

100-Hour/Basic Type of Engine Examination
N6577A Continental Engine

Conducted by Mark Ward ASI NTSB [REDACTED]

October 12, 2022

At Owner's Hangar [REDACTED] Wasilla AK

Start time: 1000am AKDT

End Time: 1230pm AKDT

Visual Documentation:

- Overall Engine Damage (cylinder damage, crankcase damage, pre-impact fire, etc.)
 - **Cylinders looked undamaged**



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- Engine Mount(s) Condition – **Impact damage to the left engine mount tube.**



- Engine Accessories (what is separated, what is still attached, and are they 100% secure to their mount?) – **All engine accessories were secure to their mounts.**
- Verify all fuel/oil lines are secure – **All lines were secure except for the lines removed by the FAA during their inspection.**
- Verify Throttle/Mixture/Carb heat/Propeller Governor control positions on the engine and obtain continuity to the cockpit controls (if able) – **Cable continuity was established from the cockpit to where the FAA disconnected the Throttle and Mixture on the carburetor.**
- Verify engine oil level (if the engine/oil supply tank is level) – **The engine was not level it was sloping to the left. Oil level was high enough to fill all left side valve covers with oil. The oil was light brown color, looked like oil had been recently changed.**

Remove Items Prior to Rotating Crankshaft:

- Disconnect all spark plug wire ignition leads (top and bottom) **Completed**

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- Remove and label all top spark plugs (label what cylinder they came from!) **Completed except for the # 2,4,6 bottom sparkplugs due to cylinders full of oil from the sloping engine.**
- Inspect spark plug electrode for mechanical damage. Damaged electrodes could be an indicator of foreign object ingestion or internal mechanical malfunction of the engine. **All top sparkplugs and bottom sparkplugs #1,3,5 sparkplugs had undamaged electrode in normal condition.**



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- Disconnect the magneto primary "P" ignition leads **Completed**
- Remove all cylinder rocker box covers – **Removed all cylinder valve covers, moved crankshaft - all intake and exhaust valves moved the same amount. Everything looked normal and in new condition.**

Internal Continuity:

- Borescope all cylinders (if able) – **Did not do**
- Rotate the crankshaft in the direction of normal rotation by hand using the propeller - **Completed**
- While rotating the crankshaft, verify all pistons are moving within the cylinders and accessory gears are moving.- **Obtained thumb compression, in firing order on all cylinders.**
- While rotating the crankshaft, observe the rocker arm movement on all cylinders for the intake and exhaust (should be equal movement up and down). – **Confirmed, everything moved normal**
- Obtain "THUMB" compression and suction on all cylinders by placing thumb lightly over the top sparkplug hole and rotating the crankshaft through by hand. **Confirmed**
- While rotating the engine crankshaft, verify spark on all ignition harness leads if mags are impulse coupler equipped – **Verified spark from the leads**
- If both magnetos remained attached to their mounts, verify engine to magneto timing if able. – **This was conducted by Wick Air INC. According to the owner, the mag timing was slightly off but still in the acceptable range.**

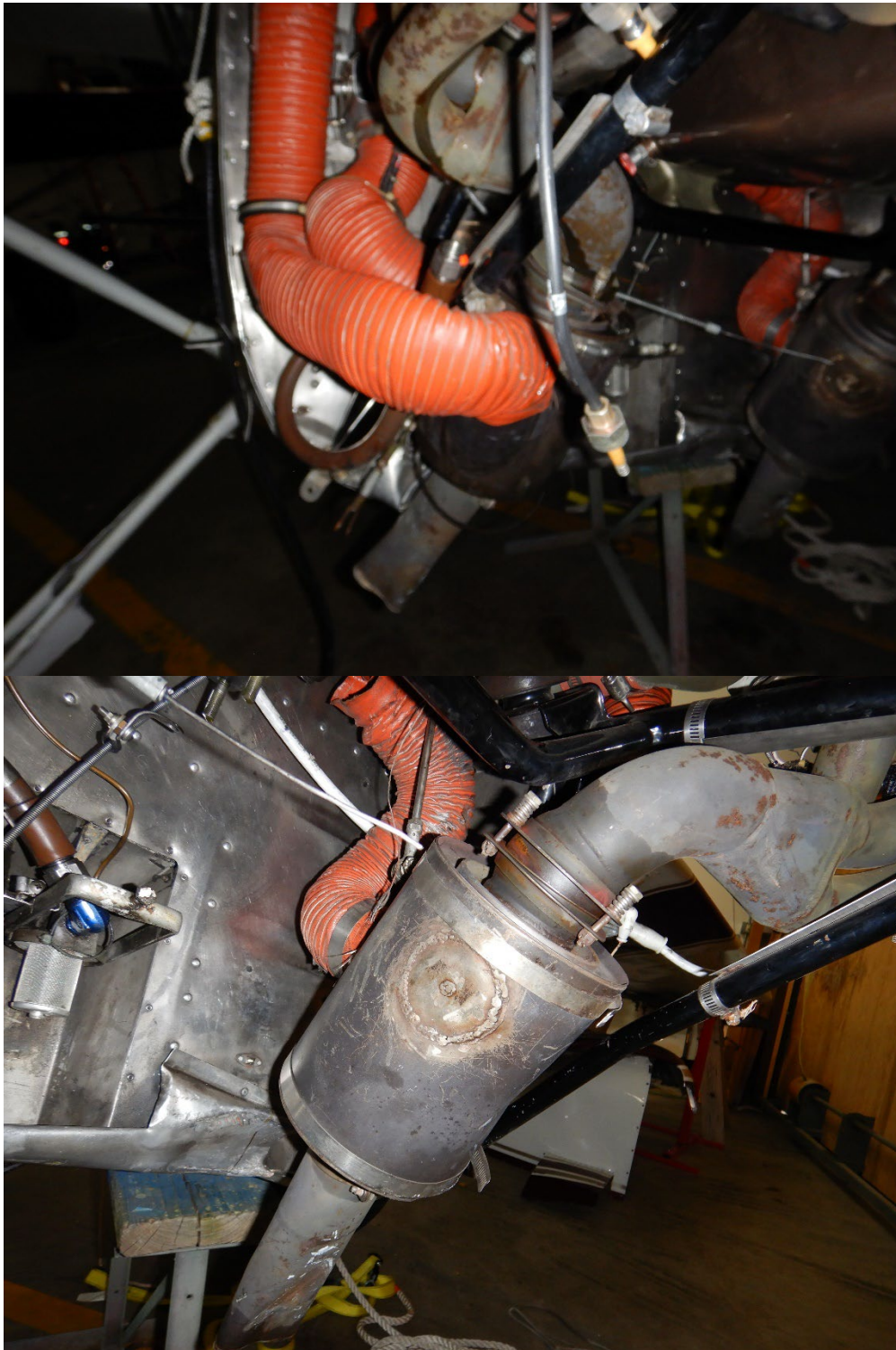
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Induction / Exhaust System:

- Document the air intake tubes/ air filter-screen for overall condition, damage, blockages, and leaks. **None found**
- Document the exhaust system for overall condition, damage, ductile bending. Also be sure to inspect the exhaust gas path for possible oil film, soot. Attempt to inspect internal exhaust baffles to see if they are in place (they can separate and restrict air flow, thus reducing engine performance). **The exhaust looked undamaged except for impact damage to the exhaust tips. Looked up into the exhaust and it looked normal.**



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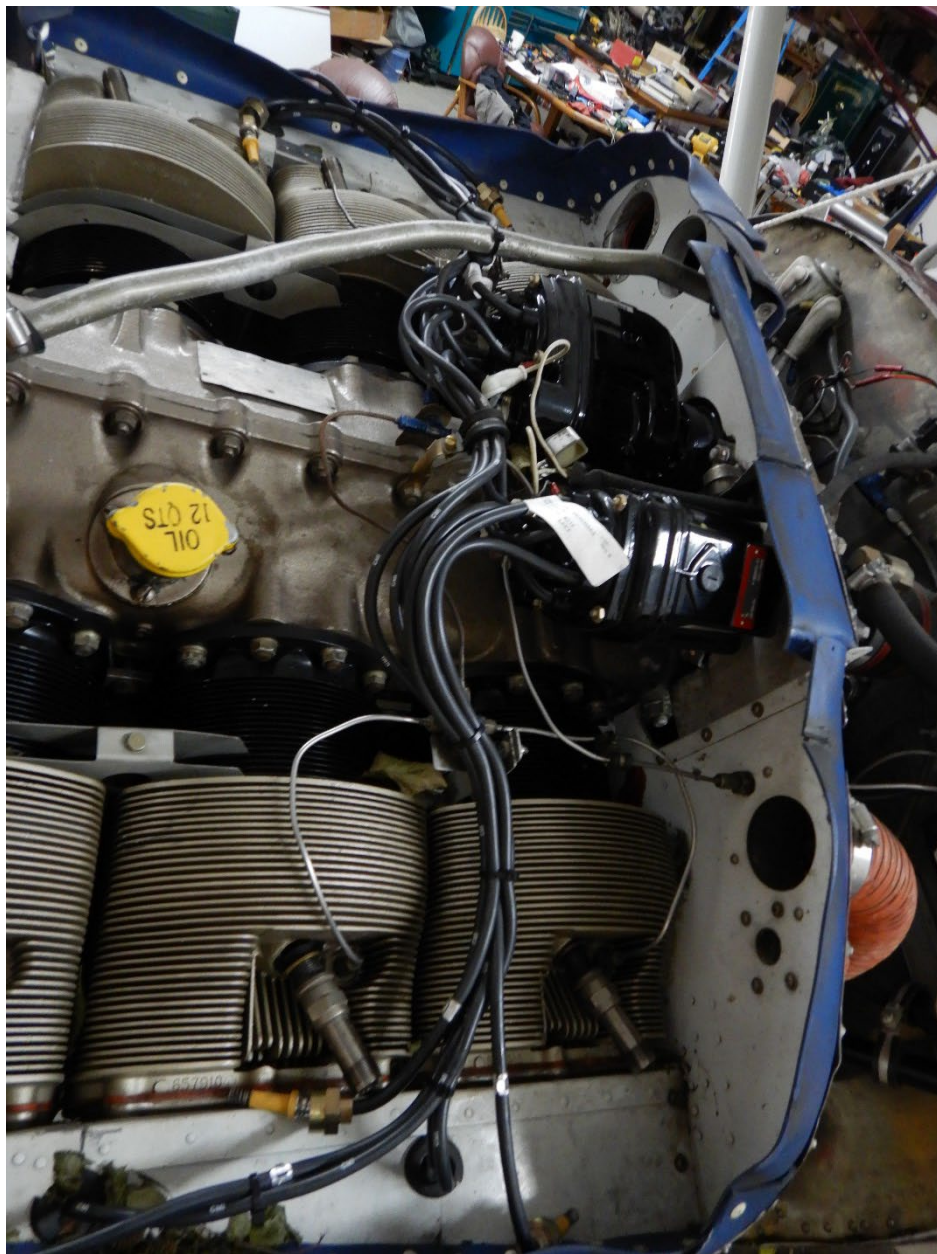
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Accessories:

Ignition System / Magnetos:

- Examine the magneto drive shaft and associated gears for security/damage/wear. – **After getting spark from the Mags, did not investigate further as Wick Air Inc had already looked into the mags.**
- Document the ignition harness. Check for impact or any preexisting damage.- **Wiring harness was undamaged in new condition.**

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Fuel System Components: - **This was completed by the FAA. I did ask the owner what fuel he uses. He uses 100L which is stored in a 500-gal tank at his hangar. The fuel is from Hinchinbrook Aerofuel LCC out of the Palmer Municipal airport.**

Below is the FAA statement on their inspection of the engine.

Here is a brief synopsis of the engine inspection on N6577A and to determine if there was fuel present in the carburetor. All work performed by the registered owner's mechanics with FAA ASI on scene.

Cowling was removed to gain access. No signs of oil leakage or compromise of the oil system was evident. The engine case halves were intact as was all cylinders. Both right side engine mount standoff brackets were broken as a result of the crash. Throttle & mixture linkage was intact and operational from cockpit controls to the carburetor. Main fuel line to carburetor was removed and fuel was present. Main fuel shutoff valve in cockpit was selected from OFF to BOTH and more fuel drained from main fuel line. (Approx 2oz)

The decision was made to remove carburetor from engine/intake manifold to determine if fuel was present in the carb and to gain access to main fuel gascolator. Carburetor was removed and it was noticed that fuel sprayed into to the carb venturi when the throttle linkage was moved indicating that fuel was present in the carb and the fuel accelerator pump was operating. The Gascolator was accessed and disassembled revealing a pinkish-red fuzz material on the strainer screen (see attached pics). Not enough material was present to obstruct fuel flow, but there was a foreign material present none-the-less. Minimal amount of debris was found in the fuel strainer.

It was not determined how much fuel was onboard the aircraft due to the amount of time the aircraft had sat at the crash site and at the angle it was resting in the hangar during this inspection. From the pilot's account and pictures taken at the scene, the aircraft came to rest in a nose low, left wing down position and the possibility of fuel draining/leaking out was present and evident from fuel stains on the aircraft. There was a minimal amount of fuel noted in the tanks at this inspection.

It was determined that there was continuity for the fuel system from the main fuel shutoff valve in the cockpit to the gascolator/strainer screen, to the carburetor. Minimal fuel was present in all these components.

Carburetor Equipped Engines: - **Conducted by the FAA**

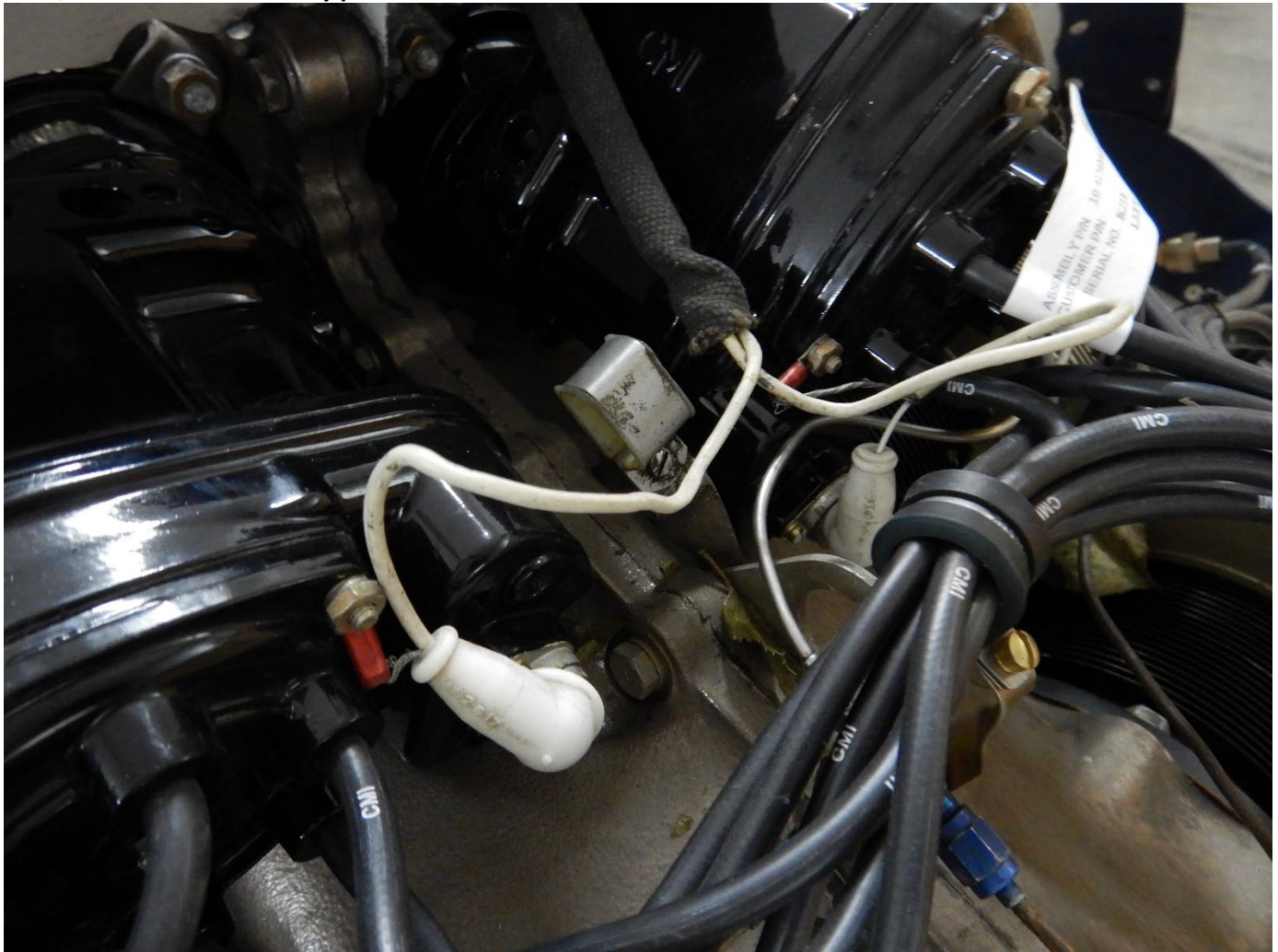
- Verify fuel lines to the carburetor are secure.
- Remove carburetor from the engine (if still attached)
- Actuate the throttle arm from stop to stop and verify that the accelerator pump functions (if equipped).
- Verify the mixture arm moves stop to stop (if equipped). Also, it is fairly typical on Stromberg carburetors to either not have a mixture arm or it'll be safety wired full rich.
- Remove the fuel inlet screen and verify it is free of debris.
- Disassemble the carburetor
- Note the condition of the floats, needle valve, needle valve seat, float bowl
- Inspect for visible contaminants and water within float bowl. Utilize water finding paste as needed.
- Check the fuel primer system (lines/plunger) for leaks and general function.

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- Verify the fuel pump and fuel lines to and from it are secure (if equipped. Some engines have a low pressure fuel pump to supply fuel to the carburetor. These are usually work with an arm which rides on the camshaft.)
- Verify throttle plate moves when the throttle arm is actuated from stop to stop and that all linkages are intact and secure.
- Verify mixture arm movement from stop to stop.
- When examining an engine with an engine driven fuel pump (Continental's), pay attention to the fuel pump drive coupling. This coupling has a sheer point and if it is not removed prior to rotation of the engine, it could shear when the crankshaft is rotated. This is specifically common

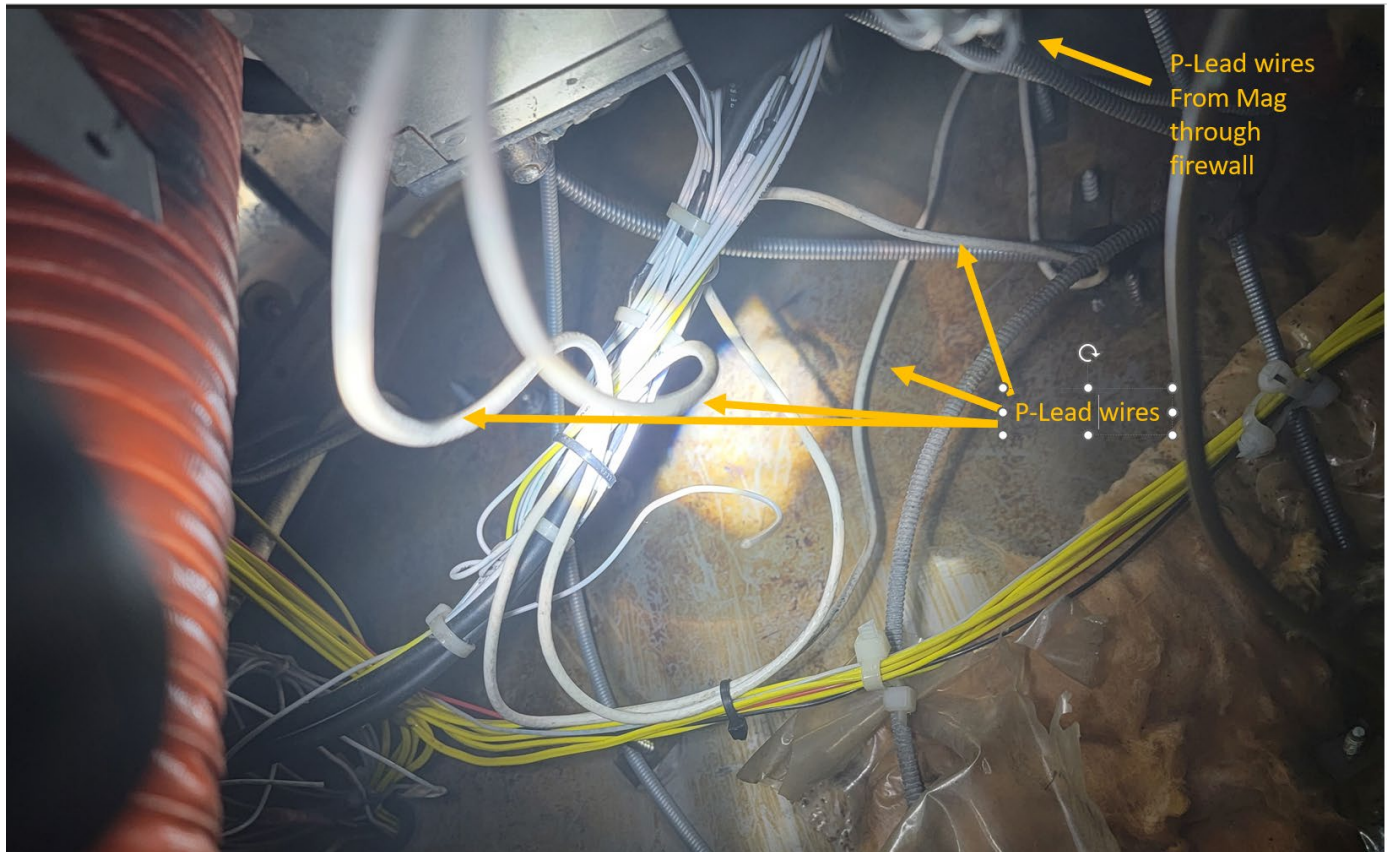
Wiring from/to the Mag. Wiring (Ground P-Lead) was traced from the Mag to the firewall and was in good condition. It could be seen entering the cockpit area but due to the airplane hanging from the hoist, I was unable to see any possible issues.



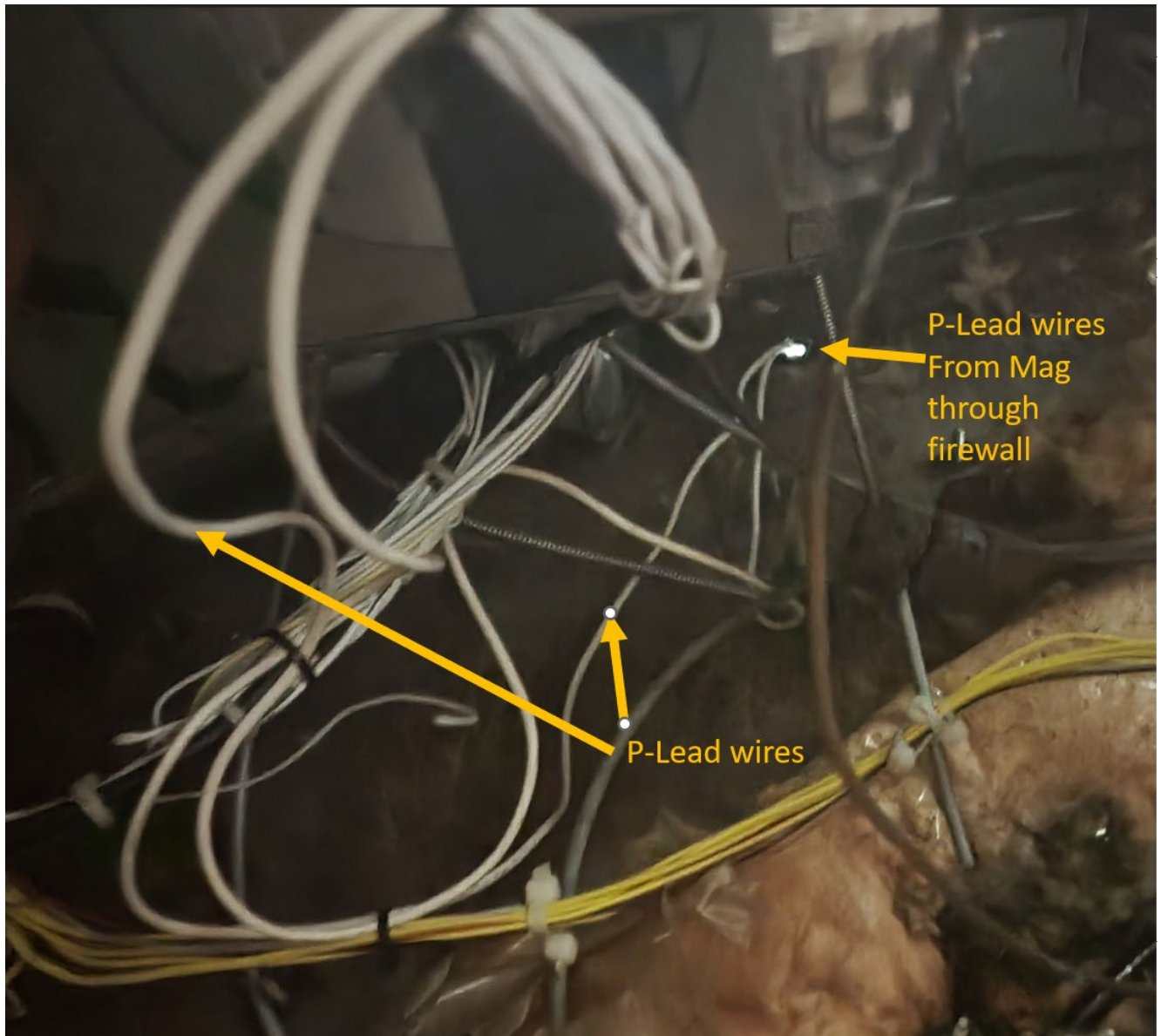
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Looking up under dash

Unable to get into the airplane because it was hanging from hoist.

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Additional photos



Right Mag

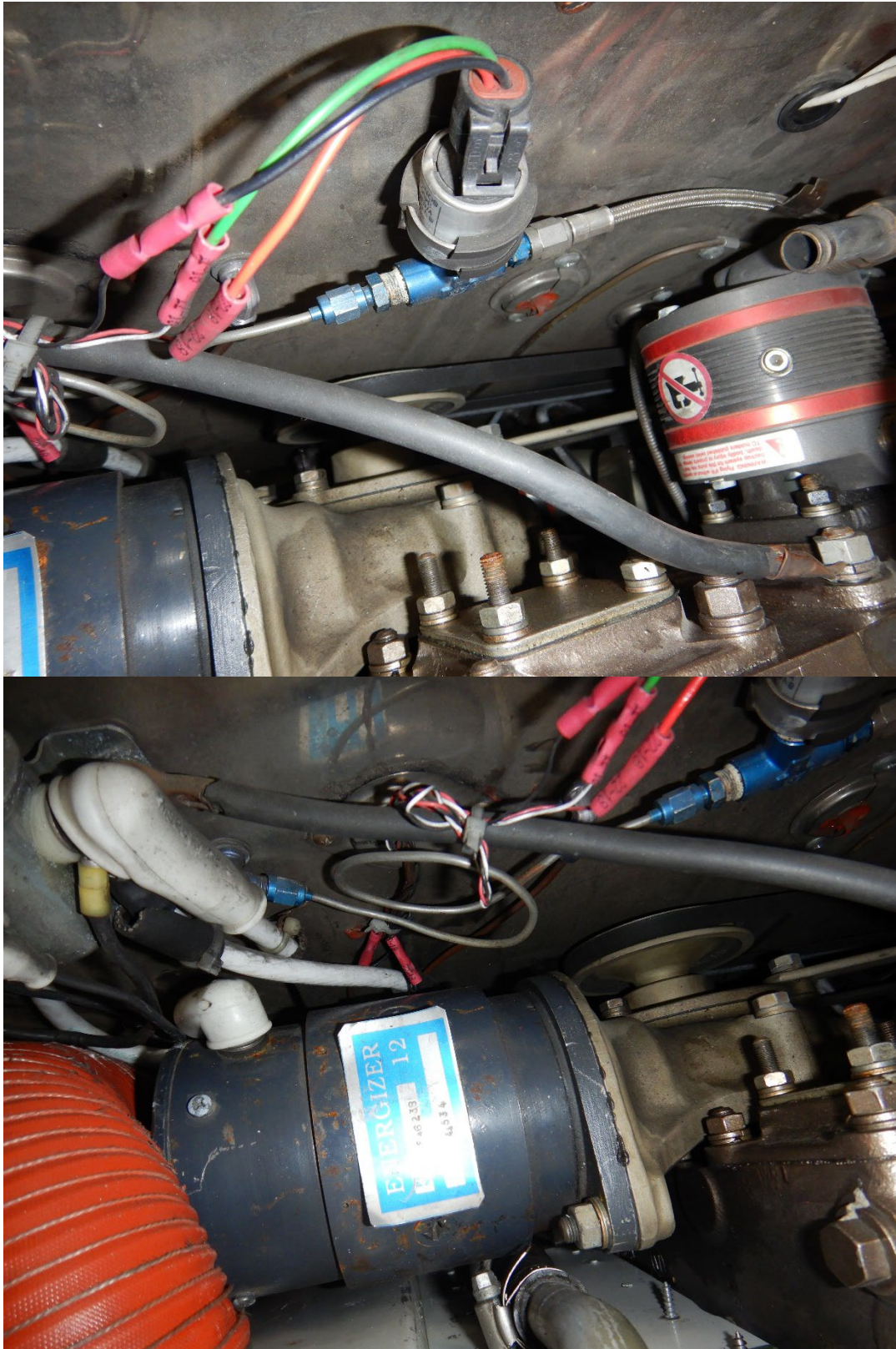
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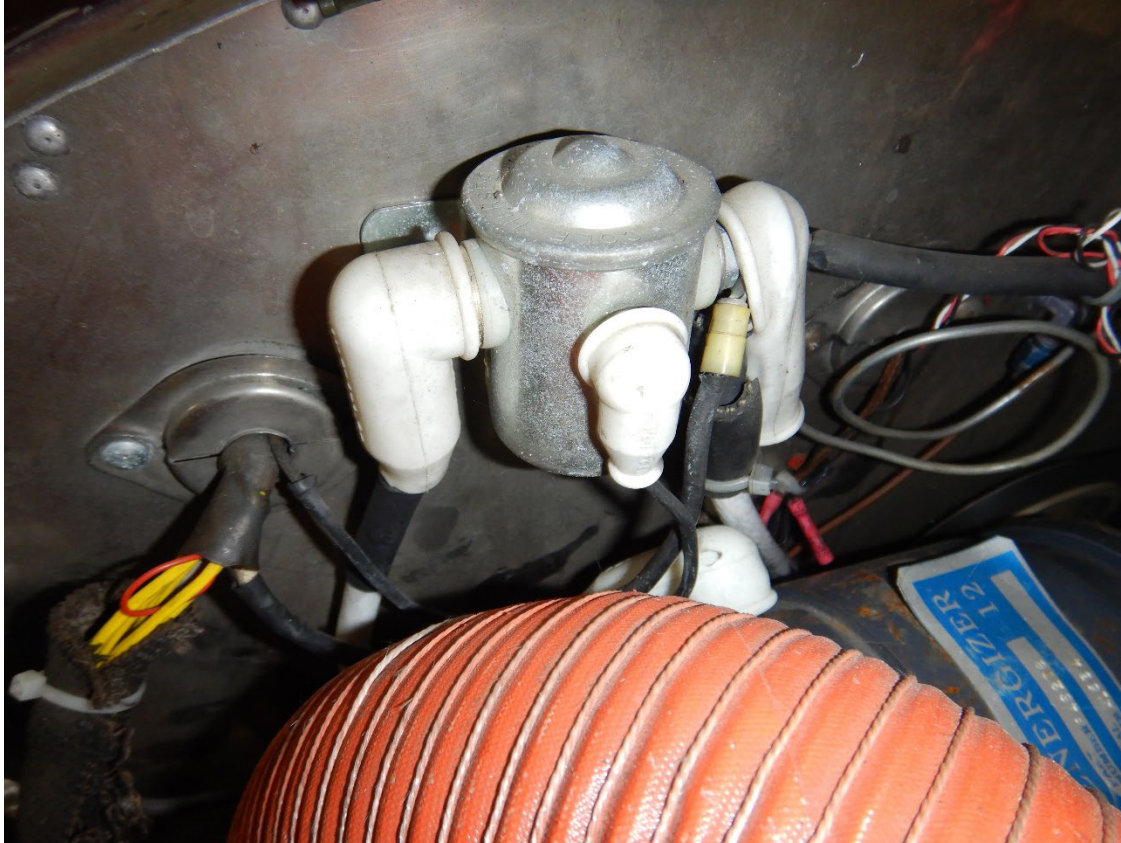
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