

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR25FA146

WRECKAGE EXAMINATION

May 3, 2025

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A. ACCIDENT

Location: Grass Valley, California
Date: May 1, 2025
Time: 08:15 Local
1:15 Zulu
Airplane: Cessna 177RG

B. WRECKAGE EXAMINATION

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Subject Matter Expert	Jennifer Barclay Textron Aviation, Inc Kansas
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Investigator	Eric Gutierrez NTSB Seattle, WA

C. SUMMARY

On May 1, 2025 at about 0815 Pacific standard time, a Cessna 177RG airplane N52156 sustained substantial damage when it was involved in an accident near Grass Valley, California. The pilot was fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 flight.

According ADS-B data and recorded Common Traffic Advisory Frequency (CTAF) recordings, the airplane over flew mid field at Nevada County Airport (GOO) and was going to make a full stop landing. The pilot reported turning left base and shortly thereafter reported that he lost his engine. The airplane descended into a business district in the town of Grass Valley. The airplane sustained significant impact damage; however, no anomalies were found with the flight control system that would have precluded normal operation.

D. DETAILS OF THE INVESTIGATION

1.0 On scene

The wreckage site was located about 2 miles to the west of Nevada County Airport (GOO) near a business area. Wreckage distribution indicated that both stabilators departed the airplane before impact. Examination revealed that the airplane contacted two pine trees as it descended. The main wreckage was located about 250 feet from the pine trees. Three sections of the left and right stabilators were located about 100 feet from the main wreckage along with debris from the two pine trees. The leading edges of both stabilators exhibited impact signatures from the pine trees.

The airplane came to rest inverted. A signature mark from the left wing was observed in the vegetation and terrain where the airplane came to rest. The propeller and spinner left a shallow divot on impact. The two-blade propeller and hub were still attached to the engine, neither propeller blade exhibited rotational signatures, and exhibited minor scratching or leading-edge nicks. The engine was impact separated from the main fuselage and came to rest on top of the left wing.

The forward cabin was severely impact damaged. The main fuselage came to rest on an east to west orientation. Both wings sustained significant impact damage. The right wing impacted a fire hydrant, and the outer 2 feet of the wing tip was separated; however, the wing root remained attached to the fuselage. The left wing remained attached to the fuselage, the leading edge exhibited impact damage.

Both the left-wing tank and right-wing tank were breached during impact. Six gallons of fuel was drained from the left tank and about a cup of fuel was drained from the right tank.

Partial control cable continuity was established from each flight control surface to the cockpit. The landing gear was in the up stowed position and the flaps were retracted or up position.

The JPI EDM 700 was retained for download and analysis.

2.0 Airframe Examination

The fuel selector valve handle and fuel valve were in the both position. The valve operated normally in all positions with positive detents. The fuel boost pump switch was damaged, and its position could not be determined.

Both fuel tanks were breached. Compressed air was blown through each section of fuel supply and vent lines. No obstructions were noted to the inlet of the engine driven pump. The fuel boost pump was removed from the aircraft and electrically operated normally.

The B-nut attached to the outlet of the fuel strainer was finger tight. A wrench was used to turn the nut and it moved more than half a flat to tighten.

The instrument panel sustained significant impact damage. Several instruments were loose in the recovered wreckage and other instruments could not be accessed due to impact damage.

2.1 Propeller Examination

The airplane was equipped with a two-blade constant speed McCauley propeller, model number B2D34C207, serial number 771391. The propeller and propeller hub remained attached to the engine. Both propeller blade A and B exhibited aft bending about mid span, with unidirectional striations on the cambered side of the blade and polishing along the leading edge.

3.0 Engine Examination

Lycoming IO-360-A1B6D, serial number L-1999-51E was installed on the airplane (Figure 1). Examination of the engine revealed that the engine was separated from the airframe during the accident sequence. All four cylinders and all engine accessories remained attached. The No. 4 cylinder rocker box cover and cylinder head were impact damaged. No evidence of any mechanical damage was observed to the engine crankcase. The oil suction screen was free of visible contamination.



Figure 1 Engine from accident airplane

The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated on all cylinders. The No. 4 cylinder, intake rocker arm and valve spring was fracture separated. The remaining intake and exhaust valve springs 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 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 in proper firing order on all four cylinders.

The top engine spark plugs were the massive electrode type. The No. 4 cylinder spark plug was oil coated. The spark plugs exhibited gray deposits within the electrode area. The spark plugs exhibited signatures consistent with WORN NORMAL when compared to the Champion Check-A-Plug comparison chart (Figure 2).



Figure 2 Top spark plugs from each cylinder

The engine driven fuel pump remained attached to the engine accessory case. The fuel inlet line and the fuel drain line were fracture separated from the fuel pump. The fuel line from air frame fuel filter to the fuel pump remained attached to the filter, and the fitting to the fuel was impact damaged. The fuel pump was disassembled, no anomalies notes.

The B-nut attached to the outlet of the fuel strainer was finger tight. A wrench was used to turn the nut and it moved more than half a flat to tighten (Figure 3).

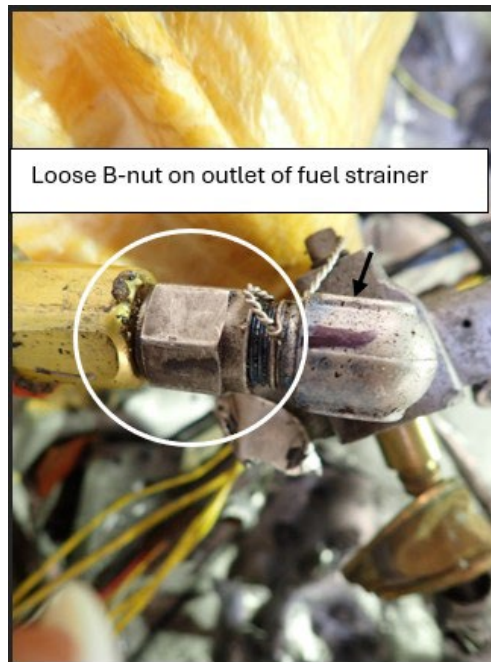


Figure 3 Loose B-nut fitting on outlet line from fuel strainer

The fuel servo remained attached to the plenum and was impact damaged. The throttle and mixture levers were intact, undamaged, and moved freely from stop to stop. The fuel servo was removed. Liquid in the fuel line from the fuel pump to the fuel servo was captured in a small glass jar. The liquid was blue in color, consistent with 100LL. The fuel was tested for water using SAR-GEL water finding paste, with negative results. The servo filter was removed and free of debris. The servo was disassembled, no anomalies notes.

The single drive, dual magneto remained attached to the engine accessory case. The engine to dual magneto timing was verified at 25° before top dead center. The dual drive magneto was removed and rotated by hand, spark was produced on all eight ignition leads and the impulse coupling engagement was heard.

The No. 4 cylinder exhaust pipe was separated from the cylinder, the remaining exhaust system and intake system remained attached to the cylinders. No evidence of any exhaust leaks around the cylinder attach points were observed. The exhaust system was examined internally using a lighted borescope, no debris or obstruction was observed from the exhaust outlet. Crushing and bending were observed throughout the exhaust and intake.

The fuel flow divider remained attached to the engine (Figure 4). The fuel flow gage line was fractured and separated from the flow divider. The remaining fuel lines remained attached to their respective fuel flow nozzles. The fuel line from the fuel servo to the fuel flow divider was approximately ½ turn loose at the fuel flow divider fitting. Blue fuel staining was observed in the area surrounding the loose fitting (figure 5). No damage was observed to the surrounding area near the attachment point. All the fuel nozzles were removed; no obstructions were observed.

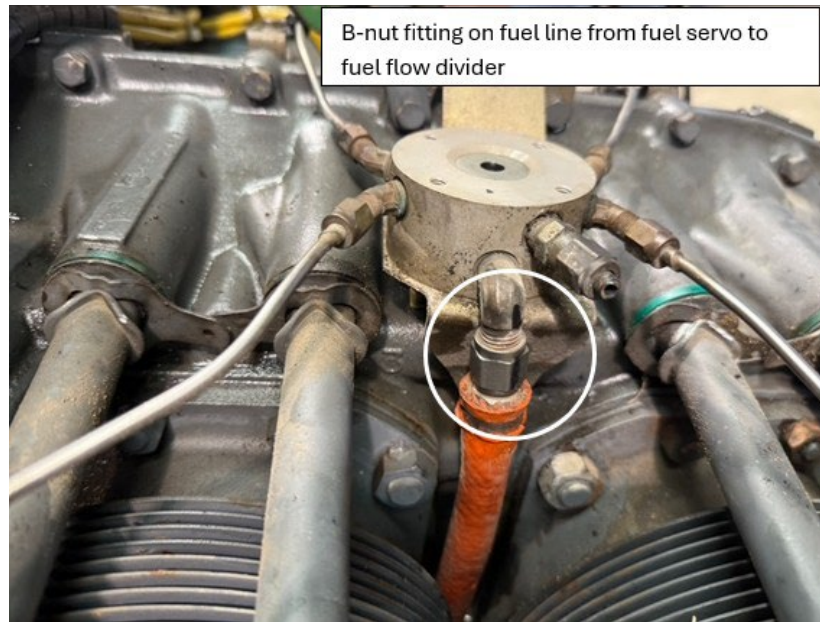


Figure 4 Fuel flow divider with B-nut fitting

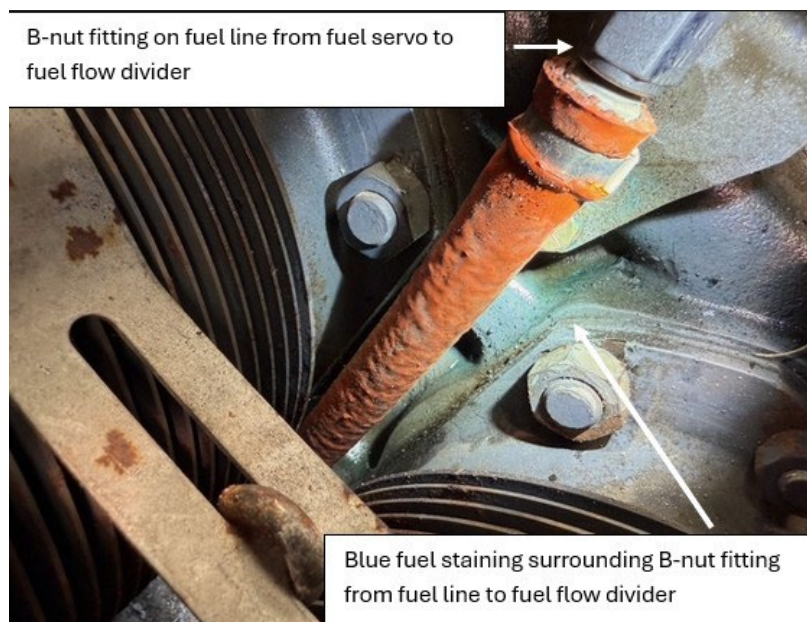


Figure 5 Blue dye staining surrounding B-nut fitting into fuel flow divider

The propeller governor remained attached to the engine. Impact damage was observed to the governor housing. The propeller governor arm was separated. The governor rotated freely, when rotated by hand.

The engine driven vacuum pump remained attached to the engine accessory and secured to the mounting pad. The vacuum line was separated. The drive was intact and rotated freely.

The fuel pump outlet line, fuel flow transducer and fuel control inlet line were removed from the engine. The fitting on the inlet side of the fuel flow transducer was loose and rotated freely (Figure 6). The fitting was tightened with a wrench and rotated

half a turn before the fitting was tight to the transducer housing. The B-nut attached to the fitting was tight.

The fuel flow transducer was tested using compressed air and rotated normally. No debris was noted.

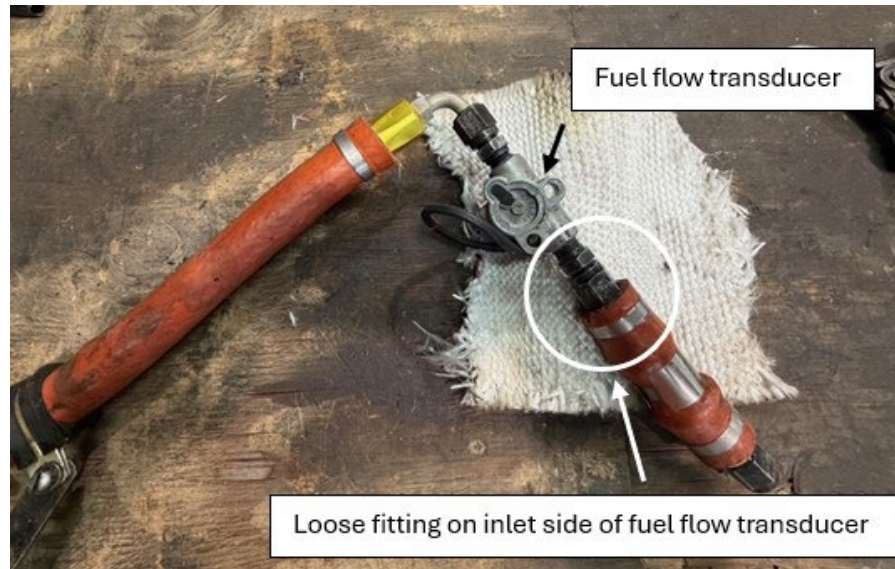


Figure 6 Loose fitting on inlet side of fuel flow transducer

3.1 Engine Data Monitor

The JPI 700 was submitted to the National Transportation Safety Board's Vehicle Recorders lab for data extraction. The parameters included are exhaust gas temperature (EGT) and cylinder head temperature (CHT) for cylinders No. 1 through 4 in degrees Fahrenheit, fuel flow in gallons per hour (GPH), oil temperature (OILT) in degrees Fahrenheit, Volts, outside air temperature in degrees Fahrenheit (OAT) and Cylinder head differential temperature in degrees Fahrenheit (CLD).

The data reflected a normal takeoff and cruise until the last few seconds of flight when the EGTs briefly spiked and then began to drop along with the CHTs. Engine RPM decreased to 0 RPM.

Data is measured in seconds, 1200 seconds=20 minutes

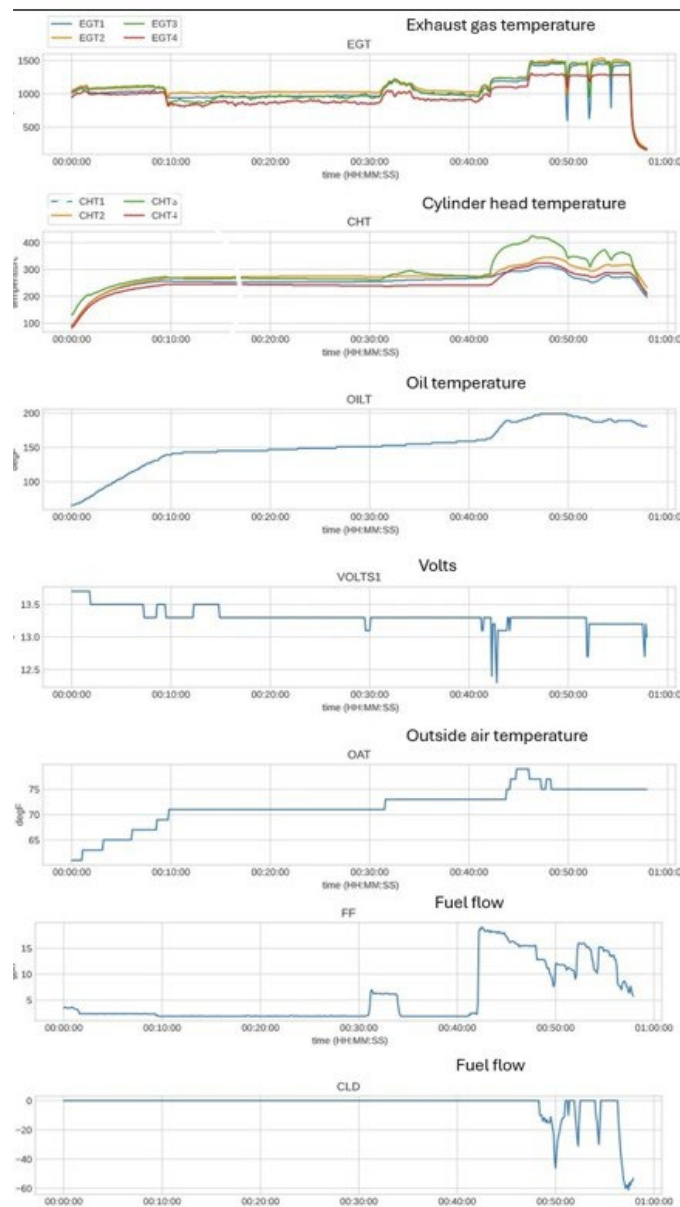


Figure 7 Engine data from engine monitoring instrument

4.0 Meteorological Information

The METAR for Nevada County Airport on the day of the accident was:
KGOO 011515Z AUTO 13006KT 10SM CLR 18/02 A2997 RMK A01

Submitted by:

Stacia Joyce
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WRECKAGE EXAMINATION

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