



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

April 11, 2018

ENGINE EXAMINATION

WPR17FA117

This document contains 2 embedded photos

A. ACCIDENT

Location: Ventura, California
Date: December 1, 2017
Aircraft: Cessna 180
N3683C, Serial #: 31182
NTSB IIC: Albert Nixon

B. EXAMINATION PARTICIPANTS:

Albert Nixon
Senior Aviation Accident Investigator
National Transportation Safety Board
Federal Way, WA 98003

Kurt Gibson
Air Safety Investigator
Continental Motors
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C. SUMMARY

Examination of the recovered engine was conducted on April 11, 2018, at the facilities of Air Transport, in Phoenix, Arizona. No evidence of pre-impact mechanical failure was noted during the examination of the recovered engine.

D. DETAILS OF THE INVESTIGATION

1.0 Engine Examination

Examination of the Continental O-470-S engine, serial number 269243-R, revealed that it separated from the airframe by the engine mounts. The engine sustained a significant amount of impact damage that was concentrated on its left and lower sides. Some of the engine's accessories including the rocker covers, carburetor, magnetos, oil screen, and top spark plugs, were previously removed and examined by NTSB investigators during the airframe examination. No anomalies were noted at that time. During the earlier examination, crankshaft rotation could not be accomplished and therefore an examination to disassemble the engine was scheduled.

During the engine disassembly examination, the right-side of the cylinder overhead areas were unremarkable. The left-side valves sustained impact damage and exhibited normal operating signatures. Several rocker arms on the left-side sustained impact damage and were either partially or totally separated. The left-side cylinders sustained impact damage and were removed. Subsequently, the crankshaft was able to be rotated by utilizing a hand tool on the accessory section and rotational continuity was established throughout the engine and valve train. The internal crankcase components were visible through the left-side cylinder bays revealing no

anomalies. A borescope inspection of the right-side cylinders revealed evidence of normal operational conditions.



Figure 1: View of right-side of the engine.



Figure 2: View of the left-side of the engine with the cylinders removed.

Both magnetos sustained impact damage and were unable to be rotated. The magnetos were disassembled, and the interior components exhibited normal operating signatures. No anomalies were noted with the ignition harness. The bottom sparkplugs from cylinder no. 1, 3, and 5, were observed with a borescope. The no. 1 sparkplug was obscured from loose material, but the other two spark plug electrodes exhibited normal wear signatures when compared to the Champion Check-A-Plug comparison chart. The carburetor was examined, and the internal components exhibited normal operating signatures and no anomalies were noted. The carburetor float valve exhibited normal movement and the fuel inlet screen was clear of contaminants.

The oil sump sustained a significant amount of impact damage and was crushed and partially separated from its mounting flange. The oil pick-up tube and screen sustained impact damage, but otherwise no anomalies were noted with the tube or screen. The oil pump remained attached and was removed for examination. Examination of the oil pump revealed no anomalies. The oil screen was removed and was clear of metallic contamination. The oil cooler remained attached and sustained substantial impact damage.

The two-bladed propeller separated from the crankshaft flange. However, the propeller attachment studs and nuts remained within the propeller flange. The spinner remained attached to

the propeller and exhibited no rotational markings.

The examination of the engine revealed no evidence of pre-impact mechanical malfunctions or failures that would have precluded normal operation.

Submitted by: Albert Nixon