NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

April 13, 2022

AIRFRAME AND ENGINE EXAMINATION

WPR22LA083

This document contains 8 embedded photos.

A. ACCIDENT

Location:	Williams, Arizona
Date:	January 26, 2022
Aircraft:	Beech, F33A, N1HH
NTSB Investigator-in-Charge:	Eric M. Gutierrez

B. PARTICIPANTS

Eric M. Gutierrez
Air Safety Investigator
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C. SUMMARY

Examination of the recovered airframe and engine revealed no anomalies that would have precluded normal operation and the production of power. However, the upper spark plugs electrode areas were black in color, consistent with a rich fuel/air mixture.

D. DETAILS OF THE INVESTIGATION

1.0 Aircraft Examination

Examination of the recovered airframe revealed that the recovery organization had removed both wings, left horizontal stabilizer and both elevators for transport. The forward section of the fuselage, near the cockpit was impact damaged. Additionally, the recovery personnel had drained about 20 to 30 gallons of fuel from the left tank. The fuel selector lever was in the right fuel tank position and the master switch was off. The observed tachometer time was 4160.9 hours.

Figure 1: View of airplane during examination (photo courtesy of the NTSB)

The left and right wings exhibited impact damage. The airplane was equipped with bladder fuel tanks and composite auxiliary tanks. Visual inspection of the right and left fuel caps revealed that the rubber seal appeared normal and unremarkable. Both fuel filler ports were normal and unremarkable.

Figure 2: View of airplane left and right fuel caps (photo courtesy of the NTSB)

Throttle and mixture control continuity was established from the cockpit controls to the throttle body. The throttle body was impact damaged and separated from the engine, however remained attached via the throttle and mixture cables. The throttle and mixture control cable moved from stop to stop when actuated by hand.

Propeller control continuity was established form the cockpit controls to the propeller governor and moved from stop to stop when actuated by hand.

A visual inspection was conducted of the fuel system. Continuity was established from the fuel tanks throughout the fuel system to the throttle body. A hose, partially submerged in water was attached to the right wing fuel supply line. The fuel selector was placed in the right tank position. The electric fuel boost pump turned on and water was observed coming from a fractured fuel fitting at the throttle body. The fuel selector was then switched to the left tank position and air pressure was applied to the engine driven fuel pump supply line, and water was observed coming from the left fuel tank supply line. Air pressure was applied to the fractured fuel fitting at the throttle body and air pressure was detected coming from the fuel injector lines. The fuel strainer assembly was clean and unremarkable.

A blue liquid consistent with 100 Low Lead fuel was observed in the fuel strainer assembly, left wing auxiliary fuel tank and the right main tanks. The blue liquid was tested for water using a water finding paste, that was negative.

2.0 Engine Examination

Engine Manufacturer: Continental
Engine Model Number: IO-520-BA (10)
Engine Serial Number: 1005878

Examination of the recovered engine revealed that the engine remained attached to the airframe via the engine mounts. All six cylinders and all engine accessories remained attached. All fuel and oil lines that were removed were tight. No evidence of any mechanical damage was observed to the engine crankcase.

The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated on all cylinders. All intake and exhaust valve springs were in place and visually appeared to be undamaged. The upper spark plugs were removed, and all six cylinders were examined internally using a lighted borescope. A normal amount of combustion deposits was observed within the combustion dome of each cylinder and piston face. All of the intake and exhaust valves were unremarkable. The crankshaft was rotated by hand using the propeller. Rotational continuity was established throughout the engine and valve train. Thumb compression and suction was obtained on all six cylinders.

Figure 3: View of left side of the engine (photo courtesy of the NTSB)

Figure 4: View of right side of the engine (photo courtesy of the NTSB)

The top engine spark plugs were removed from the engine, and they were the massive electrode type. The sparkplugs exhibited black deposits within the electrode area. All of spark plugs exhibited signatures consistent with CARBON FOULED when compared to the Champion Check-A-Plug comparison chart.

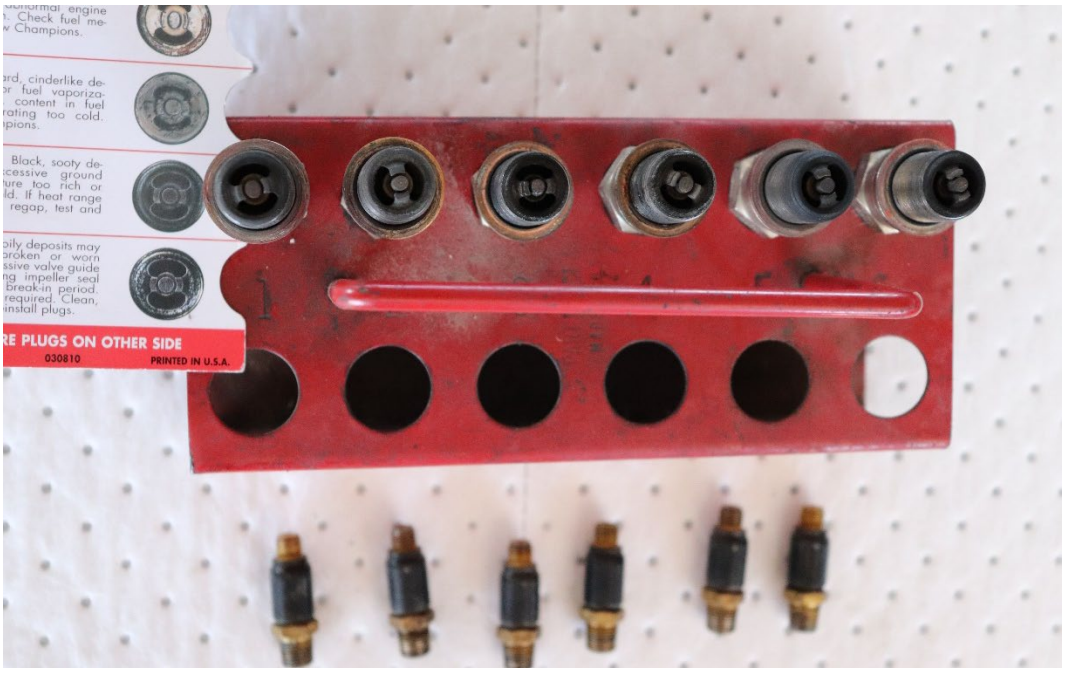

Figure 5: View of top engine spark plugs (photo courtesy of the NTSB)

The throttle body was separated from the engine and impacted damaged. The throttle control cable remained attached to the throttle body and unremarkable. The mixture control cable remained attached to the throttle body and unremarkable. The throttle and mixture control moved the available length. The fuel servo inlet screen was removed, and a slight amount of debris was observed.

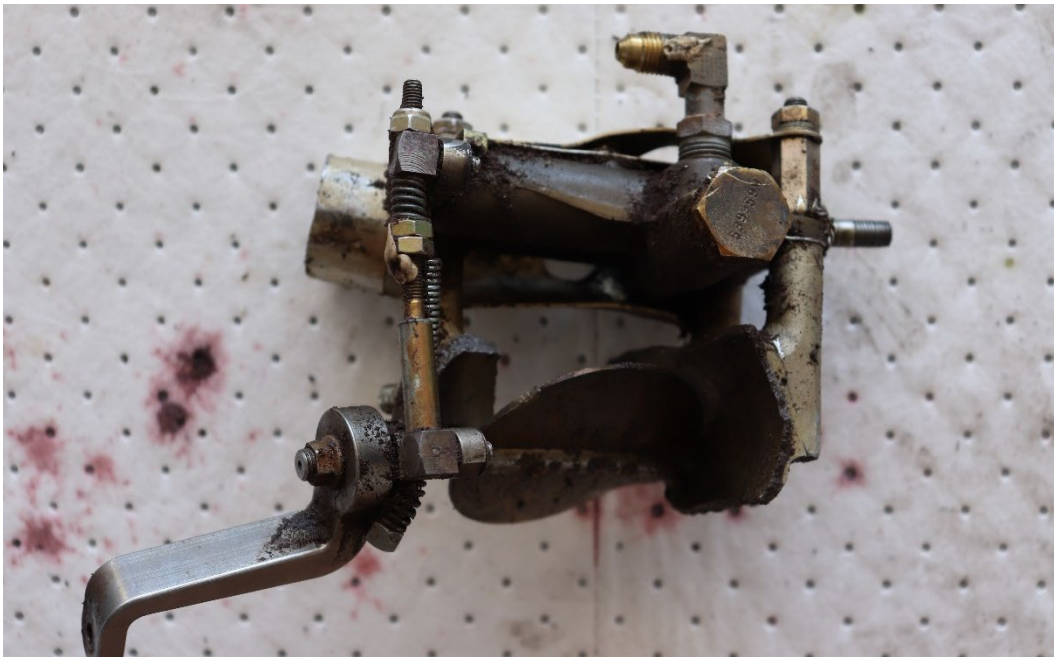

Figure 6: View of throttle body (photo courtesy of the NTSB)

The air induction body had fractured separated at the throttle body assembly. The air induction conduit was clear of obstructions and debris.

The fuel flow manifold valve was intact, undamaged, removed and disassembled. The screen was clear and free of debris. The spring and diaphragm were intact and undamaged.

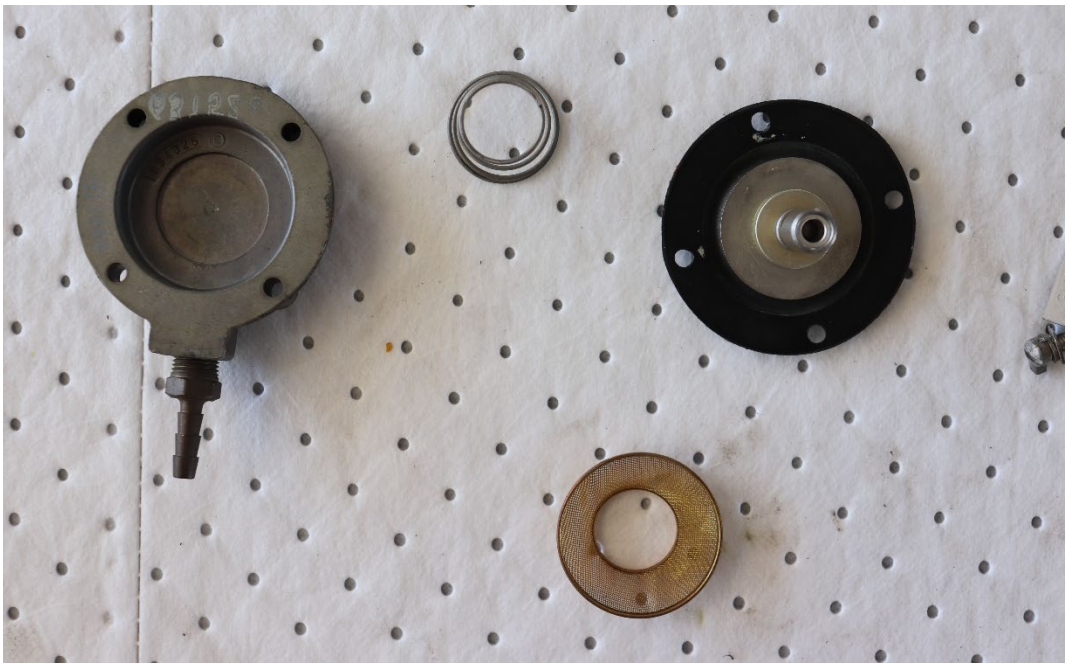

Figure 7: View of fuel flow manifold spring and diaphragm (photo courtesy of the NTSB)

All six fuel injector nozzles were removed from the cylinders and were found to be free of debris or restrictions.

The engine driven fuel pump remained attached to the engine and was unremarkable. The fuel pump was removed and rotated by hand. The fuel pump rotated freely without binding. All fuel fittings removed were tight. The drive coupling was intact.

The left and right magnetos remained attached to the engine accessory case with no external damage noted. Both magnetos were removed from the engine, when rotated by hand, spark was produced on six ignition leads and impulse coupling engagement was heard.

The exhaust system remained secure to the cylinders. No evidence of any exhaust leaks around the cylinder attach points were observed.

The propeller governor remained attached to the engine and with bending to the control rod bracket. The propeller governor screen and gaskets were intact and free of debris. The propeller governor arm remained attached to the control rod and moved from stop to stop when actuated by hand. The drive shaft was rotated by hand.

The engine oil sump had impact damage and the oil quick drain was partially separated.

Figure 8: View of oil sump damage (photo courtesy of the NTSB)

The airplane was equipped with a 3 blade, constant speed propeller. The propeller blades remained attached to the propeller hub, with slight aft bending about mid span. The blades exhibited various striations on the cambered side of the blade.

The engine driven fuel pump was retained for further examination.

Submitted by: Eric M. Gutierrez