

Shaun Williams
Senior Aviation Accident Investigator
Office of Aviation Safety - Central Region

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Subject: CEN22FA131 Engine Examination Summary

On November 30, 2022, the engine from N3952W was examined with a representative from the Federal Aviation Administration and a representative from Lycoming Engines present.

The two bladed constant speed propeller blades remained captured in the hub and the hub remained attached to a fragment of the crankshaft propeller flange. The propeller blades exhibited aft bending and leading edge damage consistent with impacting terrain and trees.

The carburetor was impact separated from the lower side of the engine and sustained high impact damage in the form of cracks and missing portions of material and fittings. The fuel inlet fitting and its respective threads on the carburetor body were missing. Only a small portion of fuel inlet screen remained within the unit. A large portion of wood was lodged within the carburetor throttle body so actuation of the throttle plate was not possible. Each brass float showed signs of hydraulic crushing, no fluid was present within the float bowl at the time of the exam.

The engine driven fuel pump remained attached to the accessory section of the engine. The pump housing exhibited impact damage in the form of a crack and missing material on one port. The pump was removed and actuated in a vice to test overall function. Suction and compression was confirmed when actuated by hand at the respective ports. The same fitting used on both ports during test as one fitting was not located within wreckage.

The right magneto sparked at all leads when rotated using electric drill. The left electronic magneto could not be checked due to lack of external power source at exam.

The spark plugs were removed and found to all have varying amounts of corrosion consistent with the water submersion noticed at the accident site. The electrodes were all undamaged and unremarkable. The ignition harness leads sustained varying amount of impact damage and were cut off using pliers during engine exam. The harness and leads were unremarkable.

The vacuum pump rotated freely by hand. The pump was disassembled, and the rotor and vanes were found free from cracks or damage.

The oil suction screen was securely installed to the oil sump. The screen was removed and found to be unobstructed. The oil filter was found tightly attached to the rear of the engine, removed, and cut open to inspect filter element. The filter element showed normal levels of debris consistent with engine operation. The oil sump suffered high levels of impact damage in the form of crack and portions of sump missing.

The engine case showed high levels of impact damage in the form of cracks throughout both case halves allowing loose cylinder base nuts and shroud tubes. All intake and exhaust pipes on the right side of the engine were found to be impact separated from the engine. On the left side, only the number two intake pipe was missing but the others showed signs of impact damage. The number 2 cylinder was observed to have two loose cylinder base nuts that were only finger tight, but these nuts were in alignment with the fractured case halves. The number 1 exhaust pushrod was found missing and the number 5 exhaust pushrod had to be removed to facilitate engine rotation. Subsequent engine rotation was achieved using the vacuum pump drive port to rotate the engine. Continuity was confirmed throughout the engine including the accessory section and propeller governor drive.

No conditions were observed during the course of the engine examination that would have precluded normal engine operation.

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