



NATIONAL TRANSPORTATION SAFETY BOARD

Eastern Region – Ashburn, Virginia

RECORD OF EXAMINATION - Engine

Aircraft: N7TL

Date of Examination: October 2-3, 2019

The engine was examined after the airplane wreckage was recovered at Anglin Aircraft Services in Clayton, DE. Present for the examination was the NTSB IIC and a representative from Lycoming Engines, David Harsanyi.

The engine sustained impact damage and the crankcase was cracked. The No. 2 cylinder was displaced, several cooling fins were broken, and the oil sump was separated from impact. All accessories, except the vacuum pump, were found separated from the engine. These accessories included the engine driven fuel pump, the left and right magnetos, the propeller governor, the fuel servo, and the oil filter assembly.

The engine would not rotate when force was applied to the propeller. A lighted borescope inspection revealed large amounts of mud, water, and debris in each cylinder. Each of the cylinder's valves were intact with varying amounts of corrosion present. The top sparkplugs were removed and exhibited light corrosion and color consistent with normal wear as per the Champion check-a-plug chart. The lower plugs were sheared off at the threaded portion of the plug and could not be removed from the cylinder. All exhaust and induction pipes were also sheared off or missing from the engine and the time of the exam.

The front of each crankcase half, around the nose seal area, exhibited large cracks and were missing portions of crankcase material along with large radial cracking around the number No. 2 cylinder portion of the left crankcase half.

The engine driven vacuum pump was removed from the engine and disassembled. No cracks to the rotor or vanes were noted upon disassembly and the shear coupler was found intact and rotated freely.

The accessory housing was removed and revealed a large amount of mud and organic debris inside the housing. Continuity between the camshaft and crankshaft was confirmed with all gears in place.

The oil pump was removed from the housing, disassembled, and inspected. No signs of scoring or metal contamination was present inside the housing or pump gears and overall condition of the pump was consistent with normal operation.

The oil filter was crushed and could not be opened. The date the filter was last installed was written on the side of the filter. The date was November 14, 2017.

The engine driven fuel pump was fractured below the two mounting bolts, but the diaphragm portion of the pump was recovered, disassembled, and examined. No anomalies were noted, all diaphragms were intact with no signs of tears or debris.

The fuel servo was recovered from the accident site but sustained heavy impact damage and was only partially intact. The diaphragm portion of the servo was missing and could not be examined. The fuel inlet screen was removed and contained wet mud inside the screen, very little light passed through the screen when a flashlight was placed on the side of the screen.

The fuel flow divider was present on the top of the engine, removed, and disassembled along with each cylinder's fuel injection nozzle. The fuel flow divider diaphragm was intact with no signs of tears or foreign debris. All four fuel injection nozzles were clear when held up to light.

Both magnetos produced spark when rotated utilizing a cordless drill at all points. The left-hand magneto ignition harness sustained high impact damage to the leads as they exit the rear of the magneto cap. The left-hand magneto had to be tested utilizing the magneto cap and harness leads from the right-hand magneto verifying spark.

The two-bladed propeller remained attached to the engine. Both blades exhibited rearward bending, chordwise scratching, leading edge gouges, and curled propeller tips.

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