



Memorandum For Record

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Date: May 1, 2020
NTSB Accident Number: ERA18LA229

Factual Observations from the Wreckage Examination.

Examination of the cockpit revealed the following:

Airspeed – 49 knots
Altimeter – 30.09 inches of mercury ~¹40 feet
VSI - -80 FPM
HSI – HDG ~108°
Suction – off scale low
Manifold Pressure – 31.9 inches of mercury
Tachometer – 0 RPM
Fuel Flow – off scale low
CHT and EGT – Both off scale low
Oil temperature and oil Pressure – Both off scale low
Left and Right Main Fuel Tank Quantity – 1/16 capacity
Prop AMPS – 50
Flap Selector – Up
Throttle – Full Forward
Propeller – 1/4 inch from low rpm stop
Mixture Control – Full rich
Aileron Trim – Right Wing low 1/2 range
Cowl Flaps – Closed
Elevator Trim – 23 units up
Landing Gear Selector – Down
Auxiliary Fuel Pump - Low
Air Conditioner – On
Magnetos Switch – Both

¹ ~ indicates approximately

Battery – On
Alternator – Off
Standby Alternator – Off
Avionics Master – On
Hour Meter – 1629.7
Fuel Selector – Right Tank Detent
Pilot's Seat – 3 Point restraint installed, not connected
Left and Right Tip Tank Transfer Pumps – Off
Pilot's Side Circuit Breaker Panel – No CB's were tripped
Co-Pilot's Circuit Breaker Panel – Only the Radar CB was tripped

The emergency locator remained secured in its bracket with the antenna connected. The switch was in the off position (armed), but no light was observed. The ARTEX ELT model 110-4, S/N 62175. The battery part number 453-0150, expired February 2020. It was made to TSO C91a. Type AF (automatic fixed).

Continuity was confirmed between the panel mounted throttle control and the engine throttle body arm/shaft. Continuity was also confirmed between the panel mounted mixture control lever and the throttle body/mixture unit. The mixture control arm was impact damaged and loose on the shaft. Continuity was also confirmed between the panel mounted propeller control lever and the engine mounted propeller governor pitch change arm.

The main induction filter was removed and inspected. The paper-type filter cartridge was lightly contaminated but not blocked with debris. No contamination or FOD was found in the induction system components.

Examination of the engine revealed all four engine mounts were broken due to impact forces. No oil was present on the engine oil rod. All rocker covers remained intact and attached to each cylinder head except cylinder No. 5 which exhibited a small round puncture on the lower left of the cover. Also, cylinder No. 6 rocker cover exhibited impact damage with only the outer perimeter of the cover remaining which was attached to the cylinder head by mounting hardware. The instrument air pump was removed and inspected. The drive coupling was intact, and the pump produced pressure at the output-port and suction at the input-port when the pump was manually rotated.

The top spark plugs were removed from each cylinder and inspected. When compared to a Champion Sparkplug "Check-A-Plug" chart, each of the sparkplugs appeared to be "worn-out-normal" in condition and oil contaminated. The crankshaft was manually rotated and thumb compression was achieved at all cylinders except cylinder No. 1. An electronic lighted borescope inspection was performed on each cylinder. All valves and piston domes exhibited normal combustion deposits and were otherwise unremarkable. The rocker cover for cylinder No. 1 was removed and both intake and exhaust rocker arms operated normally when the engine was manually rotated. No anomaly was discovered which would cause cylinder No. 1 to not exhibit thumb compression when the engine was manually rotated.

The left and right magnetos remained attached and appeared to be undamaged. The p-leads were removed from each magneto and the right magneto produced spark to the upper ignition leads for cylinder Nos. 1, 3, and 5 and the lower ignition leads for cylinders Nos. 2, 4, and 6 when the crankshaft was manually rotated. The left magneto did not produce spark to the lower ignition leads for cylinders Nos. 1, 3, and 5 or the upper ignition leads for cylinders Nos. 2, 4, and 6. The p-leads were reattached, and the panel mounted magneto switch was placed in the **Both** position. The results were the same as described when p-leads were removed from each magneto. The same result was achieved when the panel mounted magneto selector switch was placed in the **Right** position. When the magneto selector switch was placed in the **Left** position, no spark was produced at any ignition lead. Conclusion: The left magneto was inoperative during this inspection.

A second test of the left magneto was performed after removing the panel mounted magneto switch. A multi-meter was used to test for continuity with the p-lead removed from the switch. Continuity was confirmed from the lead end to end. The p-lead was reconnected to the magneto switch and continuity was confirmed no matter which position the switch was placed in; Off, Right, Left or Both indicating a short in the airframe wiring. Further testing of the magneto will be accomplished at the Continental Motors Analytical Department at a later date. No discrepancies were noted with the right magneto p-lead from the switch to the magneto. Testing of the right p-lead was also performed while wiggling the p-lead wire along its observed length and no short to ground was noted.

All secondary flight control surfaces, and all primary flight control surfaces for roll, yaw, and right elevator were accounted for. The left elevator counterweight was not recovered or observed, and an estimated 80% of the left elevator which was fragmented was recovered. The left flap actuator housing was fractured and the actuator was separated at the flap attach point which was fractured. The actuator was extended about 1.375 inches (beyond up limits). The right flap actuator which remained connected at both ends was extended about 1.85 inches which equates to flaps retracted.

Examination of the flight control cables for roll, pitch, and yaw revealed continuity from the cockpit to each control surface except where cut for recovery or overload failure of the cable, or overload failure of the elevator up portion of the elevator bellcrank. The left aileron bellcrank was fractured due to overload and only one half of the bellcrank with aileron control cable attached was located among the recovered wreckage.

Further examination of the engine revealed a flexible hose connecting the firewall- mounted turbo controller to the left (cylinder Nos. 2, 4 and 6) upper deck pressure air-fuel nozzle tube assembly was found loose (finger tight only) at the B-nut.

The three-blade constant speed propeller hub remained attached to the crankshaft propeller flange. The three composite/wood blades each separated at between 8" and 12" outboard of the propeller hub. The propeller spinner exhibited impact damage. The separated portion of each propeller blade was not presented for inspection.