

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA22LA090

WRECKAGE EXAM

February 23, 2022

A. ACCIDENT

Location: Auburndale, Florida
Date: December 17, 2021
Time: 1224 eastern standard time

Airplane: Aerofab Lake LA-4-250, N1402C

B. WRECKAGE EXAM

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Williamsport, Pennsylvania

C. DETAILS OF THE EXAMINATION

1.0 Accident Site

2.0 Airframe Examination

Recovery personnel discovered feather remnants attached to the right wing fuel tank cap / filler neck area, as the airplane was lifted from the water.



Figure 1 - Right Wing Tank Fuel Cap / Feather Remnants

The feather remnants were collected and sent to the Smithsonian Institute Feather Identification Lab in Washington, DC, for examination. The feathers were identified as being from a Turkey Vulture (*Cathartes aura*). A separate report from the Smithsonian Institute is available in the public docket. No other obvious remnants of bird were found on or in the wreckage.

The Fuselage significantly fragmented and damaged forward of the wing. No windscreen or any other acrylic-like remnants were separately recovered from the accident site, and none were observed in wreckage.

Wing leading edge crush/impact damage was present along entire span with many sections missing. The tail/empennage was completely separated just aft of the wing, though largely intact.

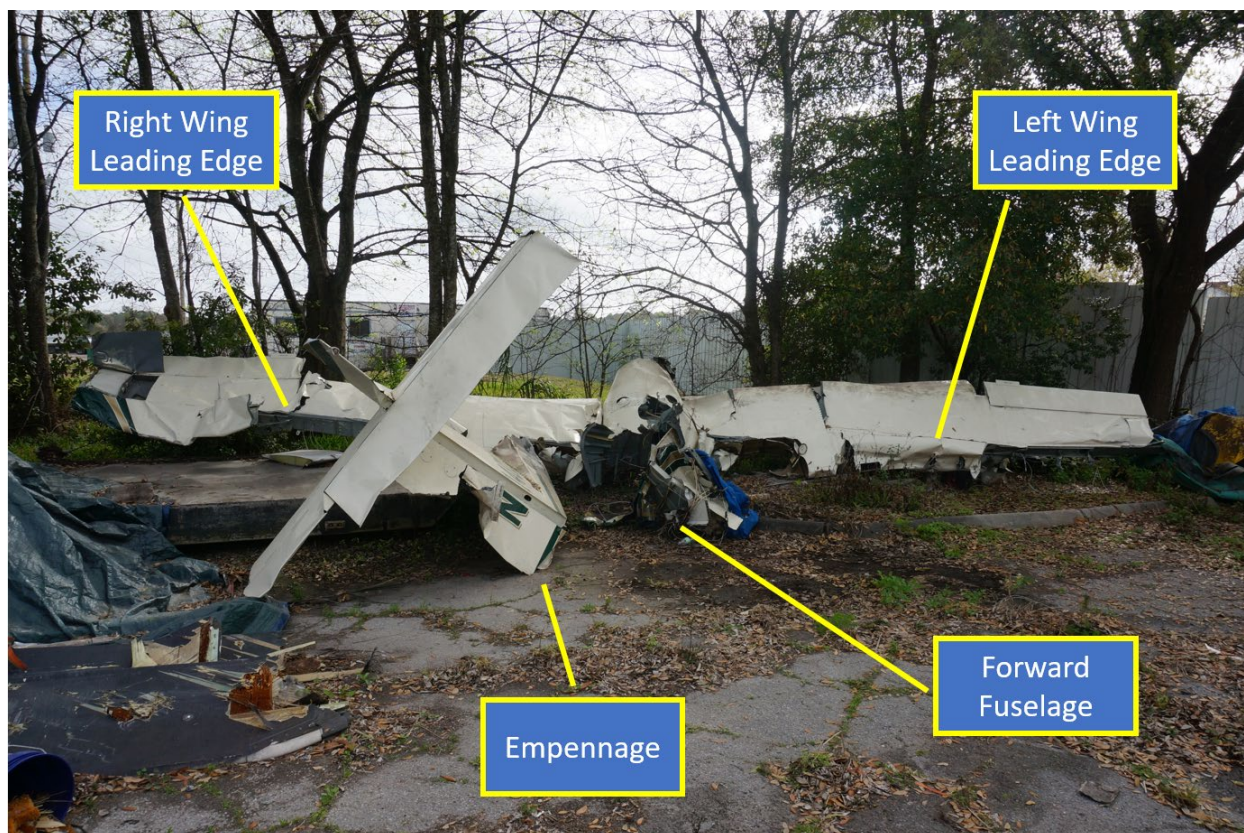


Figure 2 - View of Wreckage at Salvage Facility

Fire damage (soot, paint bubbling) was present on both sides of empennage, left wing/left flap, and many other small areas including cockpit upholstery.



Figure 3 - Left Inboard Wing/Flap and Left Forward Empennage

Both sponsons leading edge crushing along their entire forward edge.



Figure 4 - Sponsons (Left / Right)

All hinges were found intact for the ailerons, rudder, elevator, and trim tab.

The elevator and rudder push pull tubes were fractured, consistent with overload, near the forward end of the empennage just below leading edge of vertical stabilizer.

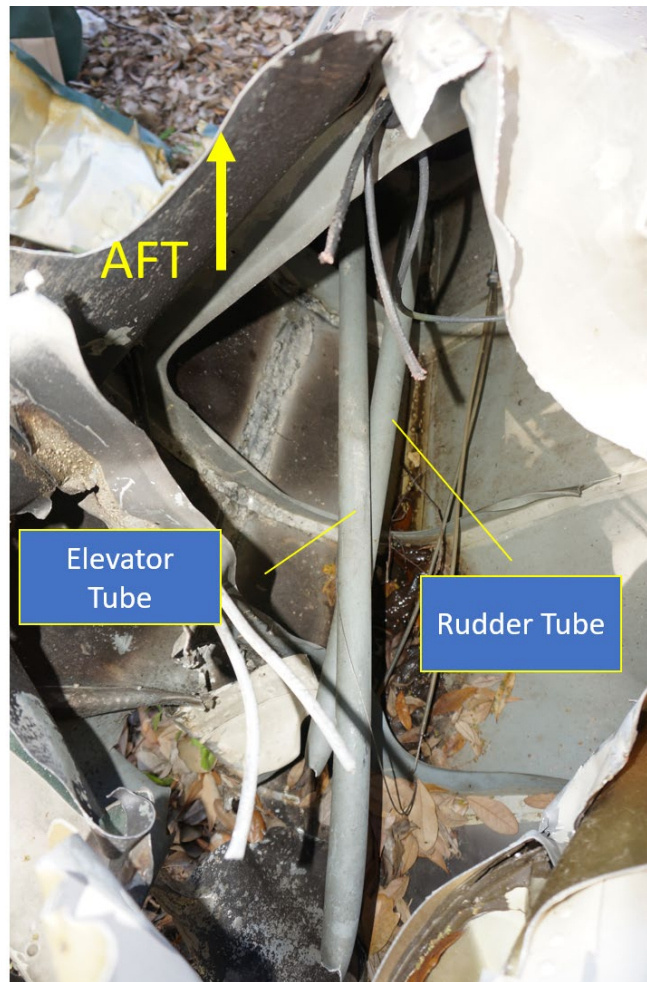


Figure 5 - Elevator and Rudder Push/Pull Tubes in Empennage

The rudder control was continuous from this fracture to another overload fracture in the rudder control horn.

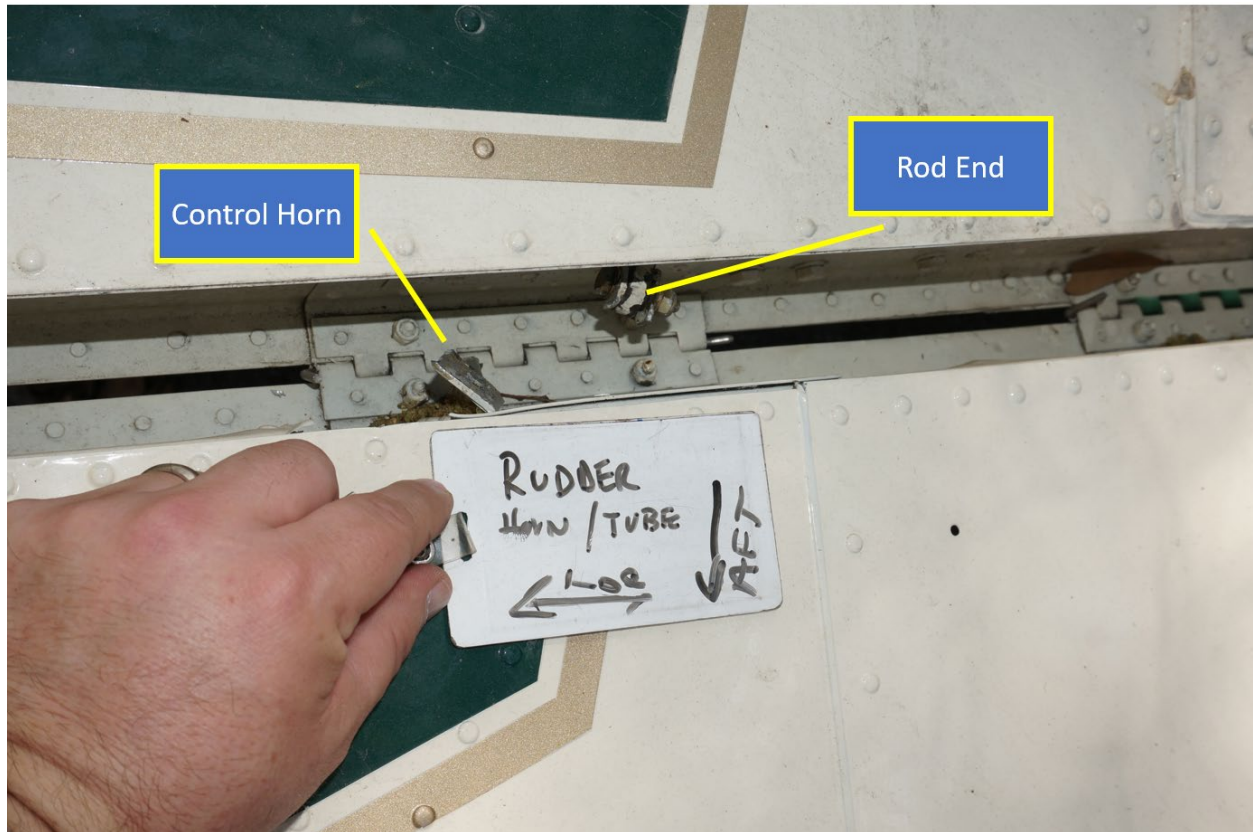


Figure 6 - Fractured Rudder Control Horn, and Rod End

The elevator control was continuous from fractured push-pull tube in the empennage, through bell crank, to the (separated) rod end that attaches to the elevator control horn. The eye of the rod end remained attached to the elevator horn, the threaded end was separated from end of the upper push-pull tube. The rod end and the (threaded) end of the push pull tube were subsequently examined by the NTSB Materials Laboratory. The internal threads in the push-pull tube were found to have fractured in shear overstress. A separate laboratory report can be found in the public docket.

Aileron continuity was established from the wing center section through an overload fracture in the push-pull tube at the left aileron control horn.



Figure 7 - Left Aileron Fractured Push-Pull Tube at Control Horn

Continuity was established from the wing center section to the right aileron control horn. The controls could not be moved due to damage/impingement of the components.

The left and right flaps remained connected to each other and found at or near the UP position. The hydraulic flap actuator was found extended 4" from the housing cap to the center of the rod end.

The pitch trim tab was found near the faired position. The push/pull tube remained attached to the control horn.

The rudder trim tab was impact damaged, remained connected to the electric motor assembly.

The rudder/brake pedal assembly in the cockpit was partially separated from fuselage, the copilot side right pedal was separated from the assembly. The control column and wheel components were fragmented and separated.

The main landing gear were found in the up position. The nose landing gear strut was largely intact and completely separated from fuselage structure. The wheel was separated from the yoke.

All five fuel tanks were impact damaged and breached. The right wing fuel tank cap was not attached - it had been removed during the recovery operation. The left wing fuel tank cap and center fuel tank cap were found secure and intact. Left cap mostly separated from surrounding structure. The wing tank caps are located about 3.5 ft outboard of the wing roots. Both the left and right sponson tank fuel caps were in place and intact. The cap vents were operable on all 3 vented caps (center and 2 sponson caps)

All seatbelt components were located, except for the left side lap portion for the pilot's position which was the "male" side of lap belt. The copilot side lap belt was buckled and the (retractable) shoulder harness was attached to the pin on the lap belt buckle.

The instrument panel was impact damaged and some instruments were separated from the panel.



Figure 8 - Instrument Panel Left/Right

The recording tachometer read: 2085.68 hours.

The airspeed indicator read 62 knots.

The altimeter setting was 30.30, the indicated altitude was about 4,000 ft (the hundreds needle was missing).



Figure 9 - Tachometer (left) Airspeed Indicator (right)



Figure 10 - Altimeter

The fuel strainer bowl was found safety wired in place. Drops of water and minor corrosion were found inside the strainer, the screens inside were unobstructed.



Figure 11 - Fuel Strainer

The right wing fuel tank outlet "finger" screen was unobstructed. The left tank screen was inaccessible.

3.0 Engine Examination

The engine was an Avco Lycoming model IO-540-C4R5, s/n L-22627-48A.

The engine was separated from the airplane. It had been immersed in a lake during the accident and had not been preserved for the 2 months prior to the examination.

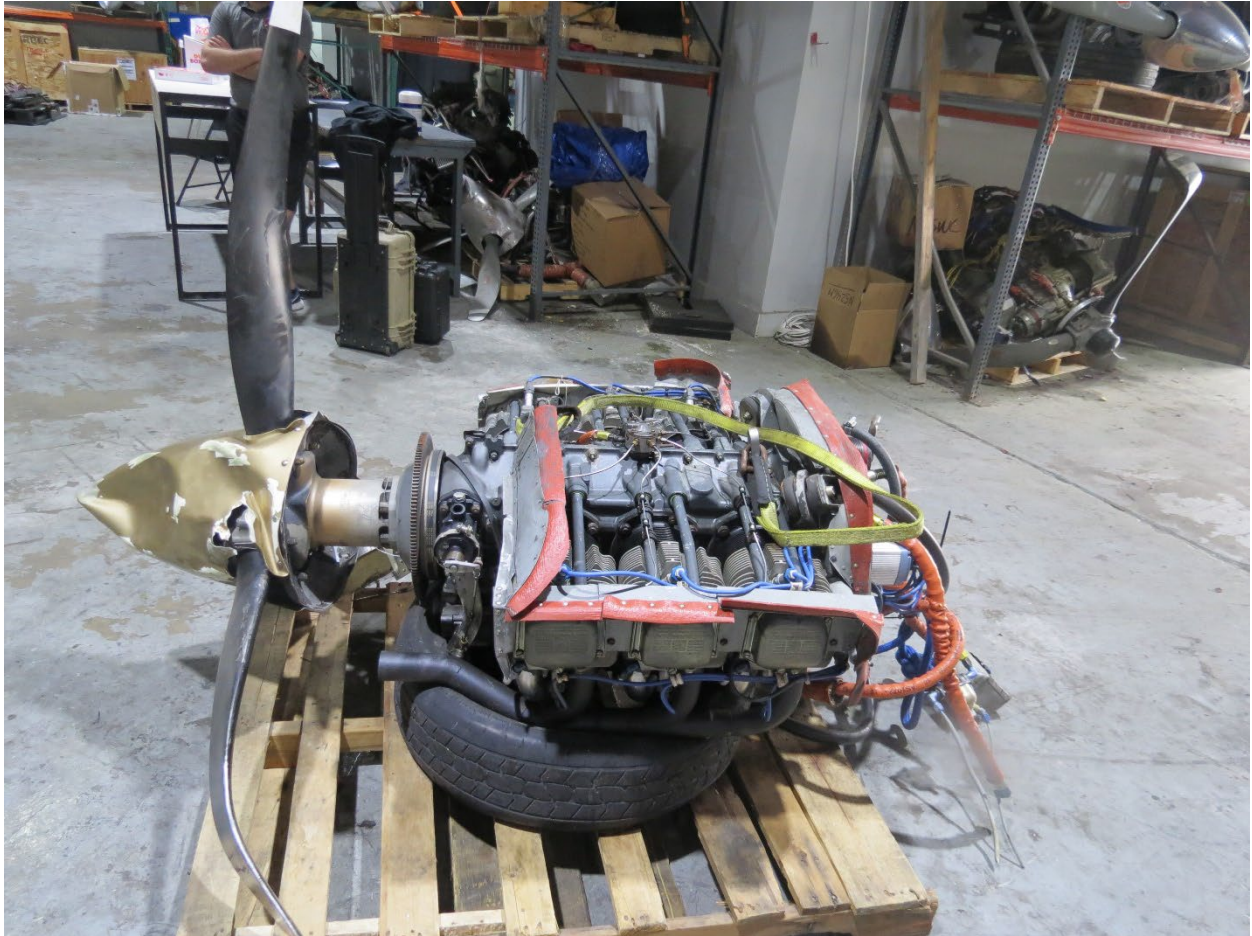


Figure 12 - Engine

The propeller remained attached to the engine crankshaft flange. The propeller spinner was partially crushed. The propeller blade labeled "A" was curved forward (toward the front of the airplane - the engine orientation as installed is with the propeller facing rearward in a pusher configuration) about 5 degrees. The blade labeled "B" was bent forward about 30 degrees at about mid-span, exhibited leading edge damage near the blade tip and chord-wise scratches. The blade labeled "C" was bent forward about 20 degrees at about $\frac{3}{4}$ span and exhibited leading edge damage near the tip. That blade also exhibited trailing edge "S" bending from about mid-span outboard toward the tip.



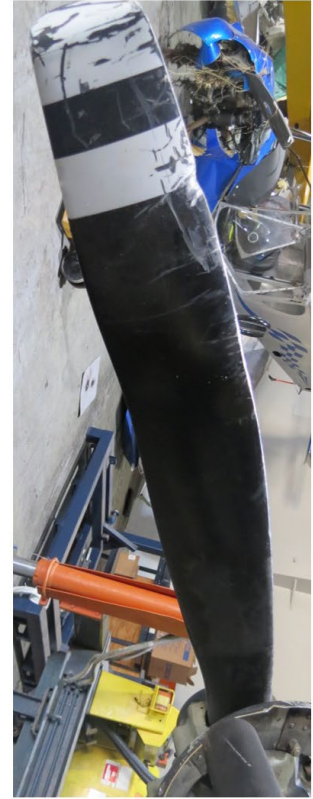
Figure 13 - Propeller and Spinner



Figure 14 - Propeller Blade "A"



Figure 15 - Propeller Blade "B"



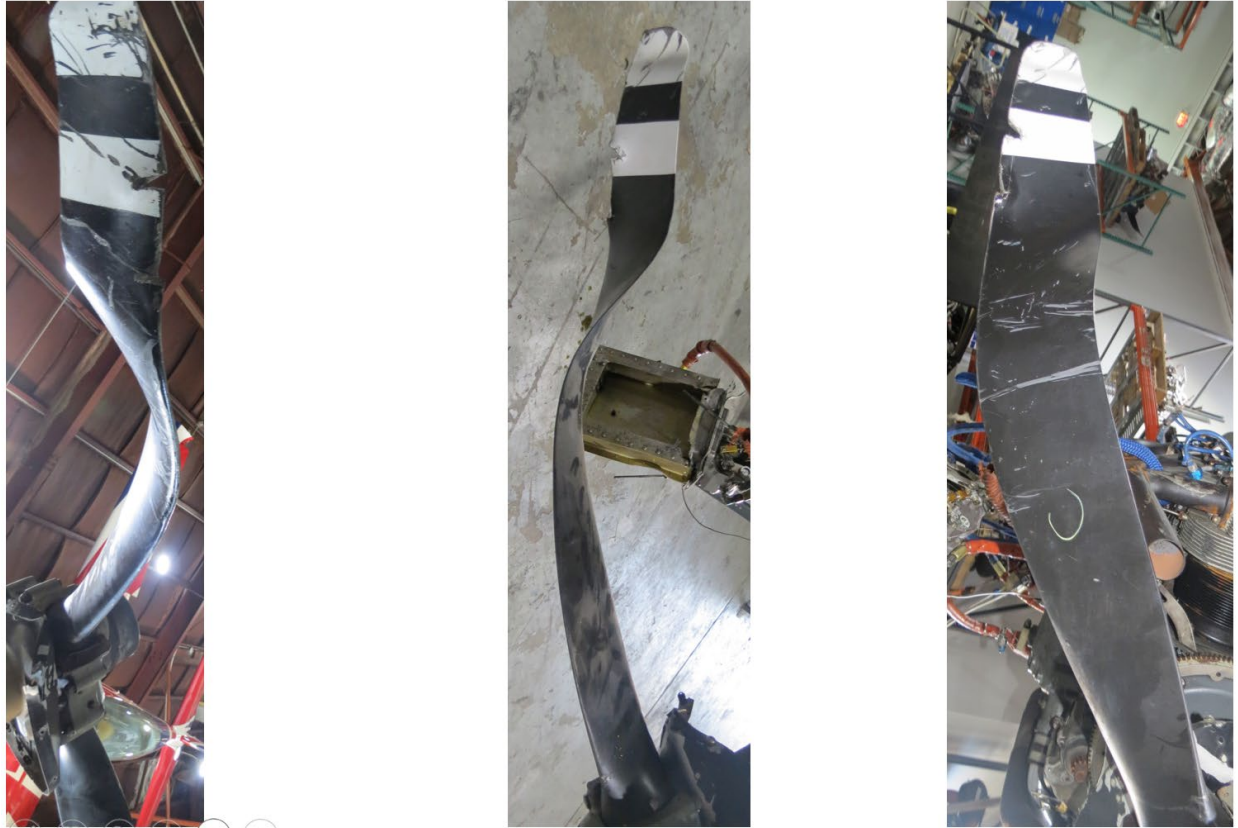


Figure 16 - Propeller Blade "C"

The propeller governor was removed from the engine, and rotated smoothly by hand. The oil screen was absent of debris.

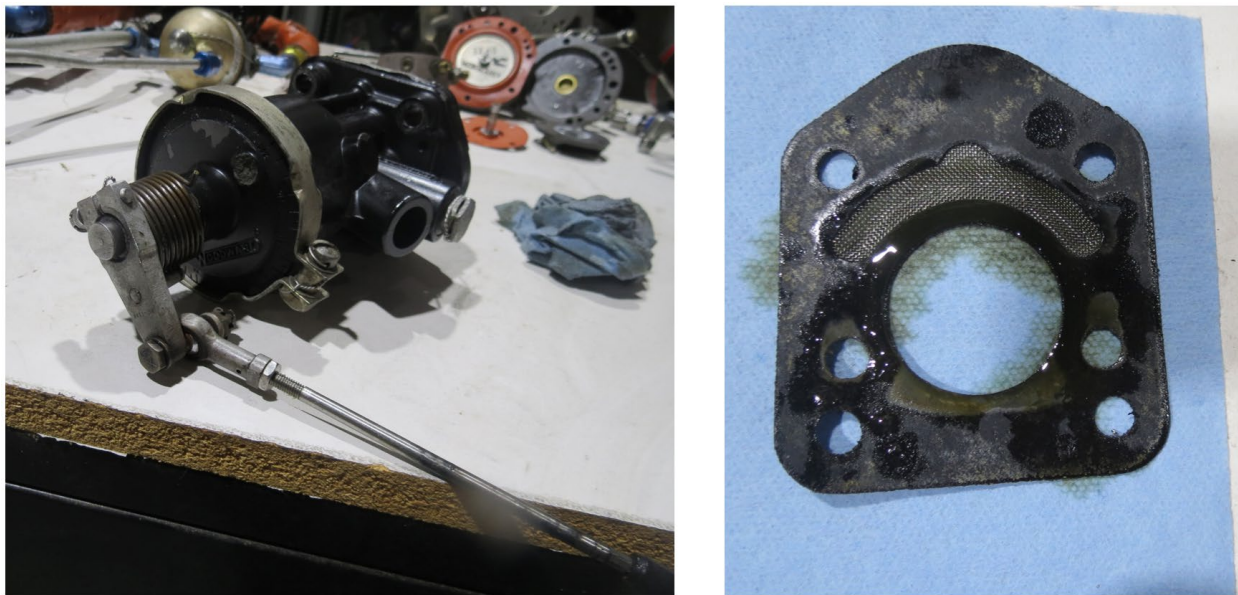


Figure 17 - Propeller Governor (Left) and Oil Screen (Right)

The oil sump was fractured at the right rear corner, a hole about 2x3 inches was present. A borescope examination of each cylinder revealed some water and corrosion in each cylinder, with no damage observed.



Figure 18 - Engine Oil Sump

The crankshaft was rotated by hand at the propeller. Crankshaft and valvetrain continuity were confirmed by observing accessory section gear rotation and valve pushrod/rocker arm motion. With the spark plugs removed, water pumped out of the spark plug holes for several cylinders and the crankshaft was rotated. Water also pumped out of the exhaust manifolds. Thumb compression and suction were observed on all cylinders. The engine oil suction screen was absent of debris. The engine oil filter assembly was fracture separated from the engine and not found.

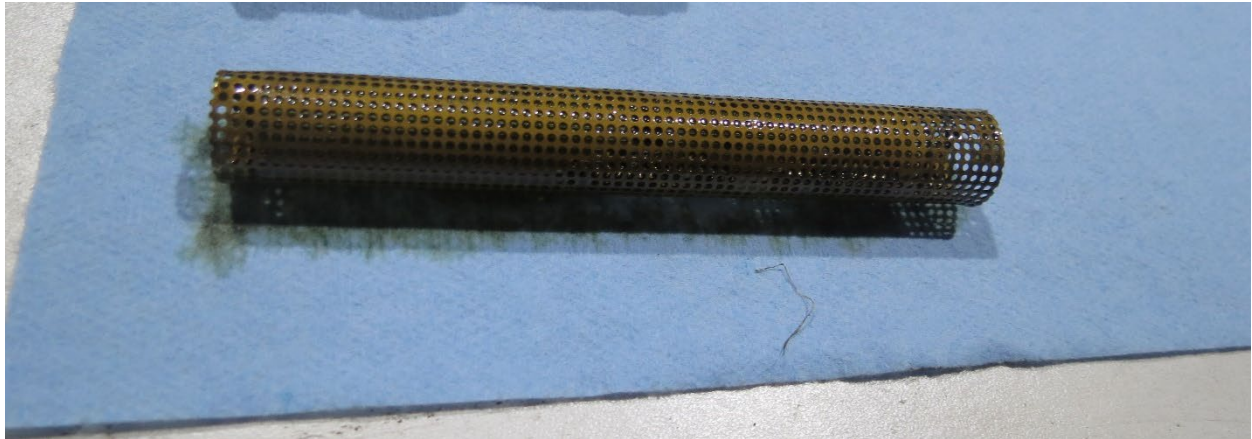


Figure 19 - Engine Oil Suction Screen

The throttle cable and mixture cable ends remained attached to their respective control arms on the fuel servo, and were separated about 6" from the rod end connector. The fuel servo was separated from the engine and fractured across the throttle bore. The fuel lines from the servo to the engine driven fuel pump and the fuel flow divider remained in place.



Figure 20 - Fuel Servo

The servo fuel regulator section was partially disassembled and no damage to the rubber diaphragms or other internal components observed. The regulator cover brass plug was secure. The servo fuel inlet screen was unobstructed.

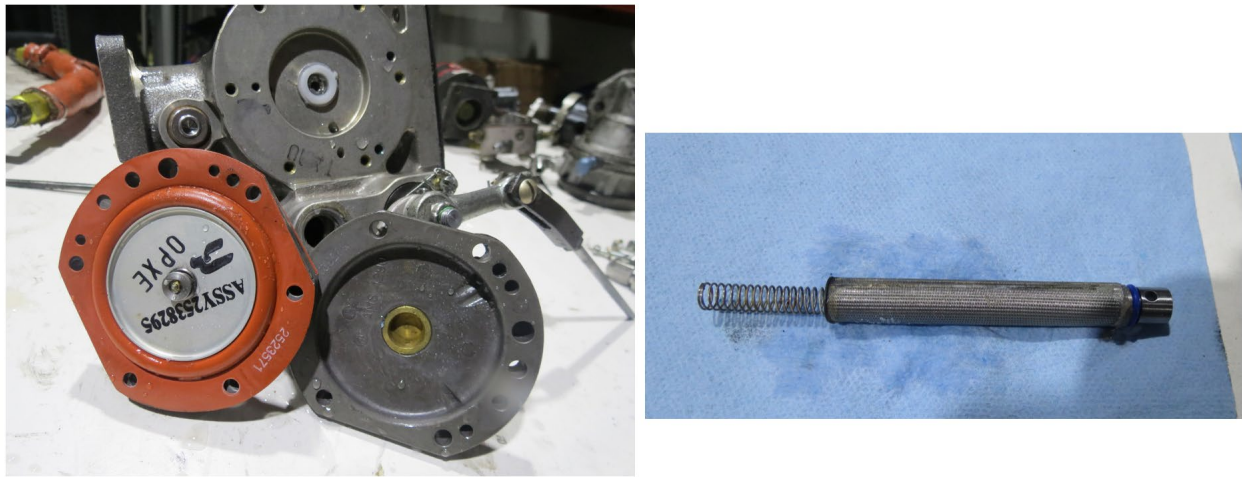


Figure 21 - Partially Disassembled Fuel Servo (Left) and Fuel Inlet Screen (Right)

The fuel flow divider remained attached to the engine and no damage was noted. The associated fuel hose and fuel injector lines were secure. The flow divider was partially disassembled, and no obstructions observed. The rubber diaphragm was intact.

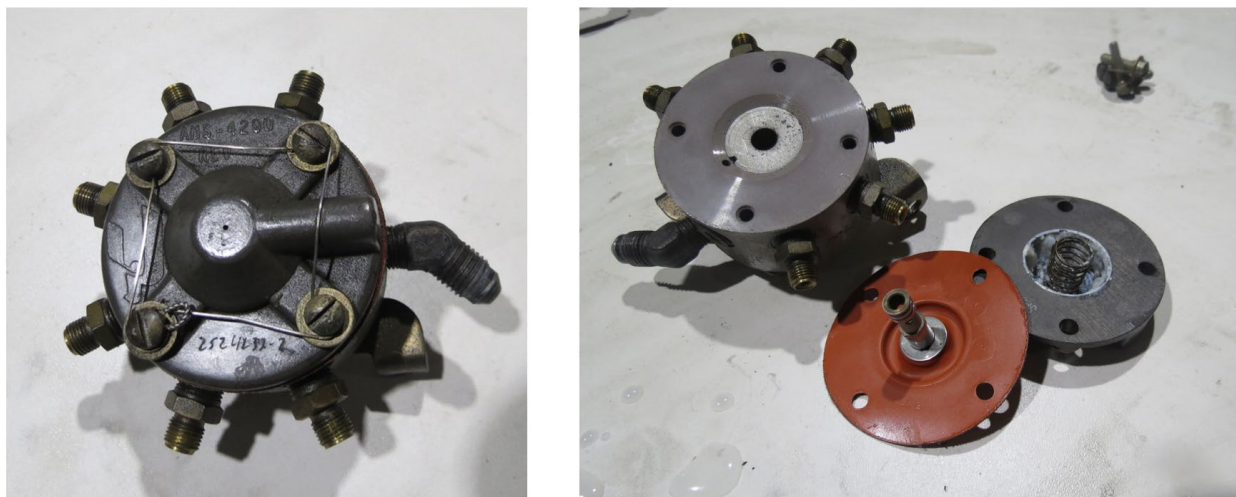


Figure 22 - Fuel Flow Divider - Intact (Left) Partially Disassembled (Right)

The fuel injector nozzles remained attached to the engine and no damage was noted. The #1, #2, #4, #5 and #6 nozzles were of a two-piece design. The #3 nozzle was of a 1-piece design. All the nozzles were unobstructed.



Figure 23 - Fuel Injector Nozzles

The engine driven fuel pump remained attached to the engine and was impact damaged. The pump was actuated by hand and produced air at the outlet port. The pump was partially disassembled and no damage to the rubber diaphragms or internal check valves noted. Corrosion was observed on the check valves.



Figure 24 - Engine Driven Fuel Pump - Intact but Damaged (Left) Partially Disassembled (Right)

Water and liquid with an odor consistent with aviation gasoline was observed in the fuel injector servo and in the engine driven fuel pump.

There was some damage to the ignition harness however the leads remained attached to the spark plugs and the magnetos. Both magnetos remained intact, in place and were undamaged. The left magneto was an aftermarket electronic unit. Water drained from the left magneto when a plug was removed from the housing. When rotated, the left magneto did not produce spark (it likely may require electrical power to function, which was not applied). The right magneto produced spark on all 6 ignition leads when rotated with an electric drill.

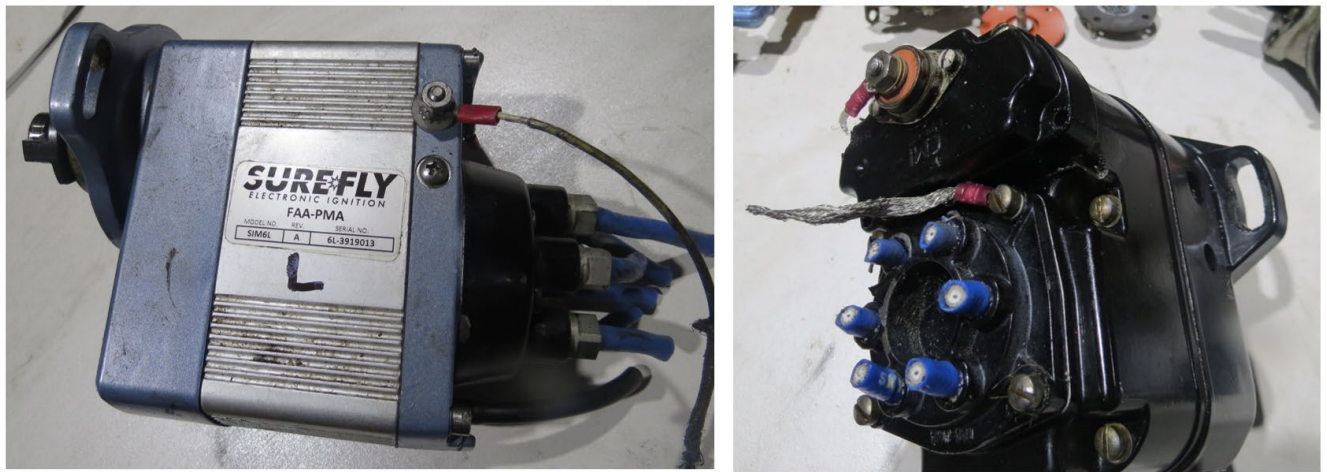


Figure 25 - Left Magneto (Left) and Right Magneto (Right)

All spark plugs exhibited some water and/or corrosion products. None of the electrodes were damaged, and all appeared "worn-normal" as compared to a Champion check-a-plug chart.



Figure 26 - Spark Plugs - No. 1 through 6 Left to Right

Submitted by:

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