NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

Aug 01, 2014

AIRFRAME AND ENGINE EXAMINATION

WPR14FA316

A. ACCIDENT

Location:	Lolo Pass, Idaho
Date:	July 28, 2014
Aircraft:	Meyer-Lancair Legacy, N29MM, Serial #: L2K-197
NTSB IIC:	Albert Nixon

B. EXAMINATION PARTICIPANTS:

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C. SUMMARY

Examination of the recovered airframe and engine was conducted on August 1, 2014, at Airlin's Aircraft Service Inc., Bozeman International Airport, Bozeman, Montana. A hole was observed in the upper left portion of the engine crankcase. The cylinder number 1 and 2 connecting rods were observed to be broken. No addition evidence of preimpact mechanical failure was noted during the examination of the recovered airframe and engine.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Airframe Total Time: 244

The airplane was disassembled at the accident site during the recovery process. The recovery personnel stated that the engine and empennage remained attached to the main fuselage only by the cables. The recovery personnel also stated that the landing gear was extended.

Examination of the airframe revealed substantial damage to the wings and fuselage. The fuselage was separated into three sections. The first section separated from the main fuselage about 6 inches forward of the forward canopy attach point. The second section was the cockpit area. The third

section was the empennage. The empennage separated from the main fuselage about 3 1/2 feet from the tail. The empennage was relatively intact. In the empennage section, all the respective control surfaces were attached at their respective mounts. The top portion of the rudder (about 3 inches) including the counter weight, were separated. The rudder trim indicated about ¼ inch right of the neutral position. Both stabilizers were attached to the empennage. On the left stabilizer, the elevator trim was about 1/4 inch up from the neutral position. The left stabilizer was separated about 1 foot on the upper portion from the leading edge aft. In the empennage section, the cables to the rudder and the torque tube to the elevator, continuity was observed within the empennage section.

The wings were both separated from the fuselage. The forward main spar was separated in three sections. The ailerons and flaps had separated from their respective mounts on both wings. The right wing tip was separated about 6 inches from the outer portion. The right flap sustained a gash through about the first 1 ½ feet from the wing root. The right aileron was separated about 3 inches from the outer portion. The left wing was delaminated and scattered into smaller sections. The left flap was delaminated on the outer portion. The left aileron was delaminated on the outer 3 inches. The trim tab was observed in the neutral position.

Figure 1: The left wing as viewed from the right and aft view.

Figure 2: The right wing viewed from the right side.

The right main landing strut and landing gear was unremarkable. The nosewheel assembly and nosewheel were intact. The nose landing gear was extended and remained attached to the engine mount assembly.

No fuel was found in the tanks during the examination and there was evidence of the fuel tanks being breached. The cabin fuel selector handle was found in the "Left" position.

Control continuity was obtained from the portion of the torque tube that remained attached to the outer one third of the right wing. Continuity was also obtained to the rudder and elevators.

Cockpit Controls:

All circuit breakers- In
Carburetor - Heat In
Ram boost - Off/In
Throttle – Full out but cable was disconnected
Mixture – Out ½ inch
Blue knob - In

The canopy had fragmented into numerous small fragments. An oil coating was observed on the canopy fragments that covered about 50% of the surface.

The Garmin and Engine Flight Indicator System were removed and shipped for the NTSB laboratory for further examination.

2.0 Engine Examination

Engine Total Time: 244
Engine Time Since Field Overhaul: N/A

The engine was separated from the airframe. The engine was originally a Continental Motors I0550N model that was converted to an I0550-EXP by Performance Aircraft Engines. The current engine data plate was provided by Performance Aircraft Engines and listed the serial number as TC-5826 and the horsepower as 370. Examination of the engine revealed that a large hole was observed in the upper left portion of the crankcase, located above number 2 cylinder. Visible through the hole, was a broken connecting rod for the number 1 cylinder. Further observation revealed that the connecting rod for cylinder number 2 was also broken.

Figure 3: The airplane engine hoisted up for examination.

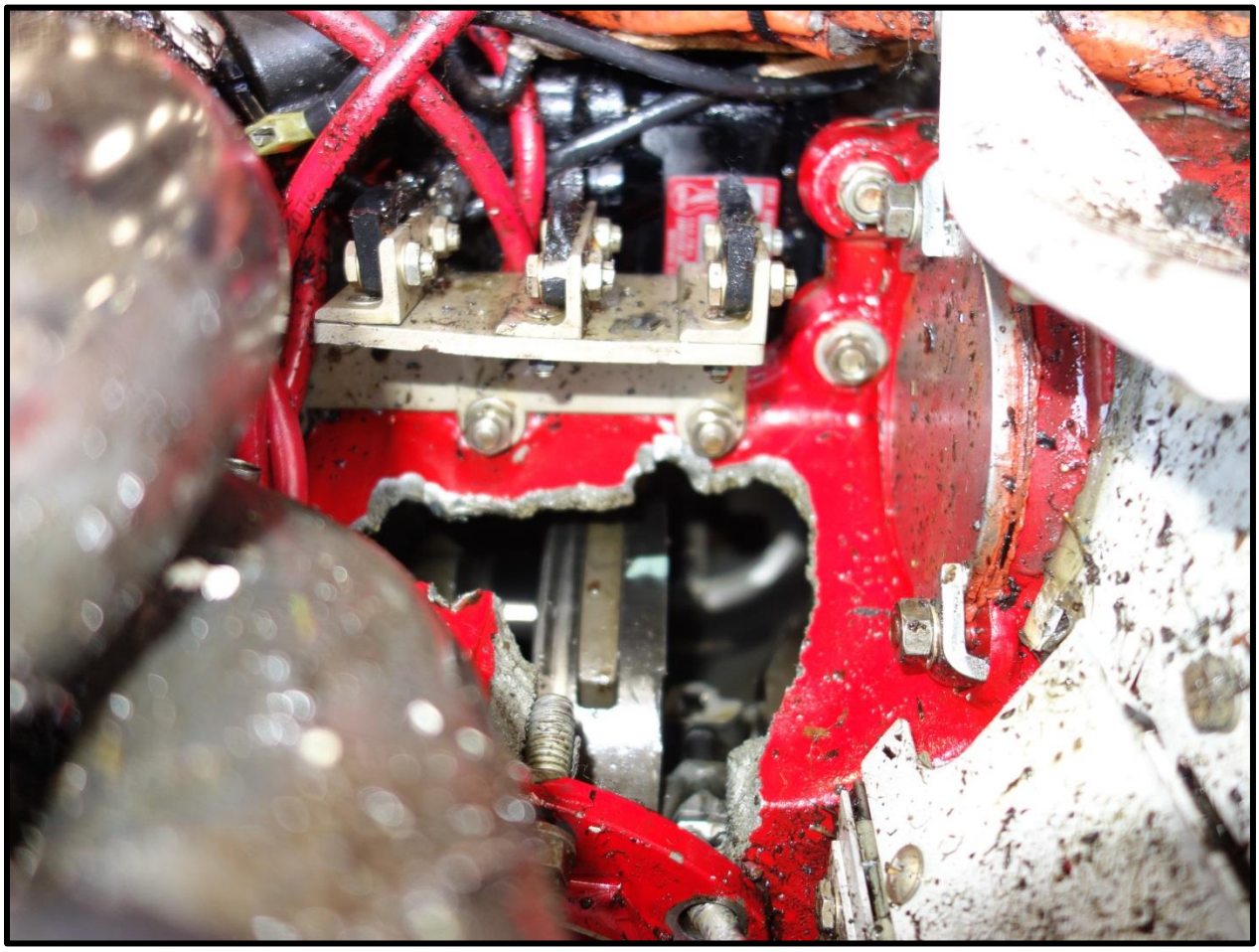

Figure 4: The Hole Observed on the Engine Crankcase.

The cylinder head for cylinder number 5, sustained impact damage to the rocker arm housing and the rocker box cover was missing. Cylinder number 2 sustained damage to its mounting flange and attaching hardware. The remaining cylinders remained attached and were intact.

The exhaust headers were attached but sustained impact damage and were removed to facilitate the examination. The oil sump remained attached and sustained crushing damage. The oil quantity dip stick was removed and a small amount of oil was indicated.

The engine was equipped with one standard aviation magneto which provided ignition voltage to the bottom spark plugs, and an electronic ignition module that provided ignition to the top spark plugs. The top spark plugs were removed from the engine and the electrodes had (Worn-out to Normal) wear conditions when compared to a Champion AV-27 comparison chart. The sparkplugs had a dark coloration which indicated a rich operating condition according to the chart. A borescope inspection of each cylinder revealed that number 6 cylinder induction tube sustained damage and was open. Cylinders number 1 and 2 could not be examined due to the

location of each piston in its individual cylinder. Cylinders 3, 4, and 5 were observed and were unremarkable.

The throttle body assembly was intact and the butterfly was observed in the partially open position. The metering unit, fuel manifold, fuel injector lines, and individual fuel injectors were intact.

The three bladed propeller was separated from the engine crankshaft. The propeller spinner was crushed aft. All three blades remained attached to the propeller hub and were observed to exhibit chordwise diagonal scratching and bent aft.

The engine was transported to the original manufacturer for further examination.

Submitted by: Albert Nixon