



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

December 12, 2019

AIRFRAME AND ENGINE EXAMINATION SUMMARY

WPR19LA226

A. ACCIDENT

Location: Fall City, WA
Date: July 26, 2019
Aircraft: Cessna 177: N1828Q
NTSB IIC: Albert Nixon

B. EXAMINATION PARTICIPANTS:

Albert Nixon
Senior Aviation Accident Investigator
National Transportation Safety Board
Federal Way, WA

Eric Gutierrez
Air Safety Investigator
National Transportation Safety Board
Federal Way, WA

Andrew Swick
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National Transportation Safety Board
Federal Way, WA

C. SUMMARY

Examination of the airplane's airframe and engine was conducted on December 12, 2019, at the facilities of AvTech Services LLC, located at the Auburn Municipal Airport, Auburn, Washington. A tulip-shaped intake valve was observed in the No. 3 cylinder that would not seat properly and left a noticeable gap in which gasses and air could escape. No other anomalies or evidence of preimpact mechanical failures or malfunctions were noted during the examination of the recovered airframe and engine.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Examination of the airplane revealed that the wings were removed for recovery.

Flight control continuity was established to the rudder, ailerons, and elevators. All associated pulleys, safeties, and hardware were in place.

The gasolator was drained and about 2-3 ounces of fuel drained that was blue in color and clear of contaminants. The left and right fuel tank cap were examined, and no anomalies were noted.

In the cabin, the fuel selector was in the off position.



Figure 1: Airplane as viewed from the front.

2.0 Engine Examination

Examination of the Lycoming IO-360-A1B6 engine, revealed it was attached to the airframe. Impact damage was noted on the air intake box. The three-blade constant speed propeller and spinner remained attached. All three propeller blades sustained slight bending to the aft.

The rocker covers were intact. The crankshaft was rotated by hand, utilizing the propeller, and rotational continuity was established throughout the engine, accessory section, and the valve train. During crankshaft rotation, thumb compression and suction were attained on Nos. 1, 2, and 4 cylinders. A borescope inspection of the cylinders revealed light amounts of carbon deposits.

A fuel source and new battery were secured for an engine run. An engine run was accomplished and the engine was noted to run rough. After the engine run, the No. 3 cylinder was noted to be cold to the touch that was consistent with it not being operational. Therefore, the No.3 cylinder was removed and examined. During the cylinder examination, the intake valve was observed not to seat properly, and a feeler gauge was able to be inserted between the cylinder top and the

valve. The intake valve was noted to have stretched to exhibit a cup shape consistent with a “tulip” like shape.



Figure 2: Interior of the No. 3 cylinder, intake valve with gap measured by the feeler gauge tool.



Figure 3: Cylinder No. 3 intake valve.

The oil quantity rod indicated about 8 quarts of oil. The oil was clear and dark in color. The oil filter had a date of July 15, 2019, written on it.

The exhaust system remained attached and the sustained minor damage.

The examination of the engine revealed no additional evidence of pre-impact mechanical anomalies or malfunctions that would have precluded normal operation.

Submitted by: Albert Nixon