



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

September 22, 2019

AIRFRAME AND ENGINE EXAMINATION

WPR19FA262

A. ACCIDENT

Location: Torrance, CA
Date: September 19, 2019
Aircraft: Registration Number: N2323Y, Cessna 177
NTSB IIC: Albert Nixon

B. EXAMINATION PARTICIPANTS:

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

Jennifer Barclay
Air Safety Investigator
Textron Aviation
Wichita, KS

Mark Platt
Senior Air Safety Investigator
Lycoming Engines
Williamsport, PA

C. SUMMARY

Examination of the airplane's airframe and engine was conducted on September 22, 2019, at the facilities of Air Transport in Phoenix, Arizona. No anomalies or evidence of preimpact mechanical failure or malfunction 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. The engine was partially attached.

Flight control continuity was established from the ailerons to the cockpit controls through separations that exhibited signatures consistent with overload. Rudder and stabilator continuity were established to the flight controls. The stabilator trim was 1.1 inches in tab up direction.

The flaps were confirmed to be near the zero-flap position with the actuator.

Both wing fuel filter strainers screens were examined and clear of contaminants.



Figure 1: Airplane wreckage prepared for examination as viewed from the rear.

In the cabin, the ignition was selected to both, the flap lever was set to about $\frac{1}{4}$ flaps but was loose and broken. The Hobbs times was about 1525.1 hours. The flap and nav light circuit breakers were out.

The left seat's lap belt buckle and should harness were latched but were cut by rescue personnel. The right seat was removed and a stand for their electronic equipment was installed that covered the right front seat area to the rear seat. The stand was removed and weighed. Both seat rails sustained impact damage.

The left and right control yokes remained in place in the cockpit, however, both yokes had separated from the control tube during impact.

The throttle lever was about $\frac{3}{4}$ out and the mixture was full in, however, the throttle lever was difficult to move from impact damage.

The turn bank indicator indicated level. The altimeter indicated 2,765 ft with 29.93 set. The airspeed indicator indicated 0. The vertical speed indicator indicated about -1,800 ft.

The fuel selector handle was selected to the “both” position. The fuel selector valve was removed and examined. The valve was determined to be selected to both tanks using compressed air and no obstructions were observed. The fuel strainer gasket screen and bowl were clear of contaminants.

The vent system was examined and clear of obstructions. In addition, the pitot system was examined, and compressed air was blown through the system and no obstructions or anomalies were observed.

An aircraft record book was found that had the most recent annual inspection record, and a weight and balance form from 2016, was in the book.

All electronic gear, table for the gear (minus seat weight) batteries, power cords, laptop, and other miscellaneous items were weighted at about 220 pounds.

2.0 Engine Examination

Examination of the Lycoming O-320-E2D engine, serial number L20776-27A, revealed that the engine sustained impact damage on the exhaust system, alternator, and right forward rocker cover. One engine mount was observed fractured. The crankcase was intact. All rocker covers were removed, and examination revealed that all intake and exhaust rocker arms, shafts, and valve springs, were intact with no anomalies observed. The crankshaft was able to be rotated by hand and rotational continuity was established throughout the engine and valve train in all cylinders. All cylinders displayed appropriate compression and suction in the proper firing order. Timing for confirmed to appropriate for both magnetos. Both magnetos were removed and during manual rotation, spark was observed on all the ignition leads. The top spark plugs were removed, and the spark plugs electrodes exhibited “normal wear” signatures when compared to the Champion Check-A-Plug comparison chart.

A borescope inspection of the cylinders revealed evidence of normal operational conditions

The engine accessories mounted to the rear of the engine were intact, with the exception of the alternator. The alternator was observed to have sustained impact damage. The left and right magnetos remained attached.

The oil dipstick housing was fractured and loose. The oil quantity dip stick had a trace amount of oil. The oil filter was removed and opened, and examination of the filter revealed no metal contamination. Oil suction screen was clear of contaminations. No oil was observed leaking on the engine or fuselage.

The engine driven fuel pump was removed and examined. The drive coupling was intact and when rotated by hand, the drive shaft rotated freely. A small amount of residue fuel was present. The diaphragm was intact, check valves in place and no visible contaminants or obstruction to flow were observed.

All the fuel lines were intact. The carburetor accelerator pump was securely mounted with the mixture and throttle secure at their respective control lines. The foam air inlet filter remained free



Figure 2: Engine as viewed from the rear.

of visible preimpact obstructions. The carburetor was removed, and throttle arm was activated, and the accelerator arm discharged fuel. Then fuel inlet filter screen was removed and free of obstructions. Disassembly of the carburetor revealed that the bowl and floats were unremarkable, and no corrosion was noted.

The engine exhaust system remained attached. The exhaust system was removed and internal examination of the revealed no obstruction to flow. The exhibited gas path coloration consistent with normal operation.

The two-bladed propeller was examined. The blades displayed chordwise scratching trailing edge “S” bending torsional twisting.

The vacuum pump was removed, and its examination revealed no anomalies.

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

Submitted by: Albert Nixon