



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

September 3, 2020

PHOTO EXAMINATION REPORT

WPR20LA097

This document contains 14 embedded photos.

A. ACCIDENT

Location: Baker City, Oregon
Date: February 27, 2020
Aircraft: N5478C
NTSB IIC: Andrew Swick

Preliminary Report:

On February 27, 2020, about 1500 Pacific daylight time, a Cessna 170, N5478C, was substantially damaged when it was involved in an accident near Baker City, Oregon. The private pilot and one passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that about 15 minutes into the flight, the engine started to "knock and vibrate," and the oil pressure indication was low. The pilot initiated a precautionary landing to an open field, and during the landing rollout the airplane impacted a small ditch.

A postaccident examination of the airplane revealed substantial damage to the left wing. Pre-impact damage was noted to the upper crankcase area near cylinder No. 2, and the engine oil quantity indicated about 6 quarts of oil. The airplane was recovered to a secure location for further examination.

B. PARTICIPANTS

Andrew Swick
Aviation Accident Investigator-IIC
National Transportation Safety Board
Phoenix, Arizona

Carl Matthis
Director of Maintenance
Baker Aircraft
Baker City, Oregon

C. SUMMARY

Review of the engine examination photos revealed that the No. 2 connecting rod separated from the crankshaft. The connecting rod yoke end sections and connecting rod end cap sections were found in the oil sump. The cotter pin for the connecting rod bolt was not found during the examination. The connecting rod bearing and the connecting rod journal exhibited signatures of heat distress. The oil screen was covered in a thick oil and metallic debris. The oil filter screen was buckled and collapsed. The mechanic reported that prior to starting the examination the oil sump contained about 6 quarts oil.

D. Engine Examination

The examination was performed by a hired mechanic who supplied the NTSB with photographs and notes. The engine cowling was removed, and the crankcase had impact damage between cylinders No. 5 and 6.

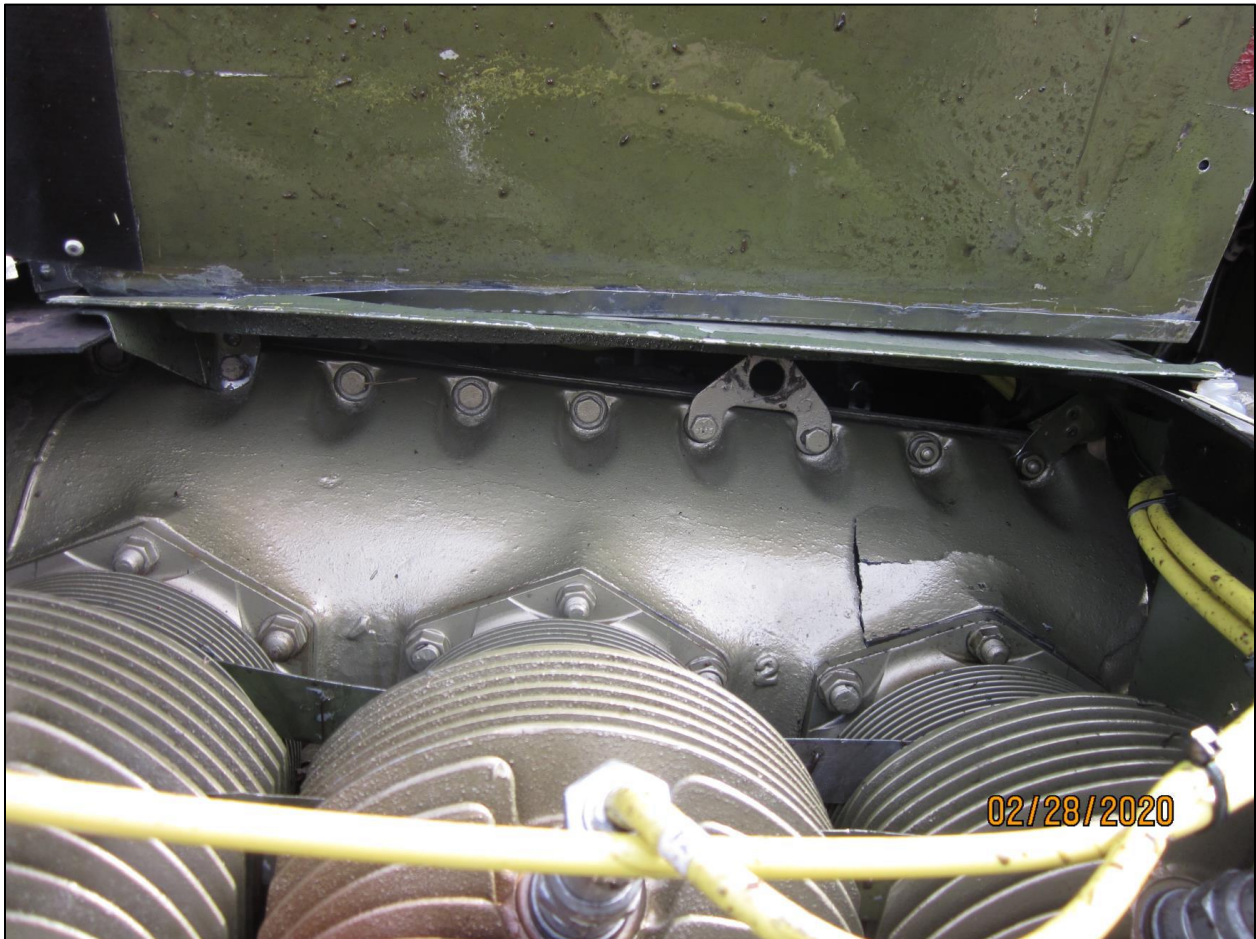


Figure 1-View of the engine from the left side.

The No. 2 cylinder was removed from the engine and had mechanical damage to the cylinder skirt. The No. 2 connecting rod separated from the crankshaft and the No. 2 crankshaft journal displayed signatures consistent with heat distress. Mechanical damage was notes to the adjacent counterweight and internal crankcase surface areas.



Figure 2-The crankshaft No. 2 connecting rod journal.

The No. 2 piston moved freely in the cylinder and the connecting rod wrist pin moved freely in the piston. The No. 2 cylinder intake and exhaust valves were undamaged. The No. 2 crankshaft journal had thermal discoloration and mechanical damage. The oil filter screen was removed from the engine, and the cylindrical filter screen was collapsed. The screen was covered in metal shavings and dark thick oil.



Figure 3-Oil filter screen.

The oil pump was removed and shows signatures of hard particle passage. The oil sump pickup screen and the accessory section cover were removed from the engine. Large metal bearing fragments were found in the area of the pickup screen position.



Figure 4-Oil pump gear cavity.



Figure 5-Oil pump drive gear.



Figure 6-Accessory section and oil pickup screen location.



Figure 7-Oil pickup screen location and metal fragments.

The oil sump was removed. The No. 2 connecting rod yoke end sections and cap end were found in the oil sump. The connecting rod end cap was found in two pieces. The yoke ends remained attached to their respective cap end pieces. The bolts remained intact and the nut from one bolt separated and was found broken in the sump. The cotter pin was not found during the examination.



Figure 8-The No. 2 connecting rod end cap and yoke end sections.

The No. 2 crankshaft connecting rod bearing material was found in pieces in the oil sump. The pieces exhibited thermal distress and deformation.



Figure 9-Oil sump debris.

The engine was disassembled, and the crankshaft was removed. The No. 2 connecting rod journal and adjacent cheeks had mechanical damage. The remaining connecting rod journals had thermal discoloration. The main bearings had thermal discoloration and bearing wear. The connecting rod bearings had thermal discoloration and wear revealing the copper layer below.



Figure 10-Crankshaft.

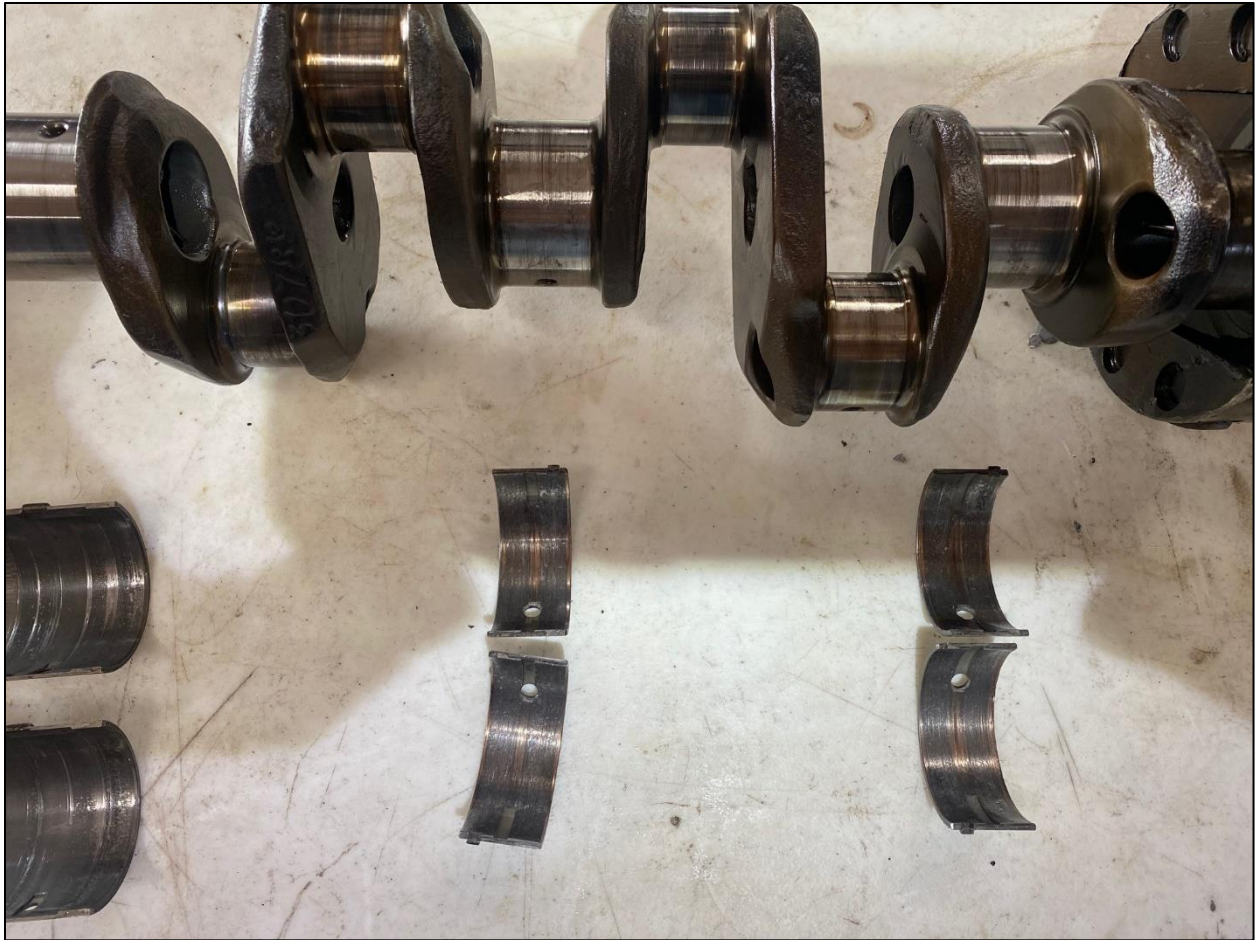


Figure 11-Crankshaft and connecting rod bearings (forward main bearing-left side of photo).



Figure 12-Crankshaft forward main bearing.



Figure 13-Connecting rod bearing.

Submitted by: Andrew Swick