

ERA22LA309
N9556H, Cessna 172M,
Lancaster, Ohio, June 22, 2022

N9556H Wreckage Examination Requested Items:

INSPECTION CHECKLIST

1. Document with notes and photographs the left wing fuel tank sump drain part number
P/N CAV-170 (note pictures in folder "Left wing Sump Drain")
2. Take sample of fuel from left fuel tank into clean glass jar and document any contamination
The airplane has been sitting at an angle with the right wing low and we retrieved no fuel from the left tank.
3. Document with notes and photographs the right wing fuel tank sump drain part number
P/N CAV-170 (pictures in folder "Right Wing Sump Drain").
4. Take sample of fuel from right fuel tank into clean glass jar and document any contamination
Right wing showed no contamination.
5. Verify left fuel cap is a vented cap and free of obstructions
Verified cap was vented and appeared free from obstructions. (note photos provided)
6. Verify right fuel cap is a vented cap and free of obstructions
Verified cap was vented and appeared free from obstructions. (Photos provided)
7. Verify the position of the fuel selector valve and if it is in a detent (Inspector Lands and I noticed the fuel selector valve slightly off center and moved the valve to see it was in the detent. Although stiff it did feel to be in the proper detent.)
8. Move fuel selector off and then drain the airframe fuel strainer into clean glass jar documenting the quantity and quality of fuel.
We were unable to rotate Fuel Selector due to impact damage.
9. Verify primary fuel vent line and tank crossover vent lines are free of obstructions per Paragraph 12-11 of MM Chapter 12.
Completed inspection of primary fuel vent line IAW Paragraph 12-11 of MM 12. No deficiencies noted.
10. Inspect the air induction system and verify no collapsed ducts, hoses, blockage, etc.
Inspection of the air induction system revealed significant damage. It appears this damage was impact damage resulting from the aircraft crash.
11. Visually inspect the exhaust system to verify no blockage or obstruction
Inspection of the exhaust system did not reveal any blockages or obstructions. However, a slight deformity of the #3 cylinder exhaust tube was noted. This appeared to have occurred due to impact during the crash.

Reference folder titled Exhaust Pipe

12. Verify throttle and mixture control positions at carburetor first, then document continuity from the cockpit and corresponding movement at each control lever.
The throttle and mixture control continuity was satisfactory. In addition, the carb heat continuity appeared satisfactory.
13. Drain the carburetor bowl into clear glass jar documenting quality and quantity of fuel.
Noticed a slight contamination of a black particulates in the fuel.

Reference folder titled Carb Inlet Screen

14. Document the engine model and SN from the data plate

Reference folder titled Engine Data Plate

15. Inspect carburetor inlet screen for blockage, etc.

Inspected carburetor inlet screen and noticed significant amount of fibrous material at the end of the inlet screen opposite direction of fuel flow. The sides of the inlet screen was clean. Did not notice any black particulate material on screen.

Reference folder titled carb inlet Screen

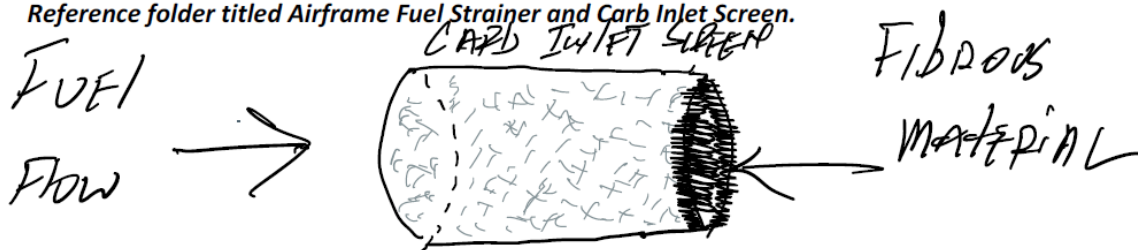
16. With fuel line disconnected at carburetor inlet, briefly move fuel selector to left, right, and both positions and document fuel flow out separated hose. If no flow isolate what side(s) are not flowing.

The fuel selector valve will not move from center "BOTH" position due to impact damage. It appears during the crash the nose wheel folded back impacting the area that houses the fuel selector mechanism.

17. Review results. If no issues found then ...

To recap, the aircraft has been tilting roughly 15 to 20 degrees to the right for several weeks. This has caused all the fuel to move into the right wing. No fuel was able to be obtained from the left wing sumps. The right wing sump showed no contamination and had the color and consistency of 100LL. The fuel selector valve had been damaged in the impact and would not rotate from center position. The fuel sump handle had been damaged due to the crash and would not sump fuel. The fuel strainer was disassemble and fuel was drained from the strainer. This fuel had the color and consistency of 100 LL. However, it contained a small amount of black particulates. Inspection of the screen assembly did not show any black particulates adhering to the screen. However, there was a small amount of fibrous material on the screen and dark discoloration on the bottom of the bowl. In addition, the standpipe had significant damage to the lower portion. Perhaps this is the source of the black particulates. Fuel was removed from the carburetor. It too had the color and consistency of 100 LL. However, it too had a small amount of black particulates. An inspection of the carburetor screen filter did not show any black particulates adhering to the screen. However, there was a significant amount of fibrous material pack at the end of the screen filter opposite the direction of fuel flow.

Reference folder titled Airframe Fuel Strainer and Carb Inlet Screen.



Due to the various fuel system contamination noted during inspection. It was decided to pull and inspect the left and right wing fuel screens. Removed left wing fuel filter screen and noted very small amounts of fibrous material otherwise the screen appeared normal. Removed right wing fuel filter and noted a very small amount of fibrous material. Otherwise the screen appeared normal.

Reference folder titled Right Fuel Tank Screen and Left Fuel Tank Screen.

In summary we found some black particulate's in the fuel from the fuel strainer but no black particulates on the filter assembly. We noticed some black particulates in fuel from the carburetor but no black particulates on the carburetor screen filter. We noticed significant damage to the lower portion of the Fuel Strainer standpipe. Perhaps that is the source of the black particulates. There was not

enough fuel to take another sample due to the tilt of the aircraft. It is not believed that this fuel contamination caused the engine failure but further investigation of the black particulates and fibrous material noted in the fuel system is a concern.

18. Remove upper spark plugs from each cylinder, annotate position on each with permanent marker (such as 1T, 2T, 3T, 4T), then place in plug tray for color and gap inspection. Possibly retain for testing.

All plugs gaps were .022 inches. Plugs did not show any significant issues. However bottom plugs on the #1 and #3 cylinders had accumulated oil and were wet. All other plug appeared dry and within specs.

Reference folder titled Top Spark Plug and Bottom Spark Plugs

19. Verify all lower spark plugs leads are marked for the appropriate cylinder, document if they are tightly installed, and remove all leads from the lower spark plugs.

All leads appeared to be correctly installed to the appropriate cylinders. All leads were tightly installed. No issues noted.

20. Verify all lower spark plugs are tightly installed.

All lower spark plug were tightly installed. However a significant amount of oil had accumulated on #1 and #3 plugs. Suspect the tilt of the aircraft caused the oil over time to accumulate in the cylinders and plugs. Top plugs of the #1 and 3 cylinders were dry.

21. Remove all cylinders rocker box covers and inspect for broken parts, etc.

Inspected exhaust and intake valves. No issue's found

Reference folder titled Valves 1 and 3 and Valves 2 and

22. With ignition switch off, rotate crankshaft in the direction of rotation and verify thumb suction and compression in each cylinder and crankshaft, camshaft and valve train continuity.

Thumb suction and compression was satisfactory on all cylinders. No fault found with the crankshaft, camshaft and valve train continuity.

Reference folder titled Valves 1 and 3 and Valves 2 and 4.

23. Document quantity of oil in engine.

Aircraft was titled about 20 degrees to the right for several weeks so oil quantity from the dipstick was unreliable. However, over six quarts was indicated on the dip stick. The engine oil look clean and fairly new with proper consistency

24. Verify both magnetos are tightly installed and do not move on the accessory case.

Magnetos were tightly installed. No issues noted.

25. Verify magneto to engine timing of each magneto reference to specification on the engine data plate.

Confirmed proper Magneto timing was 25 degrees as stated on the engine data plate. No issue noted.

26. With spark plug from all cylinders removed but attached to the spark plugs leads and ignition switch on the both position, rotate crankshaft in the direction of rotation and verify spark at all spark plugs.

All spark plugs sparked with the help of the impulse coupler on the left magneto. We removed the right magneto and spun with drill and all plugs sparked. P leads tested satisfactory as well as the ignition switch.

27. Borescope each cylinder noting condition of piston and cylinder.

Some moderate scoring on wall of cylinder #1. Some rust and minor scoring was noted on cylinders #2 and 3 and 4. Did not note any significant issues that would prevent the aircraft from running.

28. Determine run-out of the crankshaft flange to see if the engine can be safely run with a different propeller installed.

Crankshaft flange measured satisfactory

29. Review results.