



NATIONAL TRANSPORTATION SAFETY BOARD

Eastern Region – Ashburn, Virginia

Summary of Engine Examination – ERA21LA187

On May 10, 2021, I provided oversight on a Lycoming IO-360-L2A engine installed on N60457, a Cessna 172S. This airplane was operated by Florida Flight Training Center, Venice, Florida. According to the operator, the airplane experienced a sudden loss of power in the traffic pattern and had to make an off-field landing in a residential area. The airplane came to rest with the engine and forward fuselage submerged in a freshwater pond. The operator stated the airplane was recovered about 18 hours after the accident, and moved to their maintenance facility, Florida Flight Maintenance, at the Venice Airport, Venice, Florida, where it was stored outside of the maintenance hangar. Both wings had been removed for transport and about 35 gallons of fuel had been drained from each fuel tank into a large clear container. The container was sealed and stored in the maintenance hangar. Visual examination of the fuel revealed that it was blue, and absent of debris and water.

The engine was then examined and test run. The following observations were made:

- 1) The engine remained secured to the airplane along with the two-bladed propeller. One blade appeared straight and the other had a slight bend aft.
- 2) After the cowling was removed, visual examination of the engine revealed all major accessories were intact and secure. All fuel lines were securely attached, and there were no obvious mechanical issues. Fuel samples were taken from the belly sumps, and firewall fuel filter. The fuel was blue and absent of debris and water. Operation of the throttle and mixture control cables were visually and mechanically verified from cockpit to engine.
- 3) The bottom spark plugs were removed, and dark water was observed draining from 3 of the 4 cylinders. The spark plugs were dark in color and three of the plugs exhibited some corrosion and debris from being exposed to water. The valve covers and the ignition leads for both magnetos were removed, and the propeller was manually rotated. Valve train continuity was established on each cylinder and the couplings for both magnetos could be heard clicking. However, spark was only observed to two of the left magneto's ignition leads as the propeller was rotated.
- 4) A compression gauge was used to check compression on each cylinder. Each cylinder produced less than 20 psi. The bottom plugs were then cleaned and reinstalled. The top plugs were then removed, and they too appeared dark and exhibited corrosion and debris. A borescope was used to inspect each cylinder and no abnormalities were observed.
- 5) A gas tank was plumbed to the right-wing fuel port and a new battery was installed.

- 6) Continuity of the fuel system was established by using the electric boost pump to pressurize fuel from the cockpit to the injector lines for each cylinder.
- 7) The top spark plugs were cleaned/re-installed and the engine was prepared to be run.
- 8) Several attempts were made to run the engine, but it would not start, and the problem was isolated to the magnetos. A timing check revealed the right magneto's points were not closing.
- 9) The magneto caps were removed to the left and right magnetos, and corrosion was observed in the cap and interior housing of the magnetos. The right magneto was removed from the engine and water/corrosion was observed. An attempt was made to dry the magneto and remove any visible corrosion with a fiberglass pen. The magneto was reassembled and placed back on the engine and timed. The engine would not start.
- 10) A brand-new right-hand magneto was placed on the engine and timed. The engine started immediately and was run thru its full power band for several minutes without interruption. A video of the first 30 seconds of the engine run were captured and provided in addition to this report.

Excluding the presence of water and corrosion due to the engine being submerged for several hours after the accident, no mechanical deficiencies were observed that precluded the engine from operating.

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