



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

DATE October 18, 2022

AIRFRAME AND ENGINE EXAMINATION

WPR22FA361

This document contains 30 embedded photos.

A. ACCIDENT

Location: Sahuarita, Arizona
Date: 9/28/2022
Aircraft: Grumman AA5B / N74349
NTSB IIC: Fabian Salazar

B. EXAMINATION PARTICIPANTS:

Name: Fabian Salazar
ASI
National Transportation Safety Board
Federal Way, WA 98003

Name: Mark Platt
Senior Accident Investigator
Lycoming Engines
Phoenix, AZ.

C. SUMMARY

On October 18, 2022, the IIC and the party member from Lycoming Engines convened at a secured facility to examine the engine and airframe of N74349. Much of the airframe was consumed by fire. A section of the carry-through cable exhibited anomalies and was shipped to the NTSB Materials laboratory for further examination.

Airframe Examination

Cockpit Documentation. The entire cockpit area except for one pair of seat rails was thermally destroyed. The entire instrument panel was thermally destroyed. The few flight instruments found in the wreckage were all destroyed and unreadable.

The fuselage, from the firewall aft to the empennage was consumed by fire.

The right wing and right flap were thermally destroyed. The right aileron was thermally damaged and separated from the airframe. The tube spar was fractured into five pieces. The right landing gear was thermally damaged, but the attachment point to the spar remained secured. Some sheet metal from the right wing remained; however, specific locations on the wing were undetermined.

The left wing and the left flap were consumed by fire. The left aileron was thermally damaged and separated from the airframe. The left landing gear was thermally damaged, but the

attachment point remained secured to the spar. Some sheet metal from the left wing remained; however, specific locations on the wing were undetermined.

The empennage was thermally damaged. The vertical stabilizer was thermally damaged. One side was completely burned away. The rudder was thermally damaged with only a small amount of sheet metal and the metal control rod remaining. The base of the rudder with the control cables remained but was partially separated due to the thermal damage.

The right horizontal stabilizer and right elevator were thermally damaged. And separated from the airframe. The right-side elevator trim remained secured to the elevator. The left side horizontal stabilizer and left-side elevator were thermally damaged and separated from the airframe. The left-side elevator trim remained secured to the elevator. All control cables to the elevators and rudder horn remained secured to their respective mounts.

The main landing gear remained attached to the wing spar and was thermally damaged. The composite struts were thermally damaged. The only remnants to the wheel were the steel brake disks. The brake assemblies were thermally damaged. The nose gear separated from the airframe and was not thermally damaged, however, the nose gear was damaged consistent with impact forces.

The engine cowling was consumed by fire, which exposed the engine.

Flight control continuity was not fully established due to the thermal damage to the airframe. Flight control continuity for the ailerons was established from the control yoke to the control horns. The torque tubes to the ailerons were reduced to ash. The right side was identified as the side with one turnbuckle at the carry-through cable. The left side was identified as the side with two turnbuckles, one on the control cable side and one on the carry-through cable side of the control horn. The carry through cable exhibited an anomaly near the carry-through pulley. There was a fracture that appeared to have occurred at two different locations about 5 inches apart. That fracture did not appear to be from the recovery effort. The fractured area was removed and shipped to the NTSB Materials Lab for further examination.

Flight control continuity for the elevators, was established from the control yoke to the recovery cuts made just before the empennage, and from the cuts to the elevators. Flight control continuity for the rudder, was established from the rudder pedal mounts to the recovery cuts made just before the empennage and from the cuts to the rudder horn at the base of the rudder.

Engine. The engine was examined by the party member from Lycoming Engines. The engine remained attached to the damaged firewall by the mounts. The engine was removed from the firewall and placed on an examination table.

The valve covers were removed, and all four chambers exhibited a wet, clean, and normal chamber with no damage exhibited.

The top spark plugs were removed and appeared normal when compared to the Champion Check-A-plug chart.

The two magnetos remained secured to their respective mounts. The left magneto, serial number 90090512, with impulse coupler, and right magneto, serial number 04061177 were examined. Both exhibited thermal damage and neither would rotate. The spark plug leads exhibited thermal damaged but remained secured to the magnetos and the spark plugs.

The engine mounted fuel pump was removed and exhibited thermal damage.

The rear accessory section of the engine was removed, exposing the valve train gears. All exhibited an undamaged appearance. All gear teeth exhibited no damage. The exposed inner chamber on the lower area of the engine appeared undamaged with no foreign material present.

The oil strainer was removed and appeared clear of debris.

The carburetor remained secured to the damaged air filter box. The throttle lever remained secured to the throttle arm. The bowl was removed from the carburetor. The composite material floats were thermally damaged and melted.

The engine would not rotate. When the cylinders were borescope inspected, one cylinder exhibited rust build up and is likely the reason for not rotating. Four holes were drilled into the top of the cases. When borescope inspected, all cam lobes appeared to have retained their original shape. There was no internal damage observed in the engine.

The two-blade propeller remained attached to the engine and exhibited thermal damage. One blade exhibited S-bends and chordwise bends along with gouging of the leading edge. The other blade exhibited a chordwise bend along with gouging of the leading edge. The spinner exhibited only thermal damage and did not exhibit impact damage.

PHOTO EXHIBIT



Figure 1. View of N74349 at the accident site, showing the right wing, aileron, flap, the right side of the empennage and the right side of the engine.



Figure 2. 1st bag wreckage items including wing, cabin, and empennage components.



Figure 3. Cabin area with control yoke, and rudder pedal assembly.



Figure 4. Control yoke assembly with control cables attached.

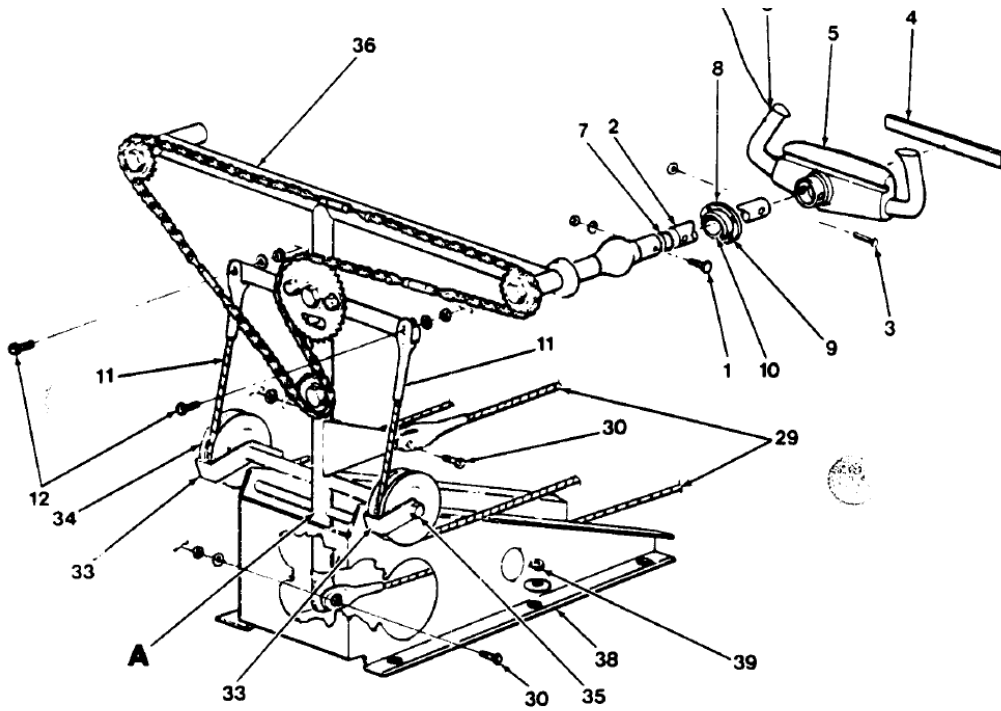


Figure 5. Illustration of the control yoke assembly from the AA-5 series Illustrated Parts Catalogue.



Figure 6. Image of the right-side aileron control cable system. The fractured end of the carry-through cable is circled in red.

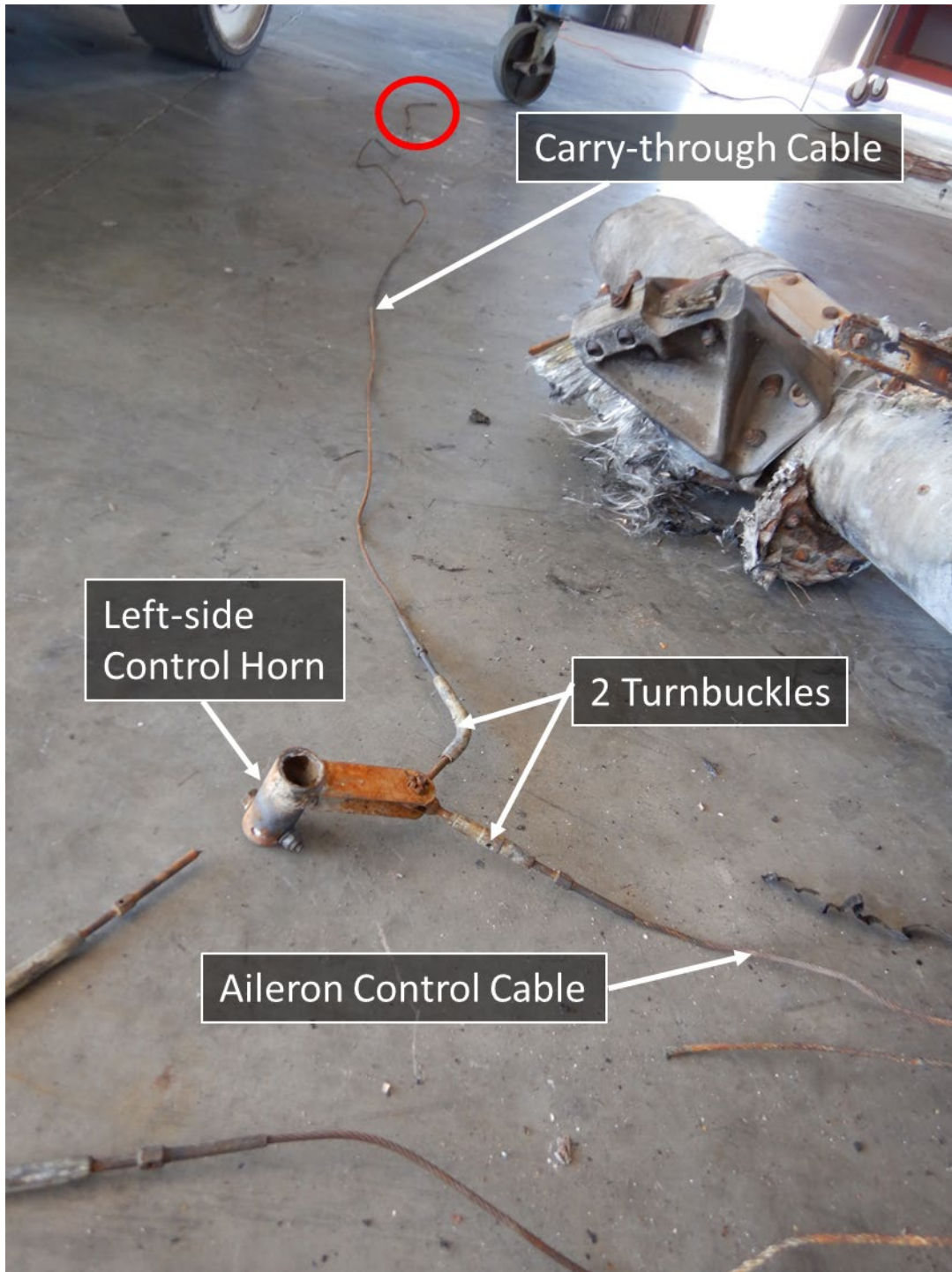


Figure 7. Left-side aileron control cable system. The carry through cable break is circled in red.

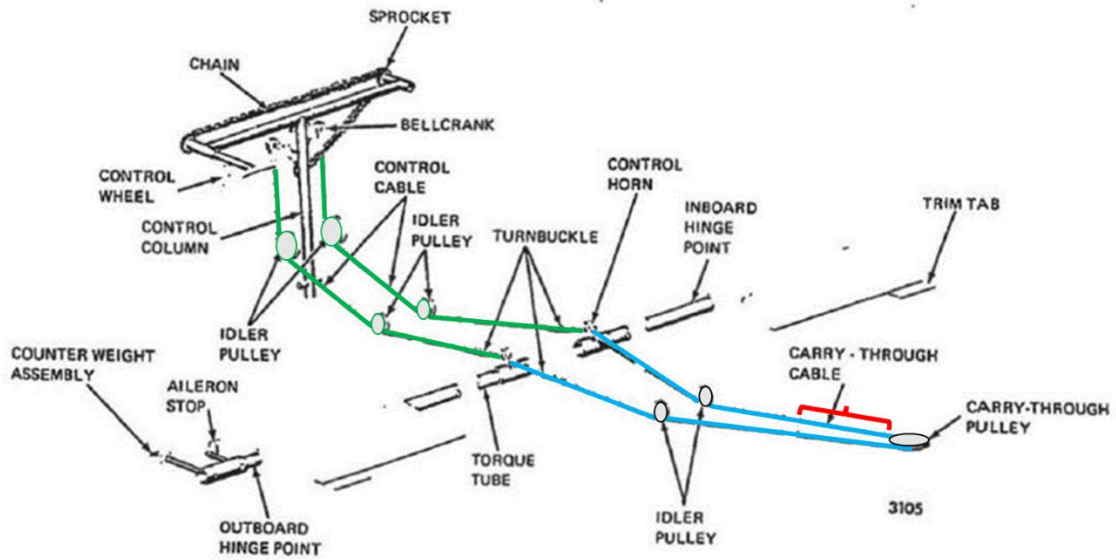


Figure 8. Illustration of the aileron control system. The control cables are highlighted in green, the carry-through cable is highlighted in blue, and the estimated location of the break is identified in red. Illustration courtesy of the AA-5 Series Maintenance Manual.



Figure 9. Rudder pedal assembly with control cables attached.



Figure 10. Flight control cables from the control yoke and the rudder pedals running through solidified aluminum.



Figure 11. Right-side view of the empennage.



Figure 12. Left-side view of the empennage.



Figure 13. Rear view of the empennage, showing the rudder and vertical stabilizer.



Figure 14. Center section of the elevators.



Figure 15. Remaining airframe sheet metal.



Figure 16. Second bag containing wreckage debris including, nose wheel, and main landing gear brake assemblies.



Figure 17. Right-side view of engine. Photo Lycoming.



Figure 18. Front-side view of engine. Photo Lycoming.



Figure 19. Left-side view of the engine. Photo Lycoming.



Figure 20. Rear view of the engine. Photo Lycoming.



Figure 21. Throttle, propeller, and mixture controls. Photo Lycoming.



Figure 22. Engine data plate. Photo Lycoming.

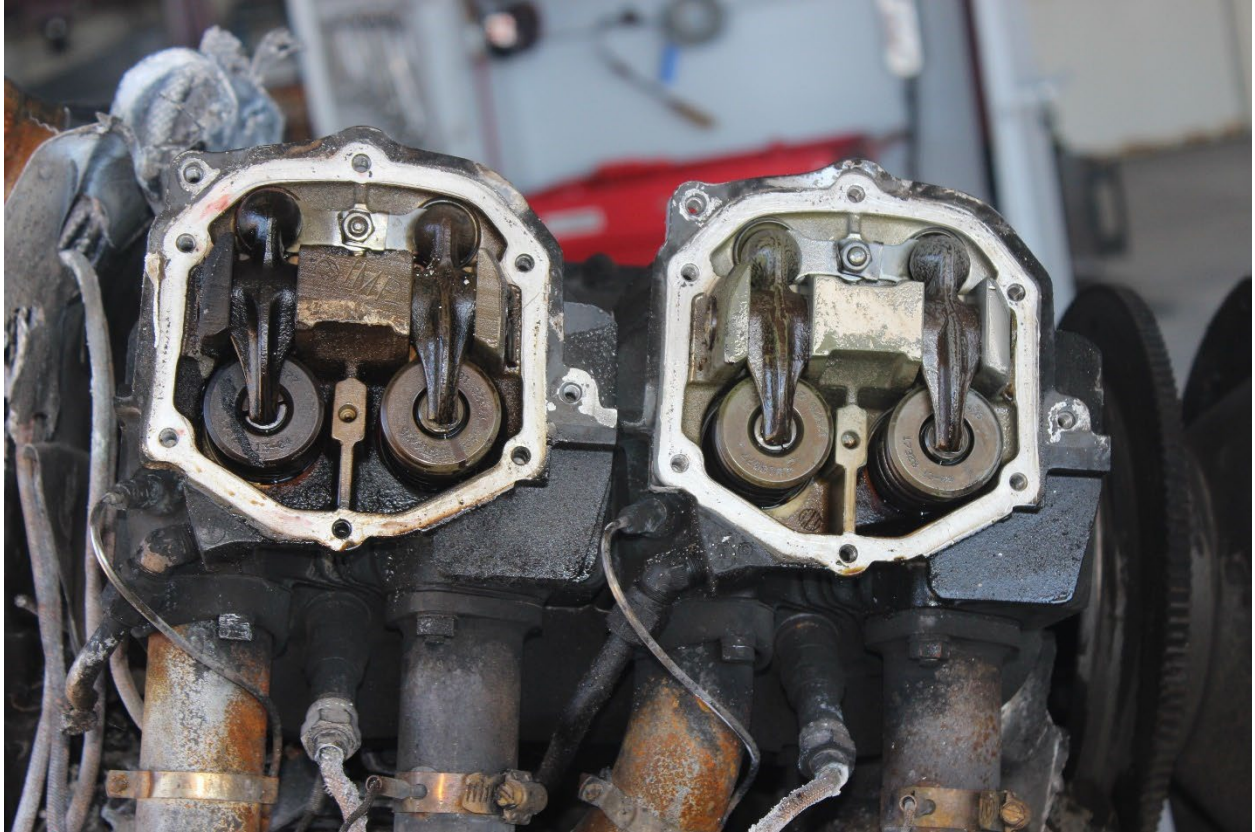


Figure 23. Valve cover chambers, right side. Photo Lycoming.



Figure 24, valve chambers, left side. Photo Lycoming.

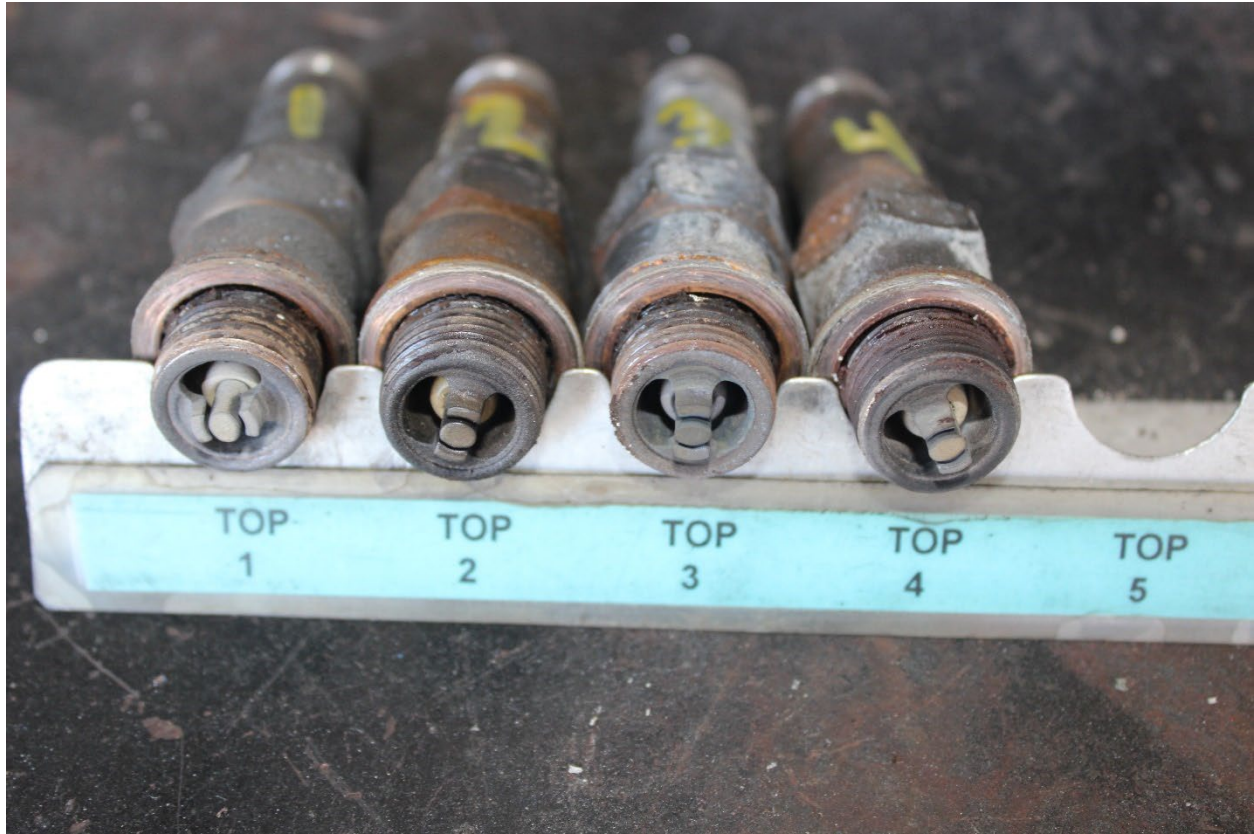


Figure 25. Top spark plugs. Photo Lycoming.



Figure 26. Magnetos. Photo Lycoming.



Figure 27. Fuel pump. Photo Lycoming.



Figure 28. Carburetor. Photo Lycoming.



Figure 29. Two of four holes drilled into cases. Photo Lycoming.



Figure 30. Propeller. Photo Lycoming.