



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

October 10, 2017

ENGINE EXAMINATION SUMMARY

WPR17LA119

This document contains 9 embedded images.

A. ACCIDENT

Location: Garfield, Washington
Date: June 3, 2017
Aircraft: N255BZ; Sonex
NTSB Investigator-in-Charge: Andrew Swick

On June 3, 2017, about 1130 Pacific daylight time, an experimental, amateur-built Sonex, N255BZ, was involved in an accident near Garfield, Washington. The pilot was not injured. The aircraft was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported in cruise flight, at 4,000 ft mean sea level, he experienced an increasing vibration followed by a loud bang. Subsequently, he saw the propeller separate from the airplane, down and to the left of his view. The pilot performed a forced landing to a paved road.

During the landing roll, the airplane impacted a power pole guy wire and the left wing sustained substantial damage.

The accident site was documented, and the examination of the airplane revealed the propeller assembly and forward section of the crankshaft separated near the forward crankshaft bearing. The propeller and crankshaft section were witnessed falling into the eyewitness's field near the accident site. A search continues for the propeller assembly and crankshaft section.

The airplane was recovered to a secure location for further examination.

B. SUMMARY

Examination of the crankshaft and crankcase halves were conducted on November 7, 2017, at the facilities of Sonex Aircraft, in Oshkosh, Wisconsin, by the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), and employees of Sonex Aircraft LLC. The engine was disassembled prior to this examination by the Federal Aviation Administration (FAA) inspector-in-charge. This examination revealed that the crankshaft separation near the propeller flange. The separated surface area showed beach marks propagating from the woodruff key area. The flywheel mounting flange and the flywheel mount on the crankshaft, showed material deformation at several screw holes and two fractured screw shafts remained in their holes. Fretting was noted around the outer circumference of the mounting flange and flywheel attachment area and is about 1/4 inch wide. The forward side of the trigger shaft had scuffing and material deformation at the locations of the flywheel mounting screw heads.

DETAILS OF THE EXAMINATION

1.0 Crankcase Halves

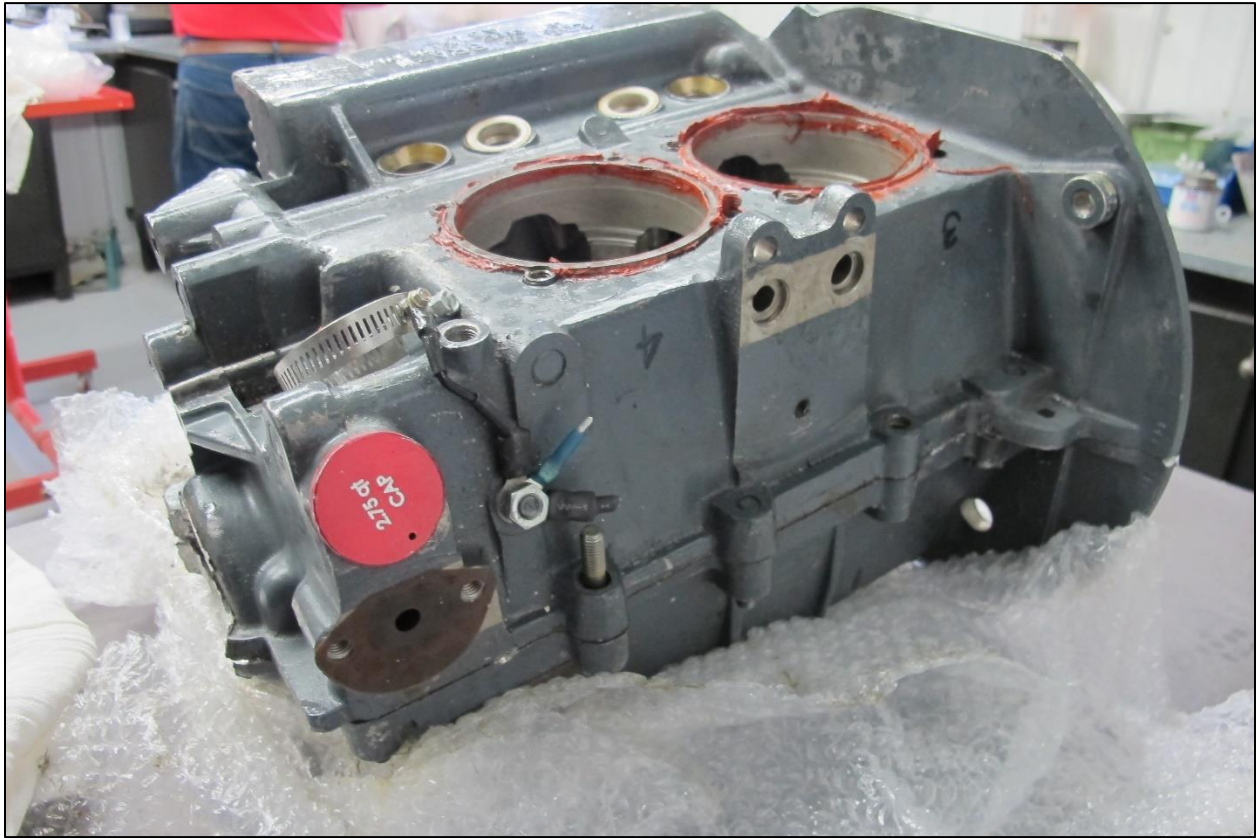


Figure 1-Crankcase Halves

The crankcase halves were removed from the shipping box and all four cylinder mounting surfaces were covered in an orange colored silicone sealant. The crankcase halves were separated, and the internal surfaces showed normal operating signatures. The forward cam bearing was not available during the examination.

2.0 Crankshaft



Figure 2-Crankshaft

The connecting rods remained attached to the crankshaft and were undamaged. (See figure 2.) The main bearing surface areas were undamaged and showed normal operating signatures. The separated surface at the forward main bearing journal area showed 'beach marks' covering most of the separated surface area, consistent with fatigue, propagating from the woodruff key slot area. (See figure 3.)



Figure 3-Crankshaft forward separation surface area.



Figure 4-Flywheel Mounting Flange

The flywheel mounting flange remained attached to the crankshaft. The flywheel mounting flange had material deformation of several screw holes. In reference to the above photo, the screw holes in the 2 o'clock and 4 o'clock positions had threaded screw sections remaining in the holes. Fretting is noted around the outer circumference of the mounting flange and is about 1/4 of an inch wide.

3.0 Engine Accessories

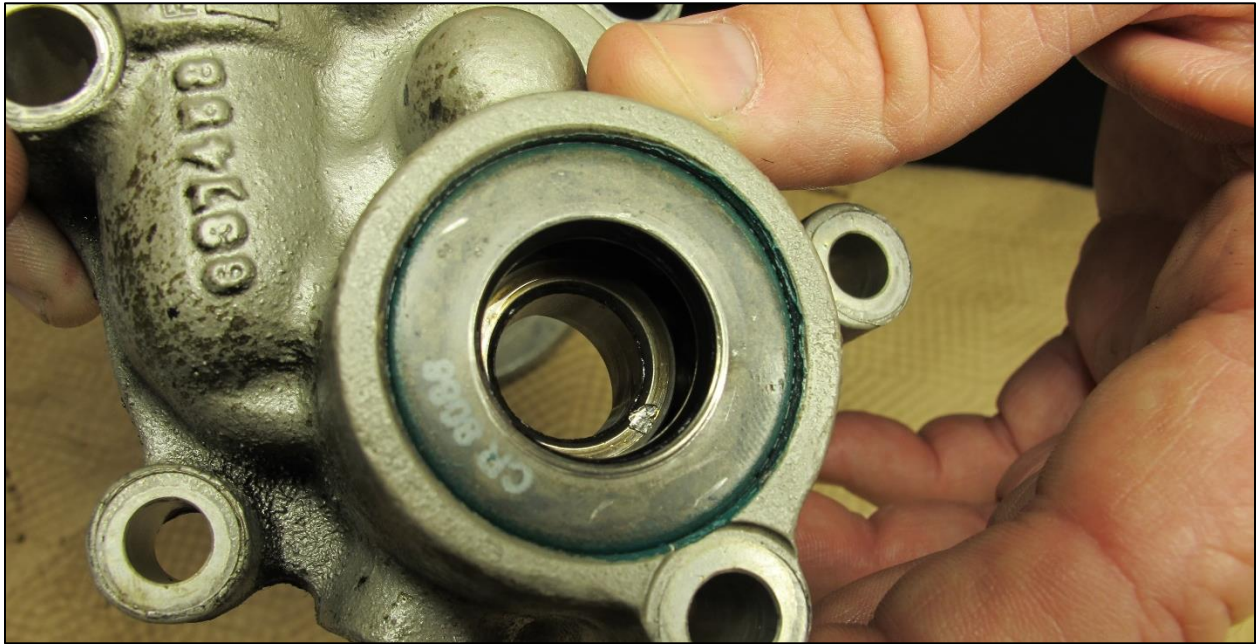


Figure 5-Starter Adapter

The starter adapter drive shaft was removed from the starter adapter and metal debris was found on the internal surfaces. The rubber seal driveshaft interface separated on one side.

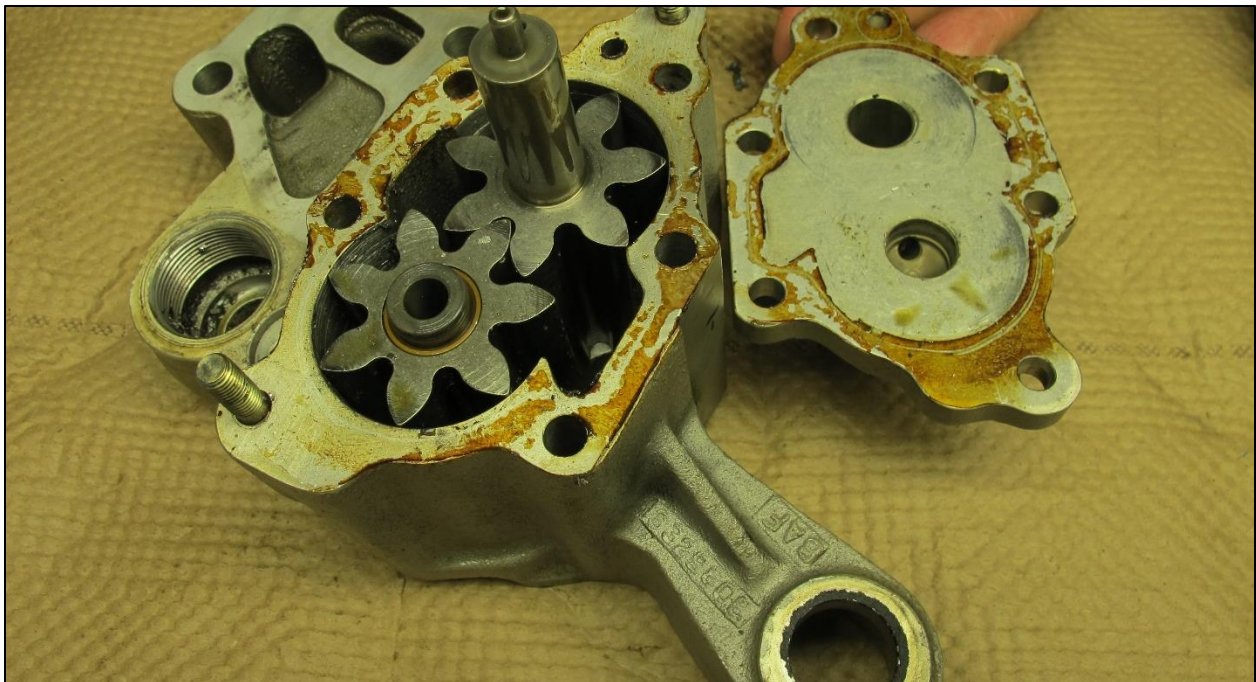


Figure 6-Oil Pump

The oil pump was removed and disassembled. Signatures of hard particle passage were found on the pump cavity walls. The drive and driven gears were removed from the pump. The drive gear separated near the splined end.

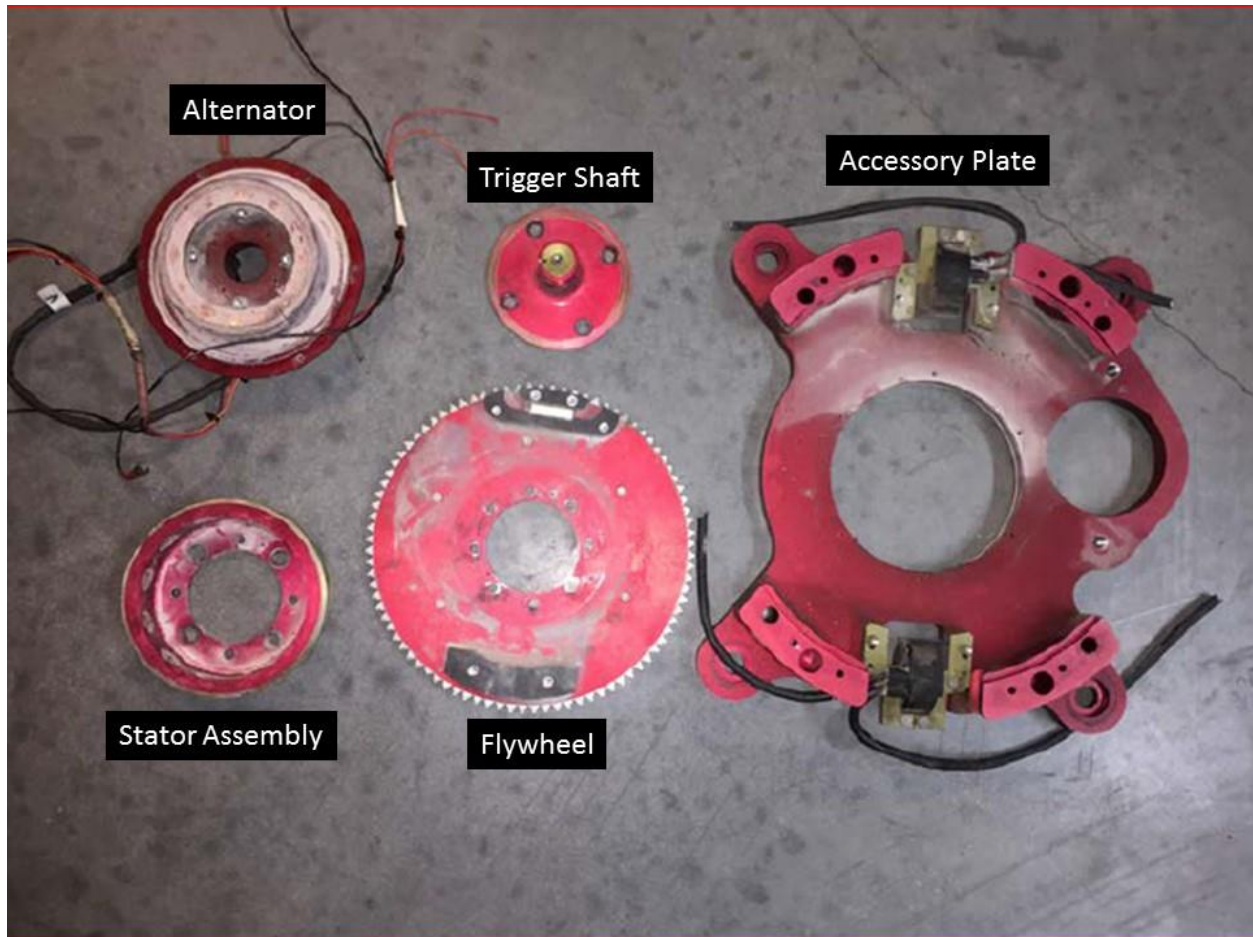


Figure 7-Engine flywheel, alternator, and accessory plate components.

Photos of the flywheel, ignition and accessory plate components were supplied by the owner. The flywheel and the upper half of the accessory plate shows a residue consistent with alternator potting compound. The alternator was damaged and showed signs of rubbing and material loss from the potting compound. The starter mounting bolt hole shows material deformation.



Figure 8-Flywheel attachment area and trigger shaft (attached).

The flywheel attachment area that mates with the flywheel crankshaft mounting flange shows fretting on the outer circumference and dark deposits. The screw holes show material deformation.



Figure 9-Trigger shaft.

The forward side of the trigger shaft had scuffing and material deformation at the locations of the flywheel mounting flange screw heads (4).