



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

AIRFRAME EXAMINATION

WPR18LA156

This document contains six embedded photos.

A. ACCIDENT

Location: Tonopah, Nevada
Date: May 30, 2018
Aircraft: Beech A36, N191HL, SN: E-1437
NTSB IIC: Elliott Simpson

B. EXAMINATION PARTICIPANTS:

Fabian Salazar National Transportation Safety Board	Kurt Gibson Continental Motors Inc.
Phillip Grice Continental Motors Inc.	

C. SUMMARY

Examination of the engine was conducted at the facilities of Continental Motors Inc. in Mobile, Alabama on November 27, 2018. Evidence of oil starvation and catastrophic engine failure and detonation/pre-ignition were observed to the number 4 piston.

D. DETAILS OF THE INVESTIGATION

1.0 Engine Examination

The engine was removed from the shipping crate, photographed and verified to be from N191HL. The engine was then placed on an engine stand and disassembled.

The following components were examined and were unremarkable:

- Exhaust system.
- Alternator.
- Starter.
- Air Conditioner.
- Vacuum Pump.

- Fuel Pump (slight resistance was found turning the pump by hand in either direction).
- Starter adapter/oil scavenge pump.
- Oil Cooler.
- Left and Right Magneto (performed appropriately in test stand).
- Prop Governor.
- Prop Governor oil screen.
- Fuel distribution valve. See attached report.
- Fuel Flow transducer.
- Fuel Metering Assembly. See attached report.

The following anomalies were noted:

- Crankcase side A exhibited three large holes, two above the piston bores and one below (Photo 1).
- Crankcase side B exhibited two large holes above the piston bores (Photo 2).
- Numerous gouges found throughout the internal walls of both engine cases.
- Large quantities of metallic fragments were found in the oil pan (Photo 3).
- Oil Pump exhibited scoring and gouges to its cavity walls.
- Oil filter paper element displayed significant deposits of metal particles.
- Unable to remove tappets due to internal damage to the engine case halves.
- Piston rods 3, 4, 5, 6 had separated from the engine crankshaft. Rods 1, and 2 remained attached. (Photo 4) The bearing surface for rod number 2 was intact, the surface for rod number 1 exhibited evidence of oil starvation.
- The number 4 piston displayed evidence of detonation/pre-ignition to its crown characterized by burn through from the top surface through to the piston skirt. (Photo 5,6)
- The remaining five piston crowns and cylinder heads exhibited were clean, free of deposits, and exhibited a sand-blasted appearance, consistent with the effects of detonation/pre-ignition.
- The camshaft lobes were intact but had a dark tint.
- The number 4 cylinder spark plugs displayed evidence of metal deposits on both of their center and ground electrode's. All remaining spark plugs were undamaged.

1.1 Engine Examination Photos

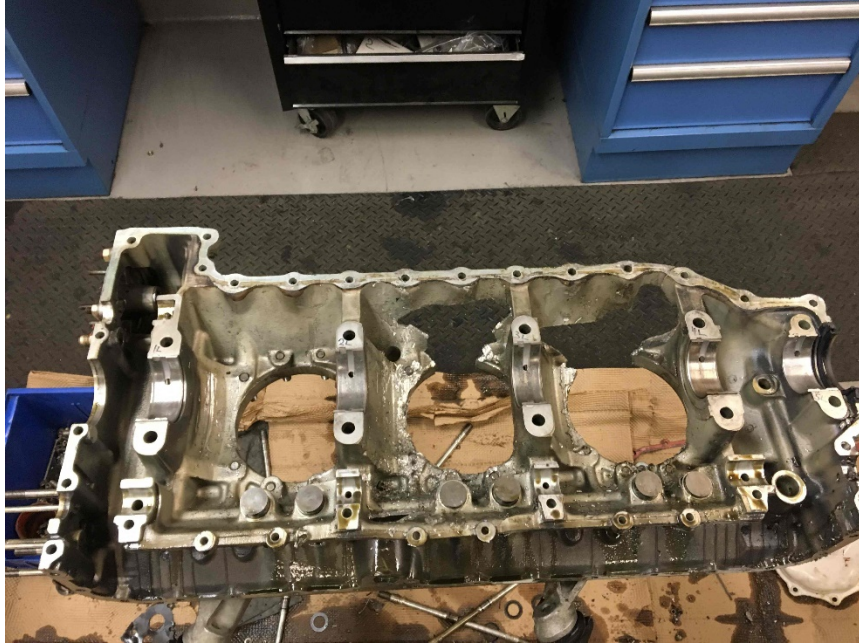


Photo 1 – Crankcase



Photo 2 - Crankcase



Photo 3 – Oil Sump



Photo 4 - Crankshaft



Photo 5 – Piston Number 4



Photo 6 – Piston Number 4