



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

June 9, 2021

AIRFRAME / ENGINE EXAMINATION SUMMARY

WPR20LA291

This document contains 8 embedded photos.

A. ACCIDENT

Location: Grand Canyon, Arizona
Date: August 28, 2020
Aircraft: Cessna TU206, N3422L
NTSB Investigator-in-Charge: Thomas Little

B. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Examination of the recovered airframe revealed that the wings were removed by wreckage recovery personnel to facilitate transport of the wreckage. The airframe fuel filter was removed and contained a small amount of liquid and debris within the bowl. The liquid was tested with water finding paste with positive results. The fuel sender units were removed from both wings. The internal fuel bladders appeared intact. The left fuel bladder had an unspecified amount of dirt/dust along the upper portion of the bladder.

HOBBS: 3308.5
Tach Hours: 992.0

Throttle, mixture, and propeller control continuity was established from the cockpit controls to the engine.

The upper portion of the cowling was compressed onto the engine and exhibited impact related damage.

2.0 Engine Examination

Engine: Continental Motors TSIO-520-M (6)
S/N: 818142-R

Examination of the recovered engine revealed that the engine remained attached to the airframe via 3 of the 4 engine mounts. The number 5 cylinder was impact damaged. No evidence of any fuel system breaches or damage to the fuel system was observed.



Figure 1: View of the engine on the airframe.

All engine accessories remained attached. All fuel lines were intact and undamaged. One oil line was impact damaged and separated at the hose fitting.

The upper spark plugs, starter/starter adapter, fuel pump, fuel injectors, and rocker box covers were removed. The crankshaft was rotated by hand using a tool attached to the propeller flange. Rotational continuity was established throughout the engine and valve train. Thumb compression was obtained on all 6 cylinders. Equal movement of the intake and exhaust rocker arms was observed.

The fuel manifold valve was intact with all of the fuel lines and injector lines attached and secure. The fuel manifold valve was disassembled. The internal spring and diaphragm were intact. The diaphragm was difficult to remove, however, once removed, exposed a liquid within the fuel manifold housing and a slight amount of debris within the screen. The liquid was tested with water finding paste with positive results.



Figure 2: View of the fuel manifold valve, with water finding paste.

All six fuel injectors were free of debris. The number 5 fuel injector was slightly impact damaged. Some corrosion was observed on the number 1 and number 2

The fuel pump was intact and undamaged with all fuel lines secure to their respective fittings. The fuel pump was removed from the engine and the drive coupling was found intact. The fuel pump drive shaft partially rotated by hand. The fuel pump was disassembled. Corrosion and dirt like debris was observed throughout the entire fuel pump. Some liquid was recovered from one of the fuel pump cavities and tested with water finding paste with positive results.



Figure 3: View of the fuel pump with corrosion and dirt like debris within the internal cavities.

The throttle body fuel control was removed from the engine and found intact. The throttle arm was impact damaged. The mixture lever moved by hand. The throttle plate interconnect was intact. The fuel inlet screen was removed and round mostly clogged with what appeared to be dirt and corrosion.



Figure 4: Fuel control unit inlet filter.

The left and right magnetos remained attached to the engine. Both magnetos exhibited some impact damage to the casings. Rub/movement marks were observed on the magneto mounting flange, consistent with movement as a result of impact damage. Engine to magneto timing was out of spec for either magneto as a result of impact damage. When the magneto drive shaft on both magnetos were rotated by hand, impulse coupling engagement was obtained with spark being produced on all ignition leads.

The upper spark plugs were intact with the exception of the number 5 cylinder, which exhibited impact damaged. All six upper sparkplugs exhibited normal operational signatures and gray deposits within the electrode area.



Figure 5: Upper 1, 3, and 5 spark plugs.

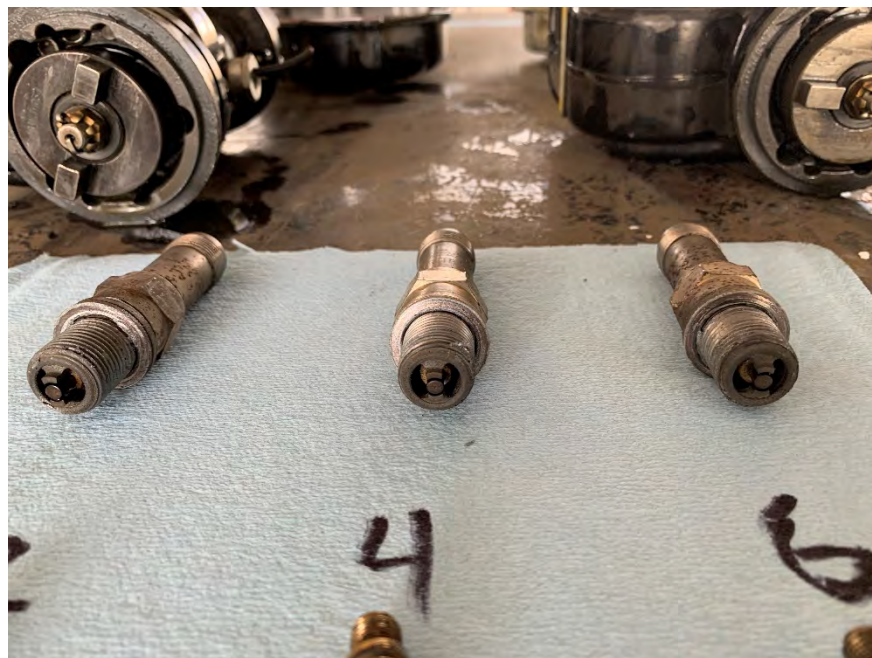


Figure 6: Upper 2, 4, and 6 spark plugs.

The induction system was impact damaged.

The exhaust system was impact damaged.

The turbocharger and waste gate was intact. The cold side (intake) of the turbo charger exhibited blade erosion consistent with hard particle passage.



Figure 7: View of the cold side of the turbine wheel.

All three propeller blades remained attached to the propeller hub and exhibited bending opposite direction of rotation, with aft bending near the blade tips.



Figure 8: Propeller Blades

Submitted by: Joshua Cawthra