces, and stems. The deposits prevented the valve heads from sealing properly. Additionally, on the Nos. 1 and 3 cylinders no compression was obtained, and a compression check revealed 5 psi in the No. 1 cylinder and 0 psi in the No. 3 cylinder. No additional preimpact anomalies or malfunctions that would prelude normal operation were noted.

D. DETAILS OF THE INVESTIGATION

1.0 Engine Examination

The engine and propeller assembly were attached to the fuselage and the engine mount assembly sustained damage to the right side. One blade tip was bent aft. The other blade was slightly bent forward. The baffling was intact with exception of some impact damage due to tree debris that was present. The rocker covers were removed, and all valves and springs were lubricated.

The top spark plugs were removed and examined. The top sparkplug electrodes displayed normal wear signatures and were oily. The bottom sparkplugs electrodes displayed normal wear but exhibited carbon deposits.



Figure 1: Engine as viewed from the top right side.

Rotational continuity was established through hand rotation of the propeller and cylinder thumb compression was obtained on cylinders Nos. 2 and 4 but not obtained on cylinders Nos. 1 and 3. Leaking air was heard from the exhaust piping. All engine control continuity was established. Timing was verified to be timed appropriately. Both magnetos were tested to be operational. A compression check revealed that the No. 1 cylinder was 5 psi, the No. 2 cylinder was 72 psi, the No. 3 cylinder 0 psi, and the No. 4 cylinder 68 psi. Borescope examination revealed that the No. 3 cylinder exhibited scoring on the walls and had carbon deposits lodged where the exhaust valve seats. The Nos. 1, 2, and 3 cylinders were removed for examination.

Examination of the cylinders revealed a build-up of carbon deposits on the pistons and valve head guides, faces, and stems. The deposits prevented the valve heads from sealing properly on the seat. The No. 2 cylinder exhibited carbon deposits that were substantially less the Nos. 1 and 3 cylinders.

The oil system was intact, and the oil quantity indicator read an adequate quantity. The muffler was removed. Examination revealed that the muffler shroud had staining on interior portion. The welded base of the standpipe was fractured. Additionally, the standpipe area near the base exhibited a fracture surface. The ride side exhaust piping sustained impact damage.

The carburetor was observed to be intact and was removed for examination. Examination of the carburetor components revealed the floats were intact, no debris, and the screen was clear.



Figure 2: View of No. 1 piston head and disassembled components for No.1 cylinder valve train.

Although no fuel was present there was a strong presence of fuel odor. In the area of the lower half of the carburetor, where the carburetor heat airway was, exhibited carbon deposits.

The induction was clear. All fuel lines were secured.

All accessories were attached and intact.

Submitted by Albert Nixon