

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR22FA227

EXAMINATION

June 29, 2022

A. ACCIDENT

Location: Mendon, Utah
Date: June 24, 2022
Time: 0903L
0303 (UTC)
Airplane: N934JH, 1979 Cessna Aircraft Company, Model 152

B. EXAMINATION

IIC	Michael Hicks National Transportation Safety Board (WPR) Phoenix, Arizona
Group Member	Mark Platt Lycoming Engines Williamsport, Pennsylvania
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C. SUMMARY

During the examination, no indications of flight control cable or control surface obstructions were observed that would have prevented or restricted the normal operation of the controls. There was no evidence of pre-impact mechanical malfunctions observed during the examination of the engine.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The wreckage was in the tall grass field located in an agricultural area. The aircraft impacted terrain about a 45° nose down attitude. The cockpit was compressed upward and aft, decreasing cockpit volume. The wings remained connected to their respective wing attachment fittings. Both lift struts remained attached to the fuselage and the wings. The left and right wing root skins exhibited compression damage. Neither wing leading edge exhibited signs of impact compression damage, albeit the left wing tip sustained impact damage. The aluminum fuel tanks remained intact. The right wing was bent upward approximately 10° outboard of the lift strut. The upper wing skins exhibited

wrinkles consistent with compression. The lower wing skins in the same area exhibited wrinkles consistent with tension. The empennage remained intact. The left horizontal stabilizer was bent downward approximately 10° about midspan.

2.0 Airframe Examination

Flight control cable continuity was established by tracing the control cables from the cockpit controls to the flight control surfaces. The rudder control cables were complete from the cockpit rudder pedals to the rudder control horn and remained connected via attachment hardware. The elevator push/pull rod remained connected to the cockpit elevator control yoke below the cockpit pedestal. The elevator push/pull rod from the control yoke to the elevator bellcrank below the cabin floorboards was connected via attachment hardware.

During the examination, no indications of flight control cable or control obstructions were observed that would have prevented or restricted the normal operation of the controls.

An area of chaffing approximately 4" in length between the right elevator and the right horizontal stabilizer lower skin existed in the area of the elevator trim actuator support structure. During examination there was light contact between the stabilizer skin and the elevator skin. The contact did not impede elevator movement during examination. The elevator was pushed downward, by hand, toward the stabilizer skin which only slightly increased contact and still did not impede movement. No other preimpact contact between the empennage control surfaces was noted. The elevator trim actuator measured 1.3", about 2° tab down.

The left horizontal stabilizer sustained impact damage and was bent downward approximately 10° midspan causing contact between the lower stabilizer skin and the leading edge of the lower elevator skin which impeded elevator movement. The elevator could still be moved forcibly by hand to the stop position. The skin contact was alleviated during the examination with the use of tools to facilitate examination. No other contact signatures were observed.

The aft stabilizer bulkhead and lower portion of the rudder were impact damaged. The bulkhead was compressed upward, and the lower plastic cover was fracture separated from the rudder.

The Cessna 152 series aircraft issued a mandatory rudder stop modification identified as *Single Engine Bulletin (SEB) 01-1*. The Service bulletin was mandated by Federal Aviation Administration Airworthiness Directive (AD)

2009-10-09 and was complied with on N934JH. The purpose as stated in the bulletin was as follows:

To provide an enhanced rudder stop, bumper, doubler and attachment hardware designed to assist in preventing the possibility of the rudder overriding the stop bolt during full left and/or right operation of the rudder.

2.1 Wings

The left and right wings were compressed forward toward the engine, emanating at the wing roots. The flaps and ailerons remained attached to their respective wing, in their entirety. The flap control cables remained attached to the flap bellcranks. The flap drive mechanism was observed in the fully flaps retracted position. The aileron direct control cables were cut by first responders in the aft door posts but remained attached to the aileron bellcranks in the wings. The cable chains were intact and remained wrapped around the aileron control sprockets. The cut sections of cable were observed at the accident site. The aileron interconnect cable remained intact and attached to the aileron bellcranks in the wings.

2.2 Cockpit

The Master switch and the alternator were found in the 'On' position. The Key was observed in the Both position. The throttle position was found in the near idle position with 1.75 inches of the shaft revealed. The carburetor heat was in the 'Off' position, and the primer was 'In' and 'Locked'. The cockpit mixture control was bent 75° to the left and the knob was partially separated. Mixture position was unreliable.

2.3 Survivability

Both occupants were secured by their respective three-point harness'. The left and right seat backs were cut by first responders. Seat rails were partially intact, and the bases were intact as well. An ACK E-04 ELT Serial No. 00085 was installed, and the battery replacement date was November 24, 2025.

2.4 Fuel/Fuel System

Fuel was observed in each tank through the filler opening. The single vented fuel caps were both in place. The gaskets were in good condition. The fuel supply lines routed through the aft door post were cut by first responders. The fuel supply lines routed through the forward door posts were cut during examination to facilitate removal of the wings and upper cabin skin. All fuel supply finger screens were observed clean. The fuel selector was not examined due to extent of airframe compression.

Carburetor Manufacturer: AvStar
Model: MA-3PA
Serial No. PAM780625

The gravity fed, carbureted fuel system had all fuel lines in place and secure at their respective component fittings. The carburetor was undamaged and securely attached at the mounting flange. The throttle/mixture controls were securely attached at their respective control arms of the carburetor. The castellated nut and cotter pin remained secure and the serrated interface at the throttle arm remained securely mated.

The carburetor was opened for examination. The fuel bowl contained no fuel and was free of visible contaminants. The float assembly was secure at the mounting and free of damage. The float pontoons exhibited no evidence of rubbing against the wall of the bowl. The metal float pontoons exhibited slight hydrodynamic crushing on each side. All internal locking tabs and safety devices of the carburetor were in place and properly secured. The fuel inlet screen was found properly installed and free of contamination. No external fuel staining was observed.

The foam filter element remained securely attached to the impact damaged airbox bracket. The impact damaged filter element remained intact and exhibited no evidence of pre-impact obstruction to airflow.

2.5 Electrical System

Magneto Manufacturer: Slick
Model: 4381
Part No. 66GNC05SFNN
Left Magneto Serial No. 10700501
Right Magneto Serial No. 17001498

The left and right magnetos remained securely clamped at their respective mounting pads. The ignition harness was secure at each magneto. The magnetos had been impinged by the firewall and sustained minor damage. Magneto to engine timing (finite) could not be ascertained, due to the displacement of the flywheel. The flywheel was loosely held up to the bent crankshaft flange and the magneto timing was generally at 24° (left) and 13° (right) top dead center (TDC) of cylinder number one.

The magnetos were removed for examination. Each magneto had an impulse coupling and each magneto produced spark at their respective spark plug

leads, during hand rotation of the drive. The drives of each magneto remained intact and undamaged.

The spark plugs were produced by Champion, and each of the four top and four bottom spark plugs were not damaged and exhibited normal operational signatures. The spark plugs were secure at each position with their respective spark plug lead attached. The spark plugs were removed, examined, and photographed. The spark plug electrodes remained mechanically undamaged, and according to the Champion Spark Plugs Check-A-Plug chart AV-27, the spark plug electrodes displayed coloration consistent with normal operation.

The ignition harness had sustained varying degrees of damage by impact energy and was not tested. The ignition harness was attached at each magneto and respective spark plug.

Starter Manufacturer: Electrosystems
Part No. MMU-6001
Serial No. C122075

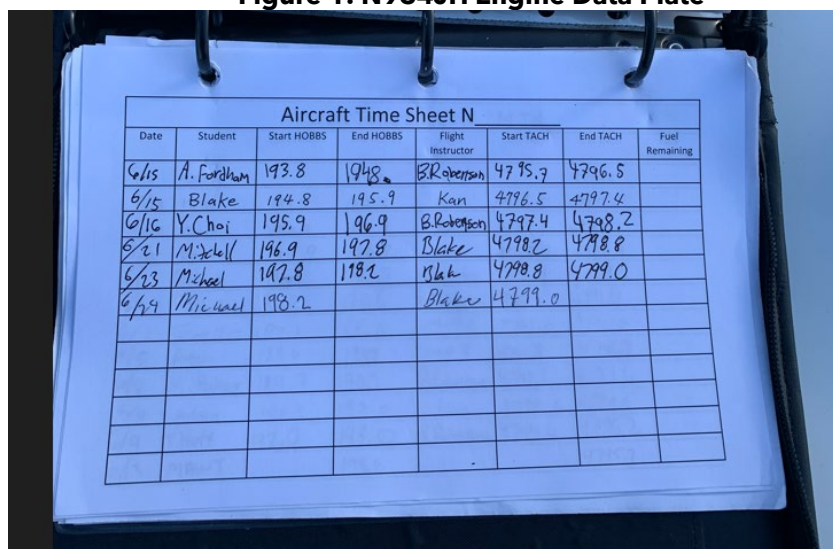
The starter was securely attached at the mounting pad, with the electrical connection secure at the post. The alternator was securely attached at the mounting pad with the electrical connections secure at each post.

Vacuum Pump Manufacturer: Airborne
Part No. 211CC
Serial No. 140353

The rear-mounted vacuum pump was secure at the mounting pad. The pump was removed, examined, and photographed. The drive was intact. The rotor was found fractured when opened for examination.

3.0 Engine Examination

Manufacturer: Lycoming O-235-L2C
Serial No. L-20130-15
Crankshaft Serial No. V537971697
Last Overhaul: March 29, 2017
Last 100hr Inspection: December 22, 2021
Last 100hr Tach: 4,723.4
Tach at time of accident: 4800.6
TSO: 399.4
Engine Total Time: 8,465.0
Hobbs: 198.9



The powerplant is a four-cylinder, air cooled, direct drive, horizontally opposed, normally aspirated (carburetor), internal combustion engine rated at 118hp @ 2800rpm.

The engine remained attached to the airframe by the impact damaged engine mount. The engine had sustained moderate impact energy damage to the forward exhaust system components, induction pipes and carburetor airbox. Visual examination of the engine revealed no evidence of pre-impact catastrophic mechanical malfunction or fire.

The top spark plugs were removed, examined, and photographed. The vacuum pump was removed, and the crankshaft was rotated by hand through the drive pad utilizing a drive tool. The crankshaft was free and easy to rotate in both directions. "Thumb" compression was observed in proper order on all four cylinders. The complete valve train was observed to operate in proper order and appeared to be free of any pre-mishap mechanical malfunction. Normal "lift action" was observed at each rocker assembly. The valve lash adjustment hardware remained secure at each rocker arm.

Clean, uncontaminated oil was observed at all four rocker box areas. Mechanical continuity was established throughout the rotating/reciprocating group, valve train and accessory section during hand rotation of the crankshaft. The combustion chamber of each cylinder was examined through the spark plug holes utilizing a lighted borescope. The combustion chambers and bottom spark plug electrodes remained mechanically undamaged and there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged. There was no evidence of valve to piston face contact observed. The gas path and combustion signatures observed at the spark plugs, combustion chambers displayed coloration consistent with normal operation. There was no oil residue observed in the exhaust system gas path.

There was no evidence of pre-impact mechanical malfunctions observed during the examination of the engine.

4.0 Propeller Examination

Manufacturer: Sensenich
Part No. 72CKS6-0-54
Serial No. K8030

The metal two bladed, fixed-pitch propeller was displaced from the crankshaft flange at the mechanical attachment of the propeller. The fracture surfaces exhibited signatures consistent with overload due to the absorption of rotational energy. The propeller blades remained continuous from tip to tip. The spinner was crushed over the hub area of the propeller. One of the blades

exhibited leading edge damage and burnishing along most of the blade length. The opposing blade remained undamaged.



Figure 3: N934JH Propeller removed for engine examination

5.0 Lubrication System

The oil suction screen was found secure and uncontaminated by any pre-mishap debris. The oil filter was detached and crushed. There was no evidence of any pre-mishap lubrication system contamination.

Submitted by:

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Air Safety Investigator