



AIRFRAME AND ENGINE EXAMINATION

NTSB ACCIDENT NUMBER: ERA23FA087

AIRCRAFT REGISTRATION: N74586
OPERATOR: Rainwater Farms, LLC
ACCIDENT LOCATION: Kellyton, AL

Investigative Team:

NTSB IIC – Lynn Spencer
FAA Coordinator – Clayton Caessens, Birmingham FSDO
Lycoming Engines – David Harsanyi

Additional On-Scene Contacts:

Southern Aircraft Recovery, Baton Rouge, LA

AIRFRAME EXAMINATION

As first viewed, the airplane was inverted and folded over the engine and propeller, which imbedded in soil. The cockpit doors had been cut away to allow for extraction of the pilot. All portions of the airplane were in the vicinity of the main wreckage, which was intact except for the outermost portion of the left wing including the left aileron which was located at the base of some large trees about 68 feet from the main wreckage. The fractured outermost portion of the left wing exhibited leading edge damage consistent with tree impact while in a left turn.

Equipment was brought to the accident site and the airplane was positioned upright and further examined. The propeller hub with propeller blades attached was separated from the engine and embedded at the ground impact point. Examination of the propeller revealed that both blades exhibited minimal chordwise rotational scoring on the face sides and no remarkable twisting. One of the blades exhibited aft bending.

The engine compartment and cockpit control panel were impact crushed aft. The wings were attached to the fuselage with damage to the fuselage near the wing roots. The right wing with aileron and flap (retracted) intact contained no fuel in the bladder and no signs of leakage. The leading edge displayed impact aft crushing in the outermost 2.5 feet of the leading edge and evidence of impact with the ground. The left wing with flap (retracted) intact contained significant fuel, and the outer 2.5 feet including the aileron was fractured. The cabin area was impact crushed aft. The top of the fuselage displayed impact crush damage. The empennage with fully intact with impact damage to the left horizontal stabilizer and elevator. The main landing gear was stowed. The wings were placarded as 27.4 gallons of fuel for each wing. The cockpit fuel selector was placarded "Right main 24".

Elevator and rudder control continuity was confirmed from the control surfaces to the cockpit controls. Aileron continuity could not be confirmed due to impact damage at the wing roots which resulted in binding of the control tubes.

The pilot seat was attached to the rails, and the seatback remained attached. The pilot's lap belt had been cut. There was no shoulder harness installed.

The ELT was in the AUTO position and intact; however, the antenna cable was detached from its connection point on the ELT.

The cockpit controls were as follows:

Magnetos: BOTH
Throttle: full forward
Mixture: full forward
Propeller: full forward
Carburetor heat: full forward (off)
Flaps: retracted
Cowl flaps: closed
Landing Gear: stowed
Cabin Vent – full forward (closed)
Cabin Heat – full forward (cold)
Fuel Selector: right tank

The cockpit instruments were as follows:

Directional gyro – 360
Oil pressure – 0

Fuel pressure – 12
Oil temp – 60
Vertical speed – 0
RPM – 150
Manifold pressure – 38
Tachometer – 3,365.9
Transponder – 5277
Altimeter – 30.16



Photo 1 – View of wreckage prior to field examination.



Photo 2- View of outermost left wing leading edge with damage consistent with tree impact.



Photo 3 - Fuel selector selected to right main tank

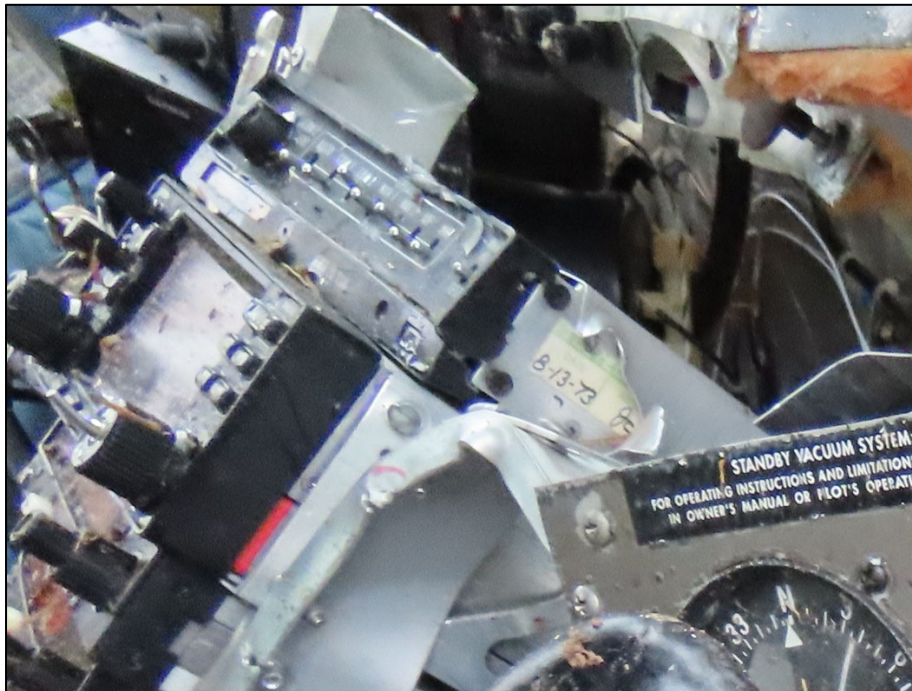


Photo 4 - Carburetor heat (upper right of photo) off



Photo 5 - Right wing fuel bladder with no fuel present.

ENGINE EXAMINATION

As first viewed, the engine remained attached to the airframe via its respective engine mount, control cables, and harnesses. The engine was oriented 90 degrees from its normal orientation with the crankshaft pointing skywards vertically. Upon the repositioning of the airframe to facilitate examination, the propeller and aircraft spinner were found separated from the crankshaft and embedded into the soft dirt at the initial impact point.

The engine was removed from its engine mounts and hoisted to facilitate examination. The engine was a Lycoming O-360-A1D, serial number L-4100-36. The engine suffered minor impact damage in the form of dents to rocker box covers, intake and exhaust pipes, and oil filter crushing. All accessories were found intact and tightly installed to the engine except for the carburetor which was found impact separated from the sump section of the engine. There was a witness mark on the starter Bendix housing from the starter ring, with no scoring and consistent with no propeller rotation at the time of impact.

With the top spark plugs removed from the cylinders, the engine was able to be rotated by hand. Crankshaft and camshaft continuity was confirmed from the front to the rear of the engine and all accessory gears and drives rotated. Thumb suction and compression were observed on all cylinders when the crankshaft was rotated manually. A visual inspection of the cylinders revealed normal coloration and condition of the piston faces. All eight spark plugs were removed and compared to the Champion Check-A-Plug chart. The coloration and electrodes were consistent with normal engine combustion and wear signatures.

Both engine driven magnetos were removed and rotated by hand producing spark at each lead. The propeller governor was removed, and the unit spun freely.

The engine driven fuel pump was removed and rotated using an electric drill, suction and compression was noted at the respective ports on the pump.

The carburetor was disassembled, and its inlet screen removed. The screen was clean and unobstructed of any debris. The float bowl was separated, and no fluid was found within the bowl and no sediment was present. The floats were of the black plastic style and moved freely throughout their travel range.

The turbo unit that was installed to the engine remained attached. The inlet and exhaust pipes were removed, and the impellers examined. No scoring to the turbo housing was present, no damage to the leading edges of the impellers was present and no signs of FOD ingestion into the turbo unit was present. The turbo and wastegate moved freely when actuated by hand within the system.

The oil system was examined, and the oil suction screen was found free and clear of any debris. The oil filter could not be removed from the engine due to impact force crushing and had to be cut to remove the filter element. The element was found clean.

The lower half of the gascolator was impact separated from the firewall and shattered.

The magnetos produced sparks on all leads when removed and rotated by hand. The carburetor was disassembled, and its inlet screen removed. The fuel screen was free from debris and unobstructed. No fluid or sediment was present in the float bowl. The floats were of the black plastic style and moved freely throughout their travel range. Suction and compression were noted at the respective ports on the engine driven fuel pump when rotated using an electric drill. No fuel was found during the examination.



Photo 6 - Engine as hoisted before examination.



Photo 7 - Oil screen free from debris.



Photo 8 - Oil filter free of debris after removal from housing.

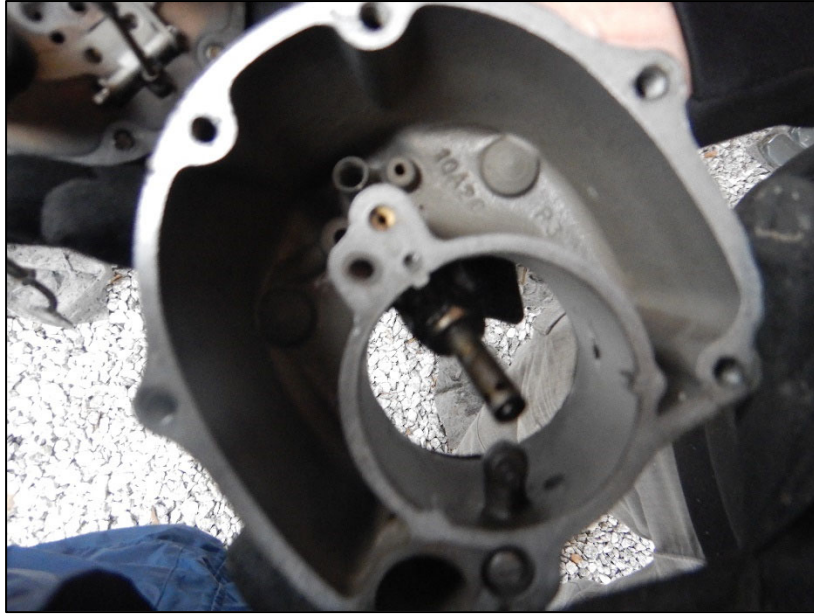


Photo 9 – View of carburetor bowl which was free of fuel.

The wreckage was recovered to Southern Aircraft Recovery, Baton Rouge, Louisiana.