

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23LA295

NTSB WRECKAGE EXAMINATION REPORT

November 8, 2023

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A. ACCIDENT

Location: Renton, Washington
Date: July 31, 2023
Time: 0920 Pacific daylight time
1720 UTC
Airplane: Experimental Lancair 320

B. PARTICIPANTS

IIC Stephen Stein
National Transportation Safety Board
Federal Way, Washington

Party Member Mark Platt
Lycoming Engines
Williamsburg, Pennsylvania

C. SUMMARY

The airplane was examined at a secure facility in Auburn, Washington on November 8, 2023. Postaccident examination of the engine or airframe did not reveal any preimpact mechanical anomalies or malfunctions that could have precluded normal operation. The main battery

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

The airplane was a fully composite monocoque design. Both wings were separated inboard by recovery personnel. The cockpit and engine compartment remained intact and mostly undamaged with exception of exhaust tubes below the engine case that were crushed and the fuel servo was partially fractured at the mounting pad.



Photograph 1: Airplane prior to examination

1.1 Electrical System

The avionics system was powered by a 12 volt main battery and was also equipped with a 12 volt auxiliary battery. Two solenoids drew power from the main and auxiliary batteries, respectively. Together, the solenoids delivered power to the starter motor. The operator could toggle between the main and auxiliary batteries through two switches on the instrument panel labeled "IGN A" and "IGN B." The switches were used to select either the main or auxiliary battery to run the electronic ignition system ("IGN A" runs 4 spark plugs and "IGN B" runs 4 spark plugs).

According to the engine manufacturer, "the subject engine had been modified from the original "legacy" magneto system to a "dual" electronic ignition system manufactured by Lightspeed Engineering, Santa Paula, CA. The PLASMA II PLUS is a distributorless Capacitor Discharge Ignition (CDI) system utilizing a solid-state control, direct crank trigger and coils to supply spark to the plugs. All Light Speed Engineering ignition systems, like the PLASMA II PLUS features automatic ignition advance based on engine load and RPM, auto retard for starting and a standard pulse tachometer output."



Photograph 2: Battery Switches on Instrument Panel

The negative terminal of the main battery was fractured and exhibited evidence of arcing. The positive leads were secured to the positive terminal of the battery. The terminals on the auxiliary battery were unremarkable. The main battery voltage measured 3.67v and the auxiliary battery voltage was 12v when tested with a multimeter.

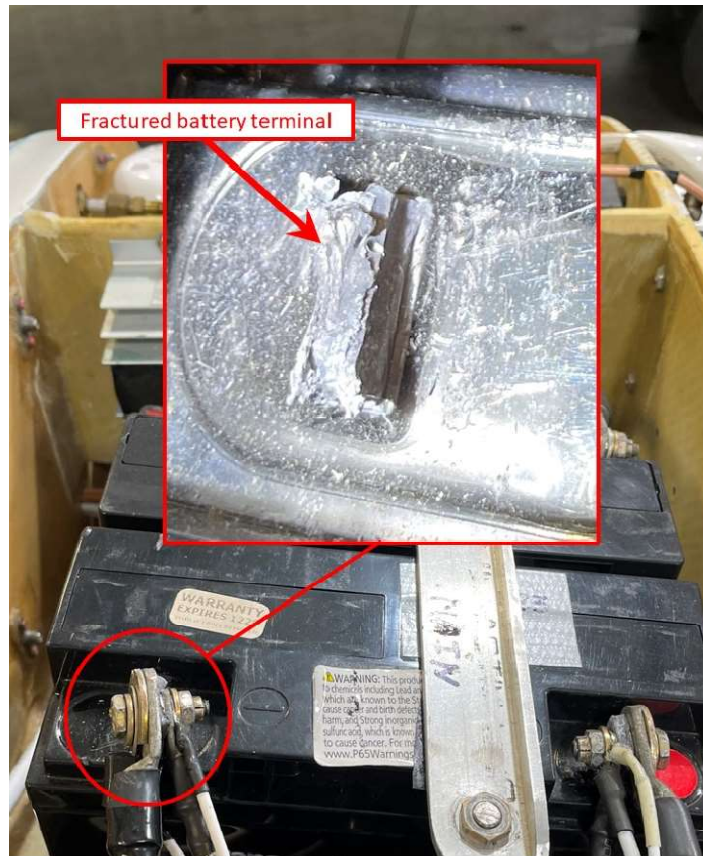


Figure 1: Main battery and fractured negative terminal

The top cowling contained two fabricated cavities that corresponded to the position of two of the battery terminals.

1.2 Fuel System

The airplane was equipped with two integral wing tanks. Continuity of the fuel system was confirmed from the fuel lines at the left and right wing roots to the engine driven fuel pump, which remained attached to the engine accessory case. The fuel selector handle rotated normally into the RIGHT, LEFT, and OFF detents when actuated by hand. The fuel selector was not obstructed. The gascolator bowl contained a trace amount of fuel and the gascolator filter was free of debris.

2.0 Engine Examination

The airplane was powered by a Lycoming Engines AEIO-360-EXP, a 180 hp, horizontally opposed, air cooled, normally aspirated, reciprocating engine. Mechanical continuity of the crankshaft and valvetrain was achieved as the crankshaft was rotated by hand at the propeller. The engine rotated normally and thumb compression was observed in the proper firing order and normal valve lift was observed on all four cylinders. The valve train operated in proper order and appeared to be free of any preimpact mechanical anomalies. Clean, uncontaminated

oil was observed at all four rockerbox areas. The combustion chamber of each cylinder was examined through the spark plug holes using a lighted borescope. The combustion chambers and bottom spark plug electrodes remained mechanically undamaged there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged and no evidence of valve to piston face contact was observed.

All four electronic ignition boxes remained attached to the engine mounts. The ignition harnesses were secured the ignition boxes and each spark plug. The top spark plugs exhibited coloration consistent with normal wear when compared to the Champion Check-A-Plug chart (AV-27).

3.0 Propeller Examination

The Hartzell two bladed constant speed propeller was attached to the crankshaft. One blade was bent and partially twisted about midspan and exhibited nicks at the outboard trailing edge. The other propeller blade was bent aft about midspan.

Submitted by:

Stephen Stein
Senior Aviation Accident Investigator