



Memorandum for Record

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Date: 2/25/2020

Subject: CEN20FA098 Wreckage Examination

An examination of the wreckage was conducted by the NTSB IIC on 2/25/2020. The accident site was located on the east end of a private grass airstrip located about three miles west of North Manchester, Indiana. The helicopter wreckage came to rest on its right side. Both aluminum main rotor blades (MRB) remained attached to the rotor mast. One MRB was partially imbedded into the ground and displayed some bending and deformation along its entire length. The second MRB was bent about 70° and exhibited deformation throughout its length. Two impact marks were located on the ground within 3 ft of the nose of the helicopter, one of which was linear. (Figure 1)



Figure 1.

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The fiberglass tail-boom was separated from the fuselage but was retained by the anti-torque control cable. The tail-rotor assembly remained attached to the tail-boom. One aluminum tail-rotor blade (TRB) was mostly straight. The second TRB was separated from the tail-rotor gearbox about 3 inches outboard of the TRB attachment point on the TRB assembly and was located immediately below the TRB assembly in the wreckage. The separation of the TRB was consistent with impact damage.

Flight control to the main rotor assembly is provided through two push-pull control rods connected to the cyclic and one push-pull control rod connected to the collective. Flight control continuity was continuous from the cyclic and the collective to the swash plate assembly. The main rotor mast was folded forward into the cabin area and continuity was broken on two control rods immediately above the swash plate assembly in a manner consistent with impact. Continuity continued from the breaks in the control rods above the swash plate through the rotor mast to the main rotor blades. Flight control from the anti-torque pedals to the tail rotor assembly was provided through a control cable. Continuity was continuous from both pedals to both tail rotor blades.

Throttle continuity was verified from the collective to the dual carburetor assembly. Both carburetors had separated from the engine. With the wreckage in an upright position, between $1/3 - 1/2$ tank of fuel was present in the 12 gallon main fuel tank as verified using the site tube. About 2 inches of liquid was present in the 8 gallon auxiliary fuel tank when checked by dipping the tank with a rod. Liquid sampled from the main tank was clear of contaminants and water when visually examined. The smell of the liquid from both tanks was consistent with automotive gasoline. Two inline fuel filters were installed on the firewall. Both filters contained liquid consistent with fuel and no contaminants or obstructions were visible.

One sparkplug was removed from each cylinder and both sparkplugs exhibited normal usage patterns. Engine continuity was verified by rotating the radiator fan and observing both pistons move in each respective cylinder and observing the output shaft on top of the engine rotate. Engine compression was verified on each cylinder by placing fingers over the vacant sparkplug holes as the engine was rotated. The helicopter was equipped with a Tiny-Tach GasTach and Hourmeter which displayed 22:06 at the time of the accident.

No pre-impact anomalies were noted with the airframe or engine during the examination.