National Transportation Safety Board
Office of Aviation Safety
Washington, DC 20594

WPR23FA137

AIRFRAME AND ENGINE EXAMINATION

August 29, 2023

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A. ACCIDENT

Location: Alcova, Wyoming
Date: March 21, 2023
Time: 16:01 mountain daylight time
Airplane: Cessna, 182S, N314FR

B. AIRFRAME AND ENGINE EXAMINATION

IIC	Eric M. Gutierrez National Transportation Safety Board Federal Way, Washington
Party Coordinator	Casey Love Textron Aviation Air Safety Investigation Wichita, Kansas
Party Coordinator	Troy R. Helgeson Lycoming Engines Williamsport, Pennsylvania

C. SUMMARY

On March 21, 2023 about 1600 mountain daylight time, a Cessna, 182S, N314FR, was substantially damaged when it was involved in an accident near Alcova, Wyoming. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 aerial observation.

The operator reported that the pilot had departed Evanston-Uinta County Airport - Burns Field (EVW) Evanston, Wyoming on an aerial pipeline patrol. On board flight tracking showed a stop of the flight near mountains terrain, about 30 miles south of the Casper-Natrona County International Airport (CPR), Casper, Wyoming. Flight Service was notified by the operator of a possible mishap and the Federal Aviation Administration (FAA) issued an Alert Notice (ALNOT) shortly after. The wreckage of the airplane was located by a Search and Rescue air unit later that evening. There are no known witnesses to the accident sequence.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

Examination of the recovered airframe revealed that the recovery organization had removed both wings, horizontal and vertical stabilizer, elevator and rudder for transport. The forward section of the cockpit was impact damaged and crushed aft. The instrument panel was impact damaged with multiple instruments displaced. Crushing and bending was observed throughout the fuselage.

Figure 1: View of accident airplane during examination.

Flight control continuity was established from the cockpit flight controls to the respective flight control surfaces. All areas of separation within the flight control cables were consistent with overload or cut by recovery personnel to facilitate recovery.

Throttle and mixture control continuity was established from the cockpit controls to the fuel servo. Both the throttle control cable and the mixture control cable were bent and exhibited binding when actuated by hand, consistent with impact damage.

Propeller control continuity was established from the cockpit controls to the propeller governor. The propeller governor cable housing was bent and the cable exhibited binding when actuated by hand, consistent with impact damage.

A visual inspection was conducted of the fuel system. Continuity was established from the fuel tanks throughout the fuel system to the fuel servo. The airframe fuel strainer was impact damaged and void of fuel. Debris was observed in the strainer bowl and screen.

The fuel selector valve remained attached to the cockpit and was impact damage. The fuel selector valve was a 4-position system, right hand (RH), left hand (LH), both and OFF. The fuel selector handle was separated from the mount structure and the valve. The fuel selector valve was in the both position. Shop air was applied to the RH tank inlet port and air was felt at the port to the engine. The fuel selector valve was then placed in the LH tank position and air was felt at the port to the engine. The fuel selector valve was then placed in the both position and air was felt at the port to the engine. The fuel selector valve was placed in the OFF position. Shop air was applied to the RH and LH tank inlet ports and no air could be felt at the port to the engine.

The left wing was separated from the fuselage near the wing root and fragmented about mid span. Crushing and bending was observed throughout the wing. The left wing tip was separated from the wing. The bottom side of the wing surface, near the wing root exhibited hydraulicing. The left flap and aileron remained attached via their mounts. The left aileron was moved by hand, the attached flight control cable was observed to move in the corresponding direction. Visual inspection of the left fuel cap revealed rust on the rubber seal and the fuel filler port.

Figure 2: View of left wing damage.

The right wing was separated from the fuselage near the wing root. Crushing and bending was observed throughout the wing consistent with impact damage. The right flap and aileron remained attached via their mounts. The right aileron was moved by hand, the attached flight control cable was observed to move in the corresponding direction. Visual inspection of the right fuel cap revealed that the rubber seal appeared normal and unremarkable. The fuel filler port was also normal and unremarkable.

Figure 3: View of right ring damage.

The horizontal stabilizer, vertical stabilizer, elevator, and rudder were removed by the recovery company for transport. No visible damage was observed to the horizontal stabilizer, vertical stabilizer, elevator, and rudder.

Figure 4: View of horizontal stabilizer, vertical stabilizer, elevator, and rudder.

2.0 Engine Examination

Engine Manufacturer: Lycoming
Engine Model Number: IO-540-AB1A5
Engine Serial Number: L-12823-48A

Examination of the recovered engine revealed that top two engine mounts had fracture separated. All six cylinders and various 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.

Figure 5: View of airplane engine during examination.

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 6: View of left side of the engine with the rocker box covers removed.

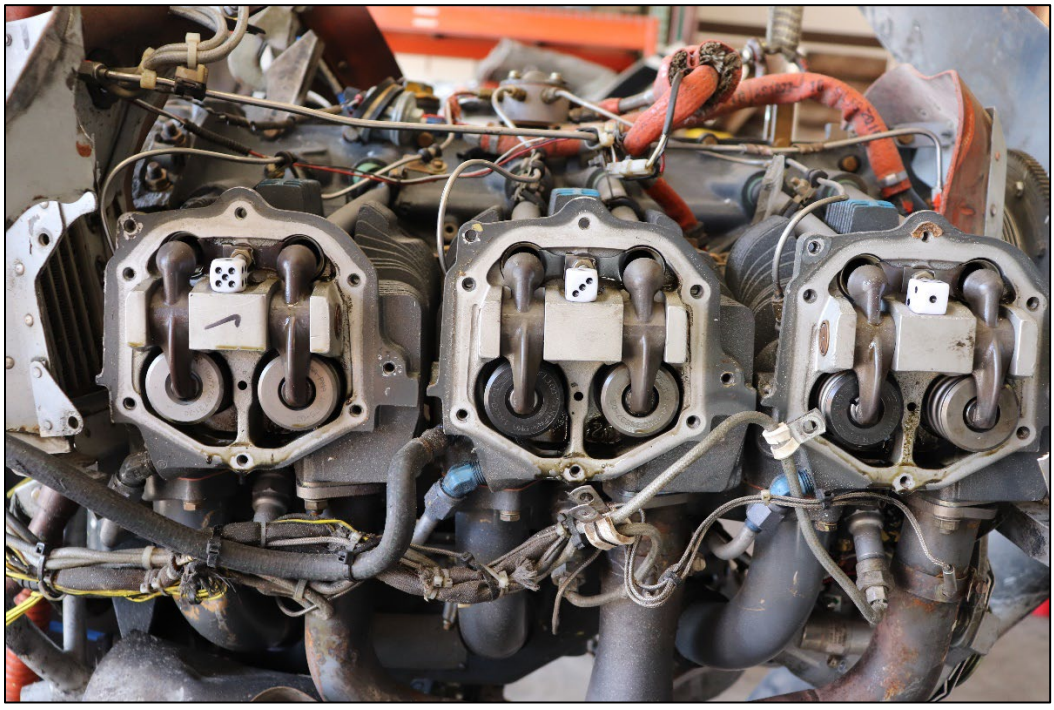

Figure 7: View of right side of the engine with the rocker box covers removed.

The top spark plugs were removed from the engine and they were the massive electrode type. All sparkplugs exhibited black and gray deposits within the electrode area with the exception of No 2 cylinder, which were oil soaked. All of spark plugs

exhibited signatures consistent with worn out-normal when compared to the Champion Check-A-Plug comparison chart.

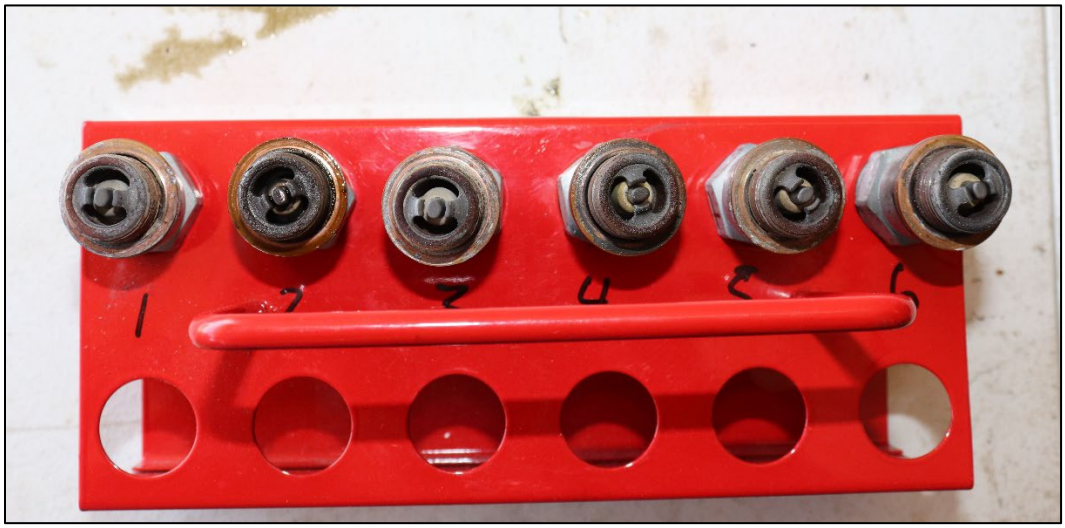

Figure 8: View of the top spark plugs.

The left and right magnetos remained attached to the engine accessory case with no external damage noted. Both left and right magnetos were removed from the engine's accessory case. The left magneto drive shaft was rotated by hand, and spark was produced at all six ignition posts and impulse coupling engagement was heard. The right magneto drive shaft was rotated by hand, and spark was produced at all six ignition posts and impulse coupling engagement was heard.

The fuel servo was impact damaged and bent aft at the plenum. The servo inlet fuel screen was removed and was free of debris. Both the throttle and mixture control cables were disconnected from the fuel servo. Both the throttle and mixture control arms rotated freely from stop to stop.

The fuel flow divider was intact, undamaged, removed and disassembled. The spring and diaphragm were intact and undamaged.

The engine driven fuel pump was impact damaged and fractured separated but remained tethered via fuel lines.

The AUX/electric fuel pump was impact damaged and remained attached to the firewall.

The propeller governor remained attached to the engine. No visible damage was observed. The drive shaft was rotated freely by hand. The propeller control cables were disconnected from the propeller governor. The propeller control arm rotated freely from stop to stop. The propeller governor screen was free of debris.

The engine oil sump remained attached to the engine and no damage was observed. The oil sump pick-up screen was free of debris.

The exhaust system remained secure to the cylinders. Ductile bending was observed on both left and right side. No evidence of any exhaust leaks around the cylinder attach points were observed.

3.0 Propeller Examination

Propeller Manufacturer: McCauley propeller
Propeller Model: B3D36C431-G
Propeller Serial Number: 040708

The airplane was equipped with a three blade McCauley propeller; for the purposes of this report the propeller blades were labeled A, B, and C. All blades remained attached to the propeller hub. Damage to the propeller hub, consistent with impact damage was observed. All the blades could be rotated by hand in the hub. Propeller blade A exhibited polishing on the leading edge of the propeller with unidirectional striations on the cambered side of the blade. Propeller blade B exhibited bending forward with polishing on the leading edge near the propeller tip, with cord striations on the cambered side of the blade. Propeller blade C exhibited bending aft about mid span.

Submitted by:

Eric M. Gutierrez
Air Safety Investigator