

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23LA313

WRECKAGE EXAMINATION

July 26, 2023

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A. ACCIDENT

Location: Churchville, MD
Date: July 25, 2023
Time: 1906 EDT
2306 UTC
Airplane: Piper PA-28R-200; N34PT

B. WRECKAGE EXAMINATION

IIC	Heidi Kemner National Transportation Safety Board Ashburn, Virginia
Investigator	Joshua Young National Transportation Safety Board Washington, DC
Party Coordinator	Ryan Enders Lycoming Engines Williamsport, PA
Party Coordinator	Kris Wetherell Piper Aircraft Vero Beach, FL

C. SUMMARY

On July 25, 2023, about 1906 eastern daylight time, a Piper PA-28-200R, N34PT, was involved in an accident in Churchville, Maryland. The pilot was fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations (CFR) Part 91 personal flight.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane came to rest on a heading of about 350°, and an elevation of 386 ft in a cut hay field. There were multiple ground impact scars, the initial ground impact scar had remnants of a red light glass. There was a large ground impact scar about 20 ft. from the initial ground impact scar. The

airplane came to rest about 18 ft from the initial ground impact scar. All major components of the airplane were located in the vicinity of the main wreckage.



Photo 1: Accident site with the airport of departure in the background. (HCSO Photo)



Photo 2: Accident site as viewed from above. (HCSO Photo)



Photo 3: Initial impact ground scar with red lens glass.

2.0 Airframe Examination

2.1 Fuselage

The fuselage was impact crushed aft and the top of the fuselage was peeled back. First responders did not cut the wreckage to remove the pilot.



Photo 4: Right side of the fuselage. (Piper Photo)



Photo 5: Left side of the fuselage. (Piper Photo)

2.2 Empennage

The stabilator remained attached at all attachment points, there was impact damage to the left stabilator tip. Control continuity was confirmed from the stabilator flight control surface to cables in the cockpit. The stabilator trim tab remained attached at all attachment points and was slightly nose up when the jack screw was measured. The vertical stabilizer and rudder were not damaged. Control continuity was confirmed from the rudder control surface to the rudder pedals in the cockpit. The beacon light remained attached to the top of the vertical stabilizer and was not damaged.



Photo 6: View of the empennage. (Piper Photo)



Photo 7: View of damage to the left stabilator tip. (Piper Photo)

2.3 Aircraft Wings

The left wing remained attached to the fuselage by one aileron control cable and was rotated towards the tail with the bottom facing up. All spars in the left wing were impact separated and exhibited overload fractures. The leading edge of the left wing was impact crushed aft along the entire length. The left aileron remained attached at all attachment points and exhibited impact damage. Both left aileron cables were attached at the bell crank and the bell crank was impact separated in the wing. The left aileron primary control cable remained intact through the wing and into the fuselage. The left aileron through cable was impact separated and exhibited unraveling and broom straw overload fracture. The left flap remained attached at all attachment points and exhibited impact damage, however it was separated from the control rod. The left wingtip was impact separated and the red navigation light lens was shattered.



Photo 8: View of the left wing.



Photo 9: View of crush damage to the leading edge of the left wing. (Piper Photo)



Photo 10: Aileron through cable end that was attached to the left aileron bell crank.



Photo 11: Left main spar fracture.

The right wing remained attached to the fuselage at all attachment points. The leading edge was impact crushed aft along the entire length. The right aileron remained attached at all attachment points. The right aileron cables remained attached to the bell crank and the bell crank remained attached in the wing. The right aileron primary cable was continuous to the control yoke and the right aileron through cable was impact separated and exhibited a broom straw overload fracture. The right flap remained attached at all attachment points and was in the extended position. Control continuity was confirmed from the flight control surface to the control yoke. The right wingtip remained attached, and the green navigation lens remained intact.



Photo 12: View of the right wing leading edge.



Photo 13: View of the trailing edge of the right wing.

2.4 Landing Gear

The airplane was equipped with an electrohydraulic landing gear extension and retraction system. The landing gear handle in the cockpit was in the down position. The left main landing gear was in an extended position. The right main landing gear was partially retracted and remained attached to the right wing. The nose landing gear was impact separated but remained attached to the fuselage by a spring. The airplane was equipped with an automatic landing gear extension system.

2.5 Cockpit

The landing gear handle was found in the down position. The flap handle was found in the flaps fully extended position, this was confirmed by counting the chain links from the flap handle to the gear on the flap torque tube. The ignition key remained in the ignition and was in both position. The vertical speed indicator was frozen showing a 1500 ft/min rate of descent. The throttle control lever was found about halfway between full throttle and idle. The propeller lever was found about a third of the way up from the bottom stop. The mixture lever was found about a quarter of the way up from the bottom stop. The left rudder pedals were fractured, and the right rudder pedals were intact. Both control yoke hand holds were impact separated. The left control yoke was impact fractured down and both control yokes were pulled from the instrument panel. The magnetic compass was impact separated and found near the large ground impact scar.

Switches:

- Landing Lights Panel
 - L – ON
 - R – OFF
 - PULSE – ON
- Avionics Master – OFF
- Master – ON
- Pitot Heat – OFF
- Anti – Collision Lights – ON
- Landing Light – ON
- Fuel Pump – ON
- Master – ON



Photo 14: View of the cockpit.



Photo 15: Landing gear handle. (Piper Photo)



Photo 16: View of the flap chain attached to the flap torque tube.



Photo 17: Vertical Speed Indicator.

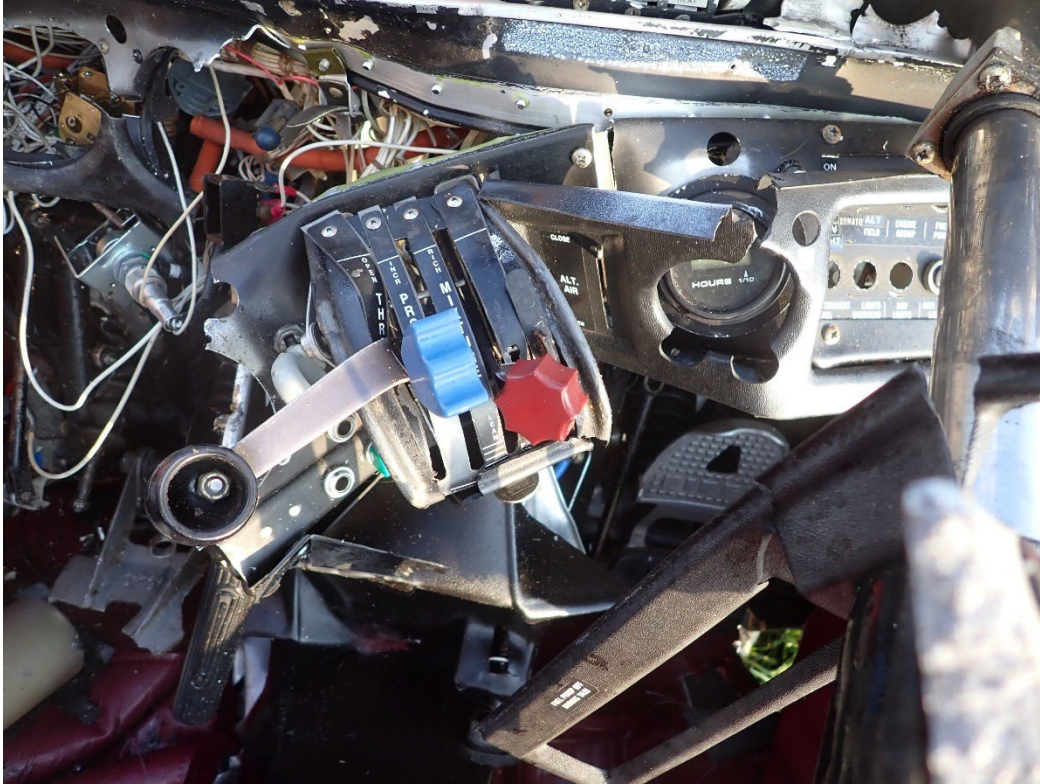


Photo 18: View of the throttle quadrant.



Photo 19: View of cockpit switches.



Photo 20: View of cockpit switches.



Photo 21: View of the magnetic compass impact separated from the glareshield.

2.6 Survivability

The seat the pilot was sitting in remained attached to the seat rails. First responders reported the pilot was wearing his seat belt which was cut to facilitate recovery. The 3-point seat belt remained attached at all attachment points and was latched.

2.7 Fuel/Fuel System

Both fuel tanks were breeched, and both fuel caps remained seated in place. There was a residual smell of aviation fuel. The fuel selector was in the right position. Fuel was found in the fuel selector and the fuel lines from the fuel selector toward the engine. The electronic fuel boost pump remained attached at all attachment points and was undamaged. Fuel was collected from the fuel boost pump and tested with water finding paste, no water was detected. The fuel strainer screen was free of debris.



Photo 22: Fuel selector.



Photo 23: Electric fuel pump.



Photo 24: Fuel being tested with water finding paste.



Photo 25: Fuel strainer screen.

2.8 Other Systems

The Emergency Locator Transmitter (ELT) was removed and turned off by a Federal Aviation Administration Inspector who responded to the scene on the day of the accident.



Photo 26: ELT



Photo 27: ELT

3.0 Engine Examination

The engine model was a Lycoming IO-360-C1C, serial number L-10191-51A which had accumulated about 1273 hours of time in service since the last overhaul. The engine remained attached to the fuselage at all engine mounts. The top spark plugs, and rocker box covers were removed to facilitate crankshaft rotation. Compression and suction were confirmed on all cylinders using the thumb method when the crankshaft was rotated through 720° of rotation by hand using a tool in an accessory drive pad. Crankshaft and valvetrain continuity were confirmed when the crankshaft was rotated through 720° of rotation by hand using a tool in an accessory drive pad.



Photo 28: View of the engine. (Lycoming Photo)



Photo 29: View of the engine accessories. (Lycoming Photo)

3.1 Induction and Exhaust System

The exhaust stacks remained attached to the cylinder heads and were displaced slightly aft. The induction pipes for cylinders 2 and 4 were crushed by impact energy forces and pushed aft. The induction air filter was examined and was not obstructed.

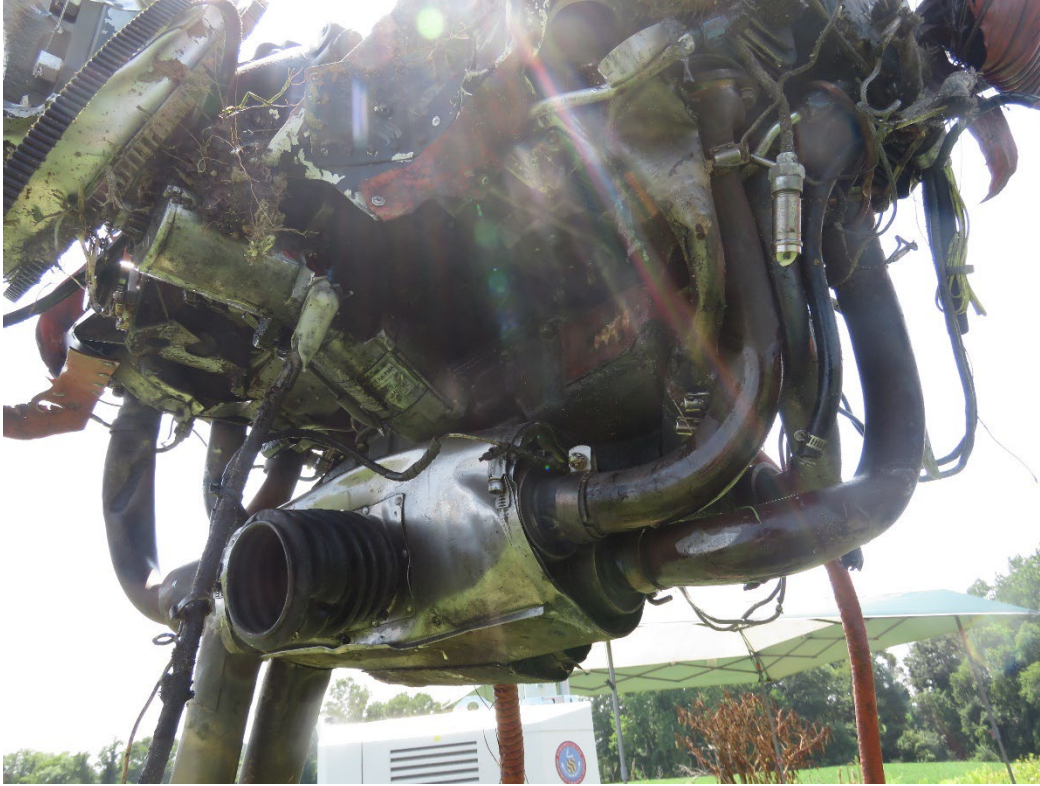


Photo 30: Intake and exhaust stacks. (Lycoming Photo)

3.2 Magnetos

The right magneto remained attached to the engine, the left magneto was separated from the mounting flange surface. Both magnetos sparked on all leads when the drive gear was rotated by hand. Both impulse couplings snapped as expected.



Photo 31: View of the magnetos. (Lycoming Photo)

3.3 Ignition System

The spark plugs remained installed in their respective cylinder heads and were undamaged, except the No. 2 bottom spark plug which was destroyed by impact forces. The spark plugs displayed coloration consistent with normal engine operation when compared to the Champion Aviation AV-27 Check-A-Plug chart.



Photo 32: View of spark plugs.

3.4 Fuel System

Fuel was found in the lines from the firewall to the engine driven fuel pump and in the lines from the engine driven fuel pump to the fuel injector. There was fuel in the flow divider. The engine driven fuel pump remained attached to the engine at all attachment points. The fuel injector was impact separated from the engine and remained attached through fuel lines. The throttle control cable was continuous from the cockpit to a cut made to facilitate recovery, from the cut to the control rod end, the control rod was bent, and impact separated at the control rod head. The mixture control cable was continuous from the cockpit to the fuel injection servo. The fuel injector inlet screen was examined and found no debris. The flow divider remained secured to the top of the engine and was undamaged. The unit was opened for further examination and liquid consistent with aviation fuel was present within the manifold and the diaphragm was undamaged. The fuel injector nozzles remained secured in their respective cylinder heads and appeared undamaged. The injector nozzles were not removed.



Photo 33: Engine driven fuel pump. (Lycoming Photo)

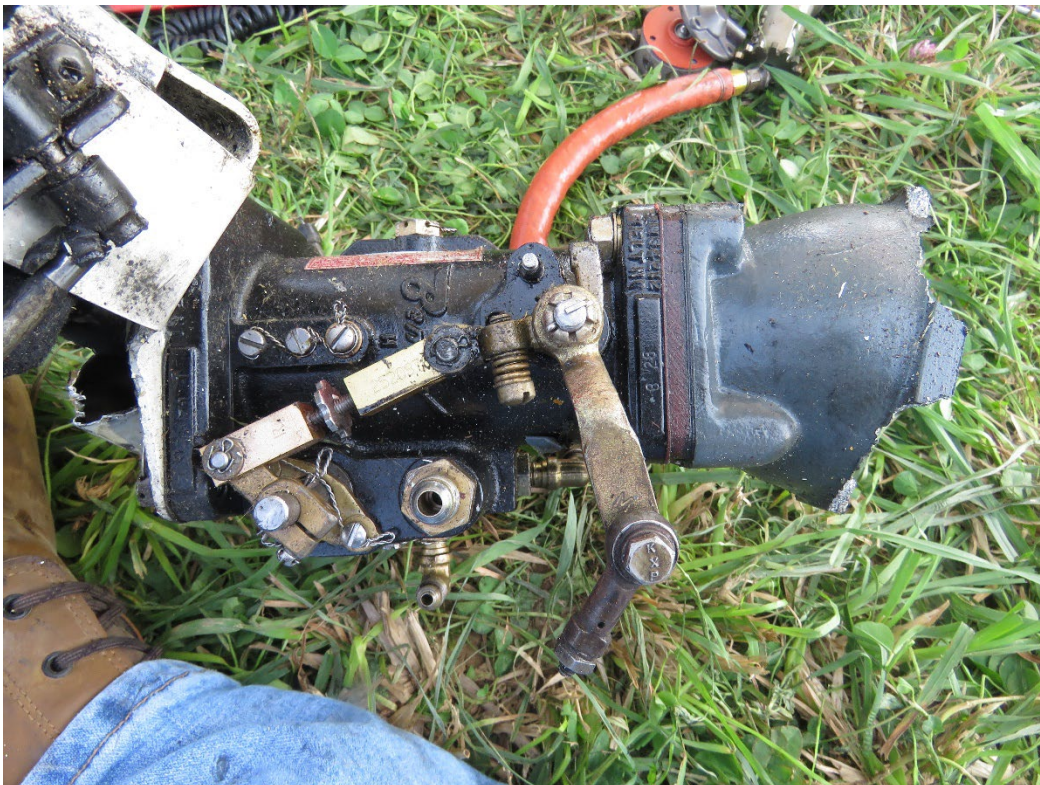


Photo 34: View of the fuel injector. (Lycoming Photo)



Photo 35: Fuel injector inlet screen. (Lycoming Photo)



Photo 36: View of the flow divider. (Lycoming Photo)

3.5 Lubrication System

The oil filter remained installed on the accessory housing and was partially crushed into the oil filter adapter base assembly. The oil filter was not examined and was dated 6/27/2023. The oil suction screen was secured into the sump and was removed for further examination. The screen was clean with no obstructions noted. With the engine hoisted, the oil level gauge showed approximately 4qts of oil remained in the sump. The oil on the oil level gauge appeared visually clean.



Photo 37: View of the oil filter attached to the accessory case. (Lycoming Photo)



Photo 38: Oil suction screen.

3.6 Vacuum Pump/System

The vacuum pump was impact separated from the accessory housing of the engine and was found approximately 10 ft away from the engine. The pump was opened for further examination and one carbon vein was fractured.



Photo 39: View of the vacuum pump impact separated from the engine. (Lycoming Photo)

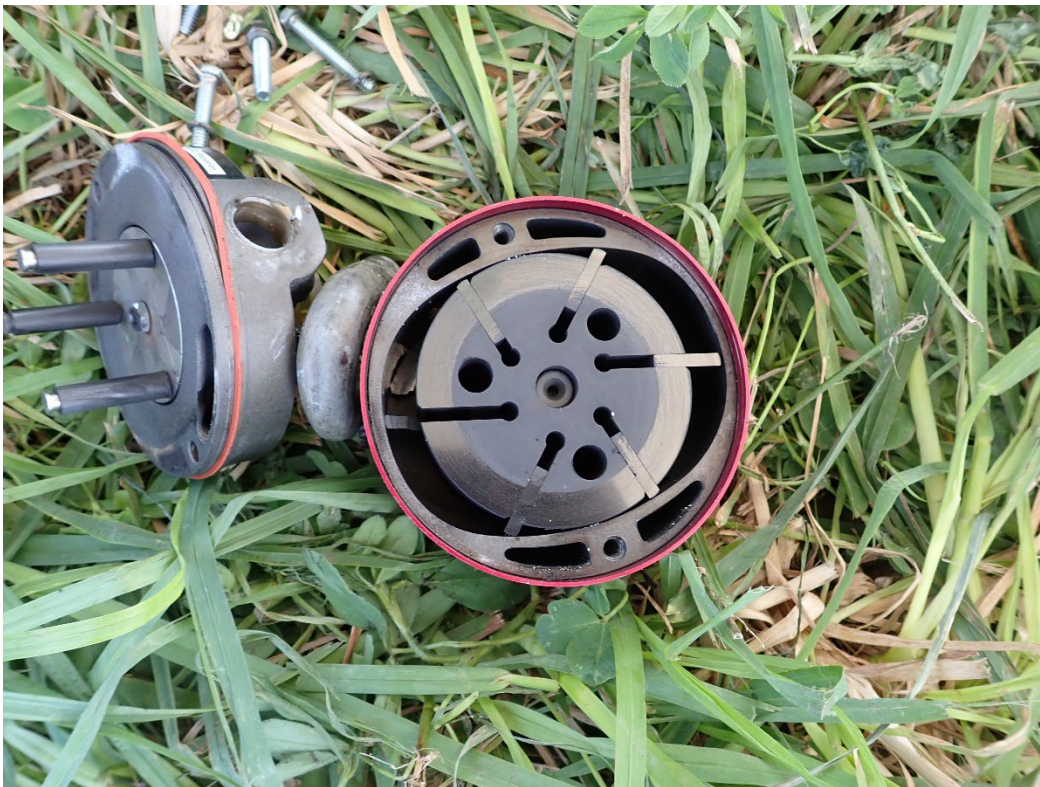


Photo 40: View of the vacuum pump disassembled for examination.

4.0 Propeller Examination

The three-bladed metal McCauley variable pitch propeller was impact separated from the engine crankshaft flange. The three blades were arbitrarily labeled A, B, and C and will be referred to as such going forward. Blade A exhibited leading edge gouging, polishing at the tip, chordwise scratches and was bent aft about 10° at the midspan. The propeller hub was fractured at the base of propeller blade B. Blade B was bent forward about 40° at the midspan, exhibited chordwise scratching, and leading edge gouging. The propeller hub was fractured at the base of blade C. Blade C was bent aft about 30° at the midspan, exhibited chordwise scratches, and leading edge gouging.



Photo 41: Overview of the propeller.



Photo 42: View of damage to the propeller hub.



Photo 43: View of propeller blade "A."



Photo 44: View of the leading edge of propeller "A."



Photo 45: Blade "A" leading edge gouging, chordwise scratching, and polishing. Blade A



Photo 46: Overview of propeller blade "B."



Photo 47: View of the leading edge of blade "B."



Photo 48: View of leading edge gouging and chordwise scratching, blade "B."



Photo 49: Damage to the propeller hub, blade "C."



Photo 50: Overview of blade "C."



Photo 51: Blade "C" leading edge gouging and chordwise scratching.

The rear-mounted propeller governor remained installed on the accessory housing but was damaged by impact forces at the mounting flange. The propeller governor control cable remained attached to the unit and was cut to facilitate the engine examination. The governor was removed and photographed. The unit rotated when the drive was rotated.

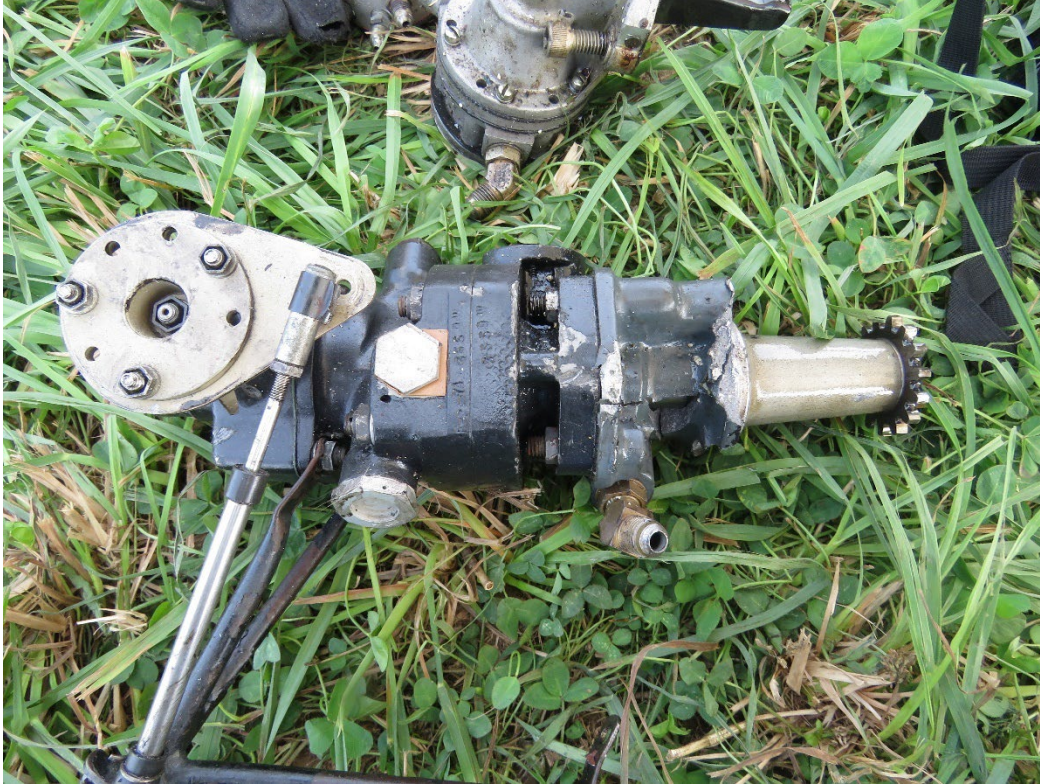


Photo 52: View of propeller governor.

Submitted by:

Joshua Young
Air Safety Investigator