



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

November 30, 2021

AIRFRAME AND ENGINE EXAMINATION

WPR21LA140

This document contains 8 embedded photos.

A. ACCIDENT

Location: Everett, Washington
Date: March 23, 2021
Aircraft: Cessna, 172S, N2164Z
NTSB Investigator-in-Charge: Maja Smith

B. PARTICIPANTS

Eric M. Gutierrez
Air Safety Investigator
National Transportation Safety Board
Federal Way, Washington

Joshua Cawthra
Senior Aviation Accident Investigator
National Transportation Safety Board
Federal Way, Washington

Oliver Cuestas
A&P / IA
Ace Aviation
Renton, WA

C. DETAILS OF THE INVESTIGATION

1.0 Aircraft Examination

Examination of the recovered wreckage revealed that the nose landing gear had impact damage, the top section, at the firewall attachments were bent forward. The firewall exhibited crushing and bending aft. The left-wing fuel line was crimped closed near the wing root by recovery personnel to stop a fuel leak.



The left and right wings remained attached to the airframe and exhibited buckling throughout. The left wing was partially separated, the aft wing spar was fracture separated near the wing root. Visual inspection of the left and right fuel caps revealed that both fuel caps rubber seals appeared worn. The observed tachometer time was 4477.9 hours and the HOBBS meter indicated 6090.2 hours.



Throttle and mixture control continuity was established from the cockpit controls to the fuel servo and moved from stop to stop when actuated by hand. The mixture control cable was

separated from the rod end, which remained attached to the fuel servo mixture arm. The damage to the mixture control cable was consistent with impact damage.

A visual inspection was conducted of the fuel system. Continuity was established from the main fuel tanks throughout the system to the gascolator fuel fitting at the firewall. When the airframe electric fuel pump was turned on, fuel expelled from the fuel fitting at the firewall. Visual inspection of the gascolator fuel and minor debris.. The fuel was tested for water using SAR-GEL water finding paste, with negative results.

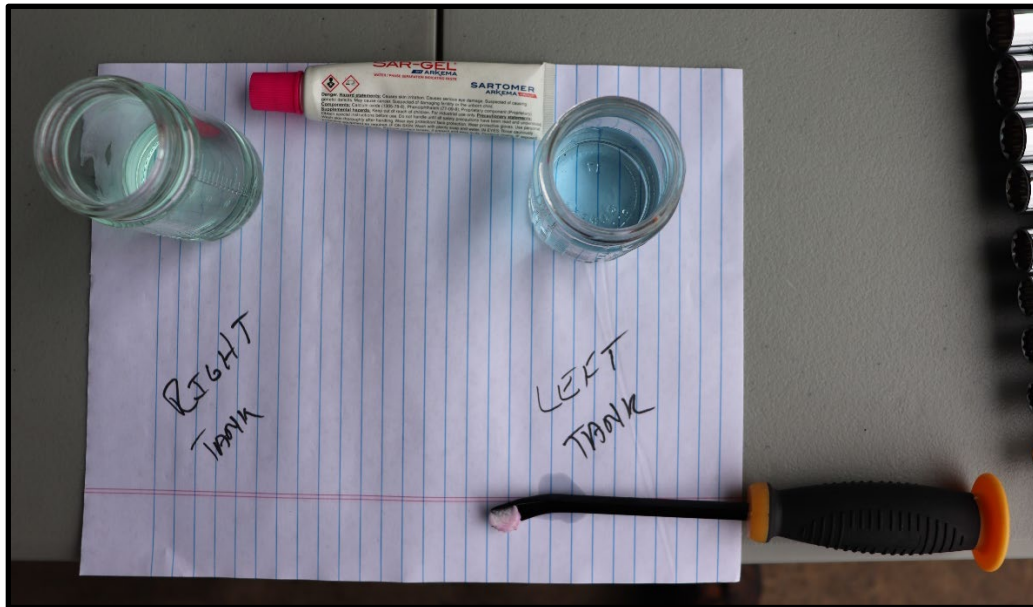


Figure 4: View of SAR-GEL water finding paste (photo courtesy of the NTSB)

2.0 Engine Examination

Engine Manufacturer: Lycoming

Engine Model Number: IO-360-L2A

Engine Serial Number: L-23214-51A

Examination of the recovered engine revealed that it remained attached to the engine mounts. All four cylinders and all engine accessories remained attached. All fuel and oil lines appeared attached to their respective fittings and were tight. No evidence of any mechanical damage was observed to the engine crankcase.

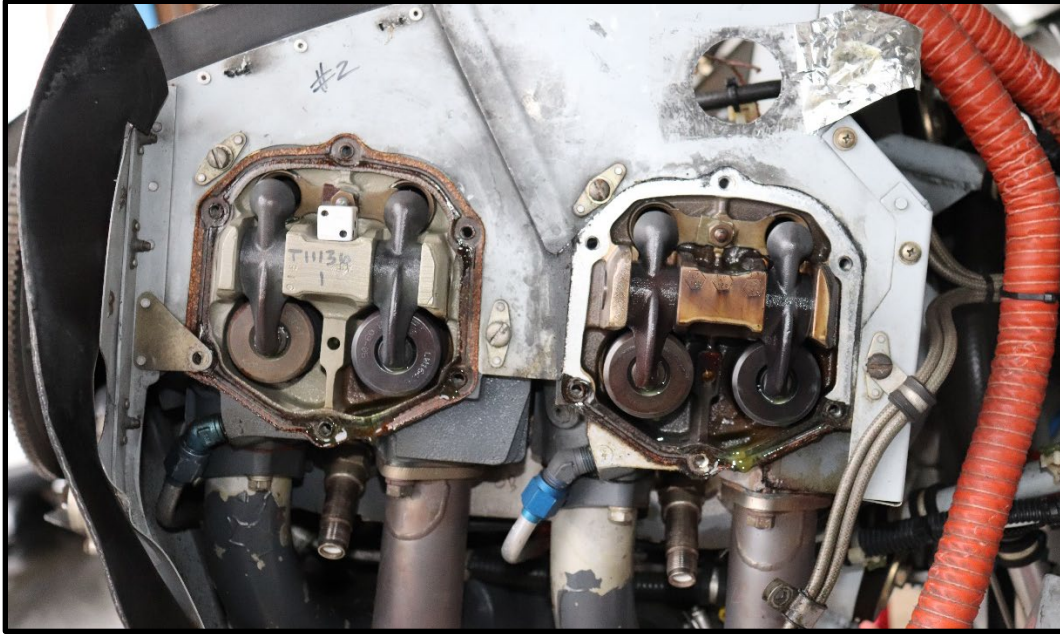


Figure 5: View of left side of the engine (photo courtesy of the NTSB)

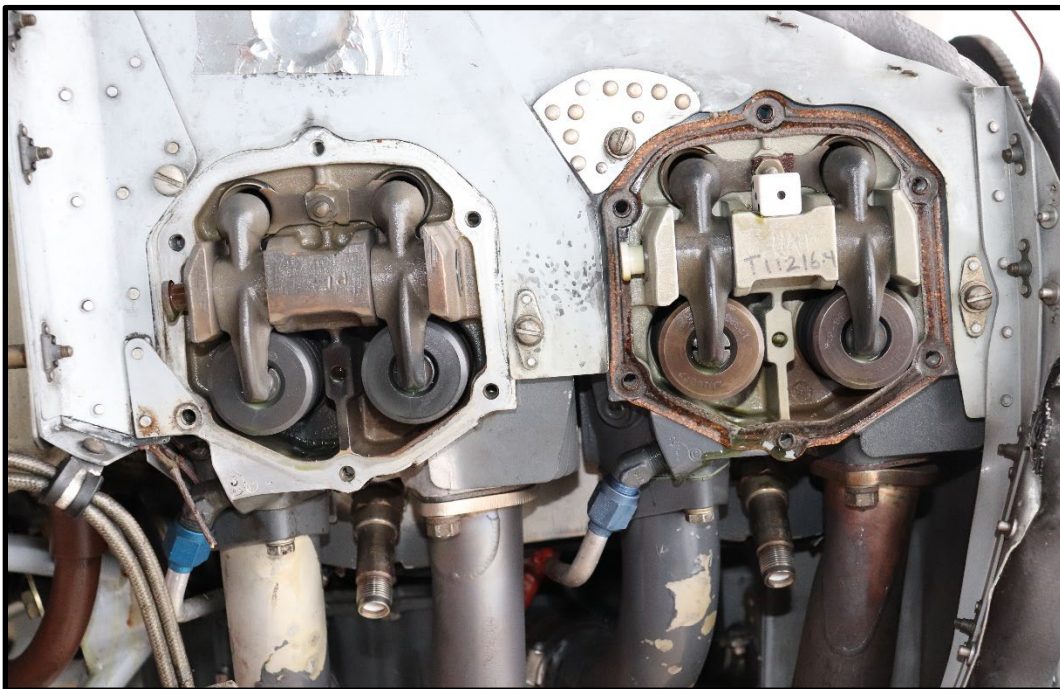


Figure 6: View of right side of the engine (photo courtesy of the NTSB)

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 on all cylinders were in place and visually appeared to be undamaged. The upper spark plugs were removed, and all four 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 four cylinders.

The top spark plugs were removed from the engine. Dark gray coloration within the electrode areas was observed. When compared to the Champion Check-A-Plug chart, the sparkplugs exhibited NORMAL use signatures.

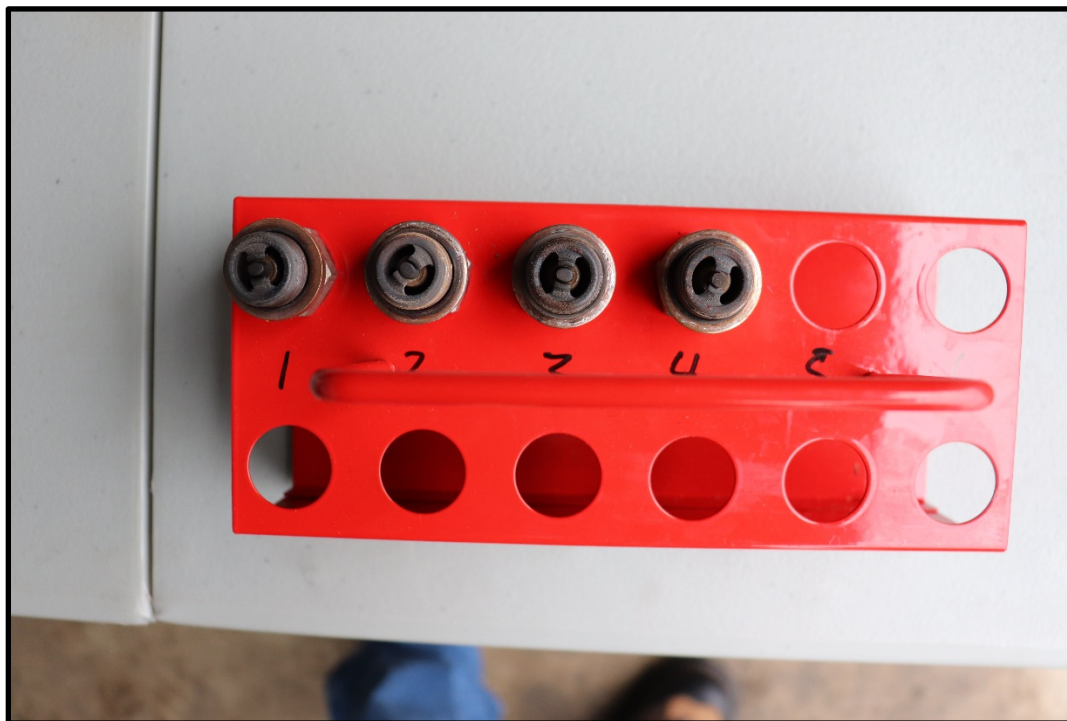


Figure 7: View of top spark plugs (photo courtesy of the NTSB)

The induction system was examined internally using a lighted borescope. The induction system was free of obstructions and undamaged. The air filter was not present during examination.

The exhaust system remained secure to the cylinders. No evidence of any exhaust leaks around the cylinder attach points were observed. The forward section of the exhaust exhibited crushing aft, consistent with impact damage.

The left and right magnetos remained attached to the engine accessory case with no external damage noted. The right engine to magneto timing was verified at 25°. When the engine crankshaft was rotated by hand using the propeller, spark was produced on four ignition leads from the right magneto and impulse coupling engagement was heard. The left engine to magneto timing was verified at 26°. When the engine crankshaft was rotated by hand using the propeller, spark was produced on four ignition leads from the left magneto and impulse coupling engagement was heard.

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



Figure 8: View of fuel injector nozzles (photo courtesy of the NTSB)

The fuel servo, fuel manifold and engine driven fuel pump were retained for further evaluation.

Submitted by: Eric M. Gutierrez