

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23FA301

AIRFRAME AND ENGINE EXAM REPORT

August 5, 2023

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A. ACCIDENT

Location: Idaho City, Idaho
Date: August 4, 2023
Time: 10:10
Airplane: N617G, Glastar with Superior engine.

B. AIRFRAME AND ENGINE EXAM REPORT

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SUMMARY

On August 4, 2023, about 10:10 mountain daylight time, a experimental amateur built Glasair Glastar, N617G, was substantially damaged when it was involved in an accident near Idaho City, Idaho. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The airplane came to rest, upright, about 100 ft southeast of the centerline of the gravel runway, on a magnetic heading of about 144° and an elevation of 3,890 ft above mean sea level (msl). All major components remained near the wreckage. Both wings fractured and separated from the fuselage. Fuel remained in both wing tanks, but the quantity could not be determined. The fuselage was breached from the right side, just aft of the firewall to the empennage. The first point of probable impact was a gouge in a pine tree, about ten ft above the ground. The left wing exhibited large circumferential dents to the leading edge.

Examination of the airframe and engine revealed no mechanical malfunctions or failures that would have precluded normal operations.

C. DETAILS OF THE INVESTIGATION

1.0 Accident Site

The accident occurred at Idaho City USFS Airport (U98), Idaho City, Idaho. N43° 49' 29.19" W115° 50' 31.71" about 913 ft from the beginning of the gravel runway, at an elevation of 3,897 ft above mean sea level (msl). The accident site was located at the

southeastern border of the runway edge. The edge was lined with tall pine trees of about 40 to 50 ft in height. Five trees, identified as tree A, B, C, D, and E, exhibited evidence of recent contact. Tree A and B exhibited small, low hanging branches broken off and deposited at the tree base. Tree C exhibited a large gouge about ten ft above ground level (agl). Tree D and E were located about three ft apart and each exhibited large impact marks and loss of bark about 8 ft agl. Tree E exhibited a deep chop mark, consistent with a cut from a sharp object. The gouges in trees C, D, and E were indicative of a left wing high, right wing low impact. See figure 1 and 2.



Figure 1. Google Earth image of the accident location and the tree locations.

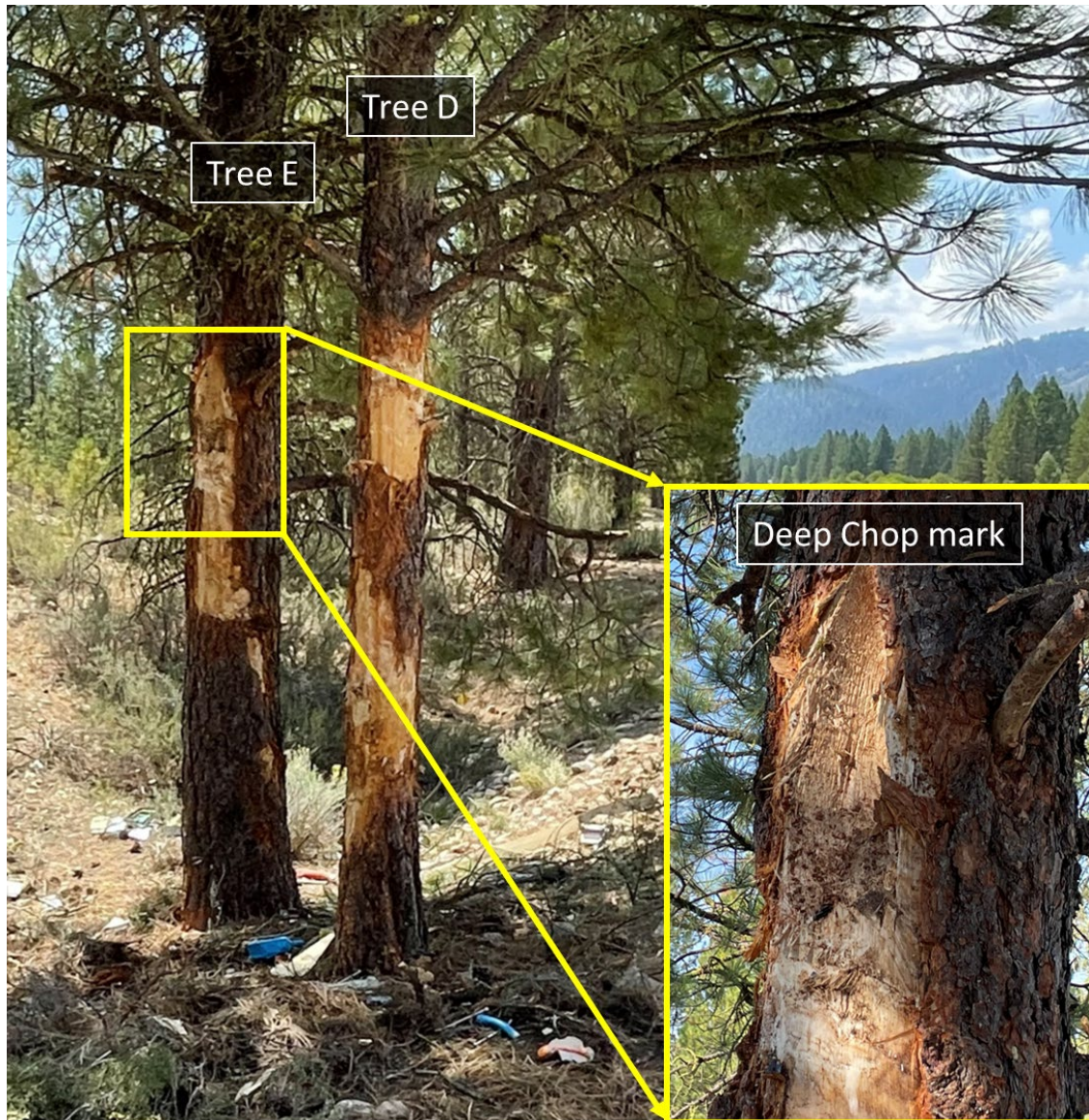


Figure 2. Tree D and E, showing gouges and chop marks.

The fuselage came to rest near tree D and E. The fuselage exhibited an impact fracture near the right door that extended to the empennage with the two-part composite fuselage separating at the longitudinal seam. Tree D was located at the end of the separation. This damage is consistent with tree D entering the fuselage as the airplane entered the tree line and splitting the fuselage along the longitudinal seam.

On the runway, about 100 ft from the end of the asphalt section, two long impressions in the gravel became visible. One was considerably wider than the second. The marks were consistent with the left main landing gear and the tail wheel. The marks progressed down the runway, arced to the left, and proceeded directly to

the accident site. Both marks remained in contact with the runway. The tracks disappeared shortly before the accident site.

2.0 Airframe Examination

The airplane was examined at the accident site. The data plate revealed that it was a Glastar, serial number: 5752. It had an empty weight of 1240 pounds, and a gross weight of 1960 pounds. It was manufactured in 2006.

2.1 Fuselage

The fuselage was breached on the right side. Tree D exhibited evidence of entering the fuselage at the right door location and ending at the beginning of the empennage. The left half of the fuselage remained on one side of the tree and the right half of the fuselage remained on the other side of the tree. The fuselage split along the seam of the two-piece composite fuselage.

2.2 Empennage

The empennage remained attached to the aft fuselage. The vertical stabilizer and rudder exhibited minor damage. The stabilator exhibited damage to the right tip and articulated full travel up and down. The stabilator trim was free to move up and down. The left side of the stabilator exhibited no damage.

2.3 Wings

Both wings fractured and separated from the top of the fuselage. The left wing exhibited a circular indentation that started about 3 ft inboard of the wing tip and progressed outboard. The wing tip and about 1 ft of the wing fractured and separated from the wing. The left-wing fuel tank remained secured and contained an undetermined amount of fuel. The quantity of fuel was easily observed in the tank and indicated an abundant amount of fuel. The left-wing aileron remained attached to the wing and exhibited spanwise damage. The left-wing flap remained attached to the wing and exhibited minor damage. The flap indicated zero degrees flaps set. The lift strut had separated from the fuselage.

The right wing fractured and separated from the top of the fuselage. The wing came to rest between the wreckage and tree D. There was a circular indentation at the root of the leading edge that was adjacent to tree D. The right-wing aileron remained attached to the wing and exhibited minor damage. The right-wing flap remained attached to the wing and exhibited minor damage. An abundant amount of fuel remained in the right-wing tank. The lift strut separated from the fuselage.

2.4 Landing Gear

The main landing gear was fractured but remained attached to the heavily damaged fuselage. The wheels remained attached to the spindles. One brake pad was liberated from the caliper. The tail wheel remained attached to the bottom of the aft fuselage and exhibited minor damage.

2.5 Cockpit

The cockpit was destroyed. The instrument panel was damaged; however, the two electronic displays were recovered and retained for possible download of data. There were no conventional gauges installed on the instrument panel, The seats were damaged, and their track position was undetermined. In a conversation with a fellow pilot, who owned a very similar airplane, the seats were not the type that could easily be repositioned inside the airplane. It was explained that to reposition the seats, the person would have to exit the airplane to make the adjustment.

The throttle was positioned in the full forward position (full power). The propeller handle was positioned in the full forward position (high RPM). The mixture lever was separated from the throttle quadrant and found in the debris.

The fuel selector switch was found in the BOTH position.

2.6 Survivability

The cockpit area was heavily damaged, consistent with intrusion by a tree. There was no postaccident fire.

2.7 Fuel/Fuel System

Both wing tanks contained an abundant amount of fuel. The engine and gascolator were not examined beyond visual examinations.

2.8 Flight Control Continuity

The flight control continuity for the stabilator was established from the control rod that connected to the stabilator to the bellcrank and from the bell crank to the control cables to the first bulkhead in the aft fuselage and from the first bulkhead to mid fuselage.

Control continuity of the ailerons was established from the left and right ailerons to the mid- point of the upper cabin.

The rudder was examined during the follow up travel conducted on February 7, 2024. The rudder remained attached to the vertical stabilizer. The two rudder control cables were cut during recovery. The two rudder control cables remained attached to the rudder horns and extended to the cuts made by the recovery agents. The rudder control cables then continued to the mid-section of the fuselage. Rudder control continuity was established from the rudder pedals to the mid-section of the fuselage. Due to the damage and inaccessibility, the continuity of the flight controls in the mid-section of the heavily damaged fuselage could not be determined.

3.0 Engine Examination

The engine was manufactured by Superior Air Parts Inc. Model: IO-360-B1AC2, serial number: 361071318, rated at 180 horsepower. The engine remained attached to the undamaged engine mounts that remained attached to the fire wall. The engine exhibited no damage, when viewed from above. There was sufficient oil in the case. There were no signs of damage to the engine case or cylinders.

February 7, 2024. Engine examination performed. The engine was located at a hangar at the Nampa Airport (MAN), Nampa, Idaho. The engine did not exhibit signs of heavy impact damage and exhibited only minor damage to external components. The intake tubes and the exhaust tubes, located at the bottom of the engine were not crushed. The fuel servo, located at the bottom of the engine exhibited minor impact damage. The air filter attached to the fuel servo exhibited upward crush damage.

- The top spark plugs were removed and compared to a Champion check-A-plug Chart, and appeared dark and with some oil fouling.
- Cylinder thumb force compression was verified on all cylinders.
- Valve train continuity was established for all cylinders by rotating the engine and observing uniform/equal length rocker arm movement.
- The oil filter was removed and cut open. Examination revealed one small metallic contaminate. The oil appeared clean and bright.
- The fuel flow divider was disassembled. The diaphragm was intact with no tears or holes.
- The oil was drained, and the oil screen was pliable and not cracked.
- The air filter was removed from the fuel servo. The throttle cable was removed from the throttle arm. The throttle arm would not move. The fuel servo was removed. The throttle valve was lodged and came free with a light tap on the throttle arm.
- The electronic magneto (Emag P114L) was removed from the engine. A drill motor was attached to the drive and the magneto was rotated. The magneto had spark on the four leads.
- The mechanical fuel pump was removed from the engine. The mechanical fuel pump created suction when manually activated.

4.0 Propeller Examination

The Hartzell two-bladed, constant speed, aluminum propeller remained attached to the engine. One propeller exhibited chordwise striations and gouges to the tip, along with a small amount of forward bending at the tip. The leading edge exhibited little gouging and exhibited some dark color transfer consistent with contact with vegetation. The other blade exhibited an aft bend of about 80°, and chordwise striations near the tip. The leading edge exhibited small gouging and exhibited some dark color transfer consistent with contact with vegetation.

5.0 Pilot Information

The pilot was described by friends as an excellent pilot who had owned the airplane for years. He was known to keep the airplane in meticulous condition. He was known to easily handle the airplane, without difficulty.

6.0 Aircraft Information

The logbooks were recovered from the pilot's hangar. Photos were taken of the maintenance logbooks and the logbooks were returned to the family.

7.0 Meteorological Information

The weather was described by the Sheriff deputy as clear with very light wind. A fellow pilot who flew to the same airport, on the same day, and arrived about the same time described the weather as clear with only a breeze.

Submitted by:

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IIC

8.0 Photo Array

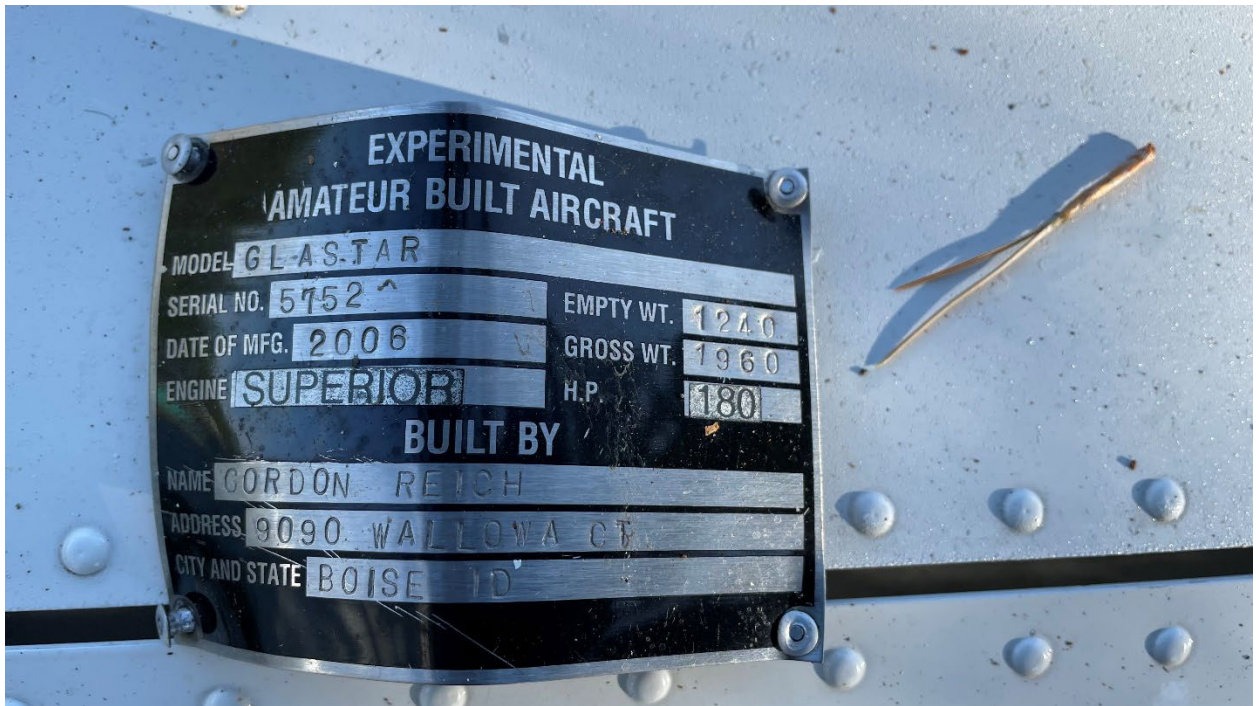


Figure 3. Airframe data plate



Figure 4. N617G at accident site, looking about 145° magnetic.



Figure 5. Fuselage left side



Figure 6. Top of cabin



Figure 7. Left wing, aileron, and flap.



Figure 8. Left wing leading edge near outboard tip.



Figure 9. Left wing tip.



Figure 10. Right wing.



Figure 11. Right wing upper surface, empennage right side.



Figure 12. Right wing underside, aileron, and flap



Figure 13. Cockpit



Figure 14. Instrument panel



Figure 15. Throttle quadrant

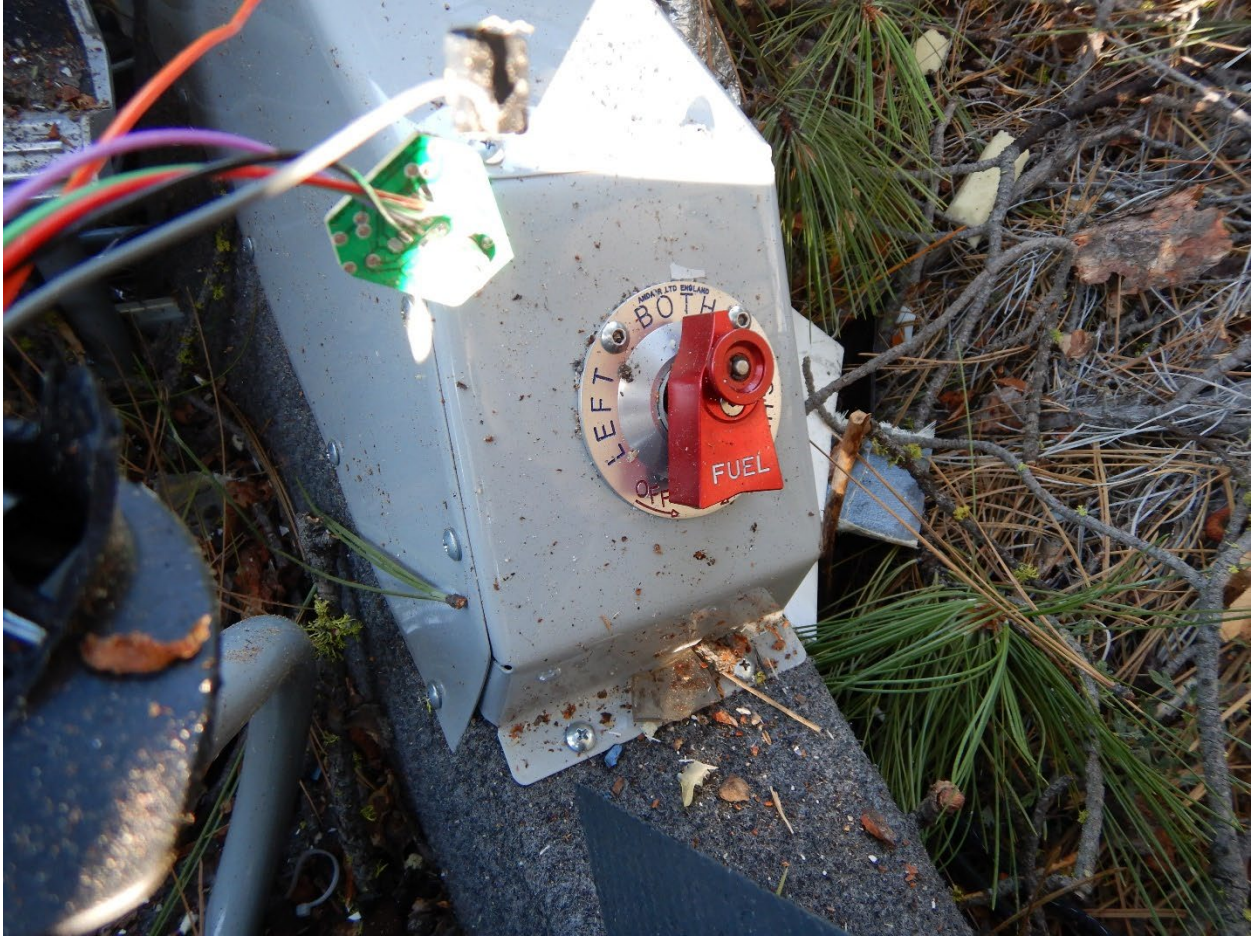


Figure 16. Fuel selector handle

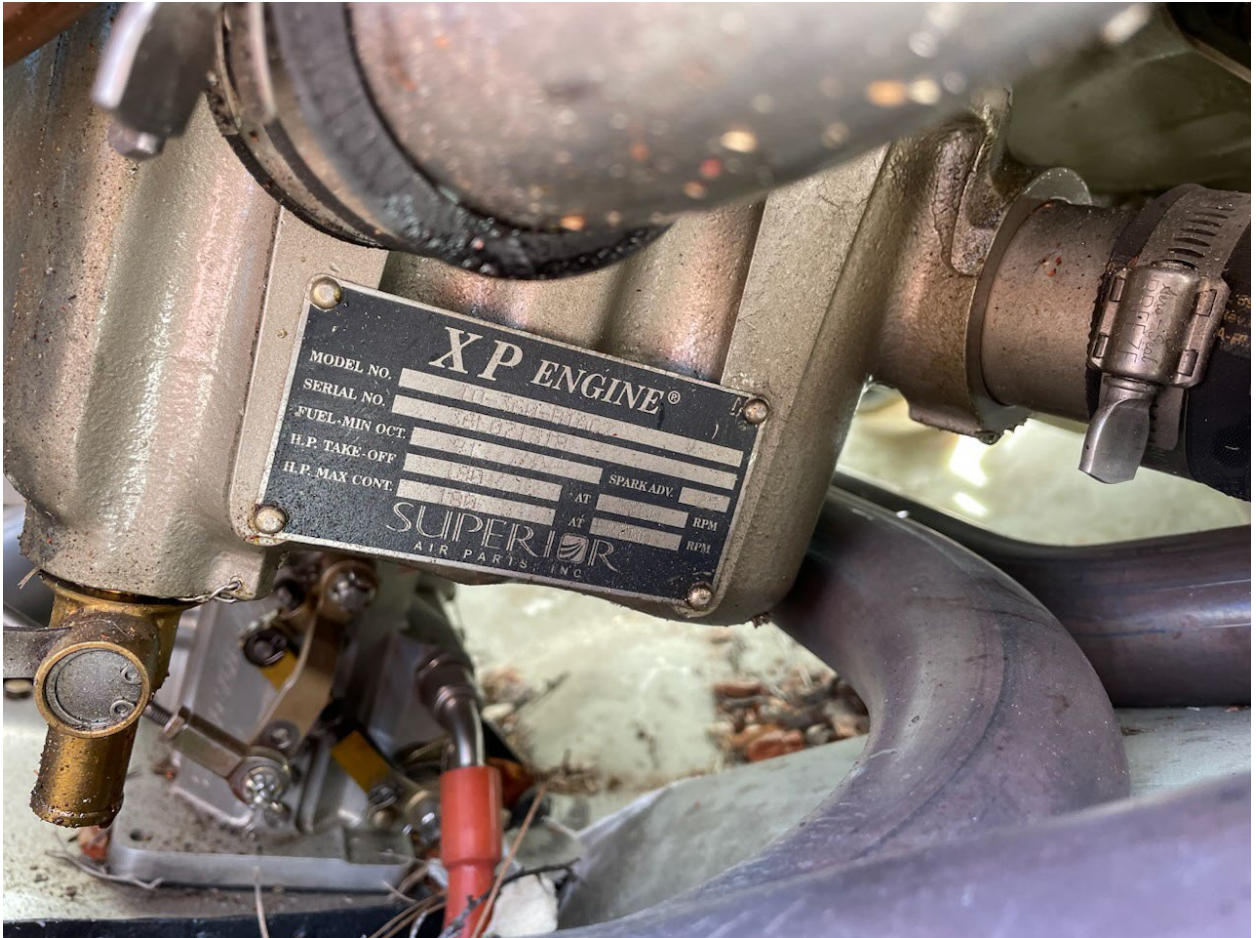


Figure 17. Engine data plate

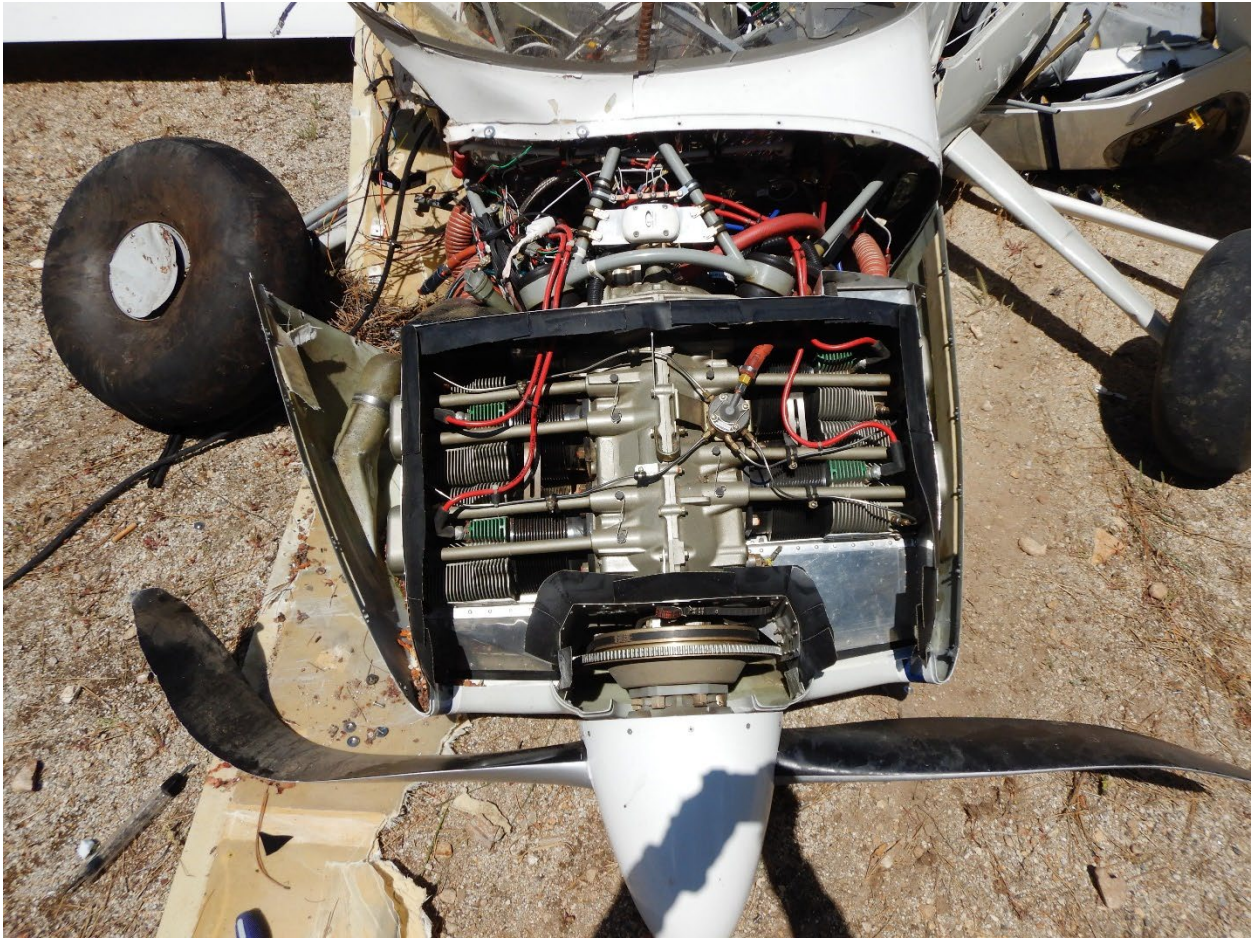


Figure 18. Engine and propeller



Figure 19. Engine at follow up examination.



Figure 20. Rudder.



Figure 21. Rudder control cables.