



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

January 6, 2022

ENGINE TEARDOWN AND EXAMINATION SUMMARY

WPR21LA145

This document contains 7 embedded photos.

A. ACCIDENT

Location: Marana, Arizona
Date: 03/28/2021
Aircraft: Cirrus SR22; N644SR
NTSB IIC: James Bledsoe

On March 28, 2021, about 1428 pacific daylight time, a Cirrus SR-22, N644SR, was substantially damaged when it was involved in an accident near Marana, Arizona. The pilot and passenger were uninjured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that while enroute to destination airport, the airplane experienced heavy vibrations and moments later a complete loss of engine power. He attempted to maneuverer to a nearby airport but determined that he did not have the attitude. He attempted to deploy the airplane's parachute to no avail. He then selected a dirt road and made an off-airport landing, the right main landing gear collapsed, and the right wing impacted the ground. According to the pilot, oil was seen streaking down both sides of the cowling.

The airplane was relocated to a secured facility for further examination.

B. EXAMINATION PARTICIPANTS:

James Bledsoe
Air Safety Investigator-IIC
National Transportation Safety Board
Salt Lake City, Utah

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

C. SUMMARY

Examination of the engine was conducted by the National Transportation Safety Board. The No. 2 connecting rod and piston pin separated from the crankshaft. The No. 2 connecting rod journal was black in color and had mechanical damage. The No. 2 main bearing half was visible and was not positioned properly in the saddle bearing support. The engine was removed from the main wreckage and disassembled. The right side of the No.2 saddle bearing support surface had mechanical damage consistent with the movement of the left-side bearing tang. The crankcase halves mating surfaces at the No. 2 saddle bearing support show excessive fretting on their entire surface area.

D. DETAILS OF THE INVESTIGATION

1.0 Engine Removal and Disassembly

The Continental IO-550-N engine (Serial No. 689836) remained secured to the airframe. The upper and lower cowlings were removed from the airframe. The magnetos were broken from their mounts and located above the crankcase damage between cylinders No. 1 and 2. The magnetos remained attached to all ignition lead ends. Aluminum crankcase parts, the No. 2 wrist pin, No. 2 connecting rod and connecting rod cap that were found during the initial examination of the wreckage, were found packaged on top of the engine. The No. 1 and 3 cylinder through bolt and deck stud nuts had torque seal. The remaining cylinders did not torque seal applied.

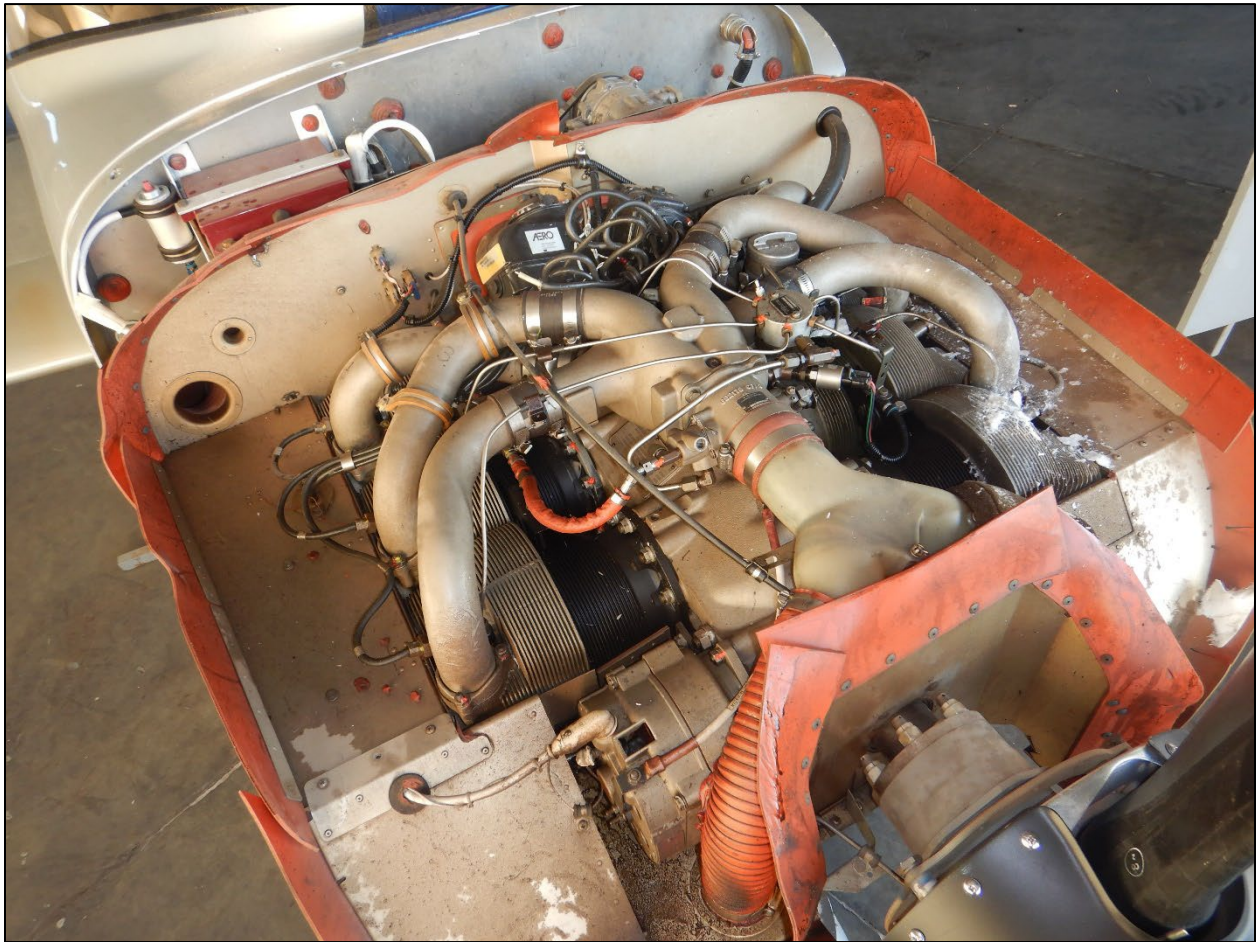


Figure 1-Engine and propeller assemblies.

The propeller was undamaged and removed from the engine. The induction and exhaust assemblies were undamaged and removed from the engine. Approximately 5 quarts of dark oil was drained from the oil sump. The oil sump was removed and contained broken aluminum and steel components. The oil vent tube was disconnected from the engine and loose carbon deposits were noted in the tube. The 8-through bolt nuts were retorqued with the specified torque according to the manufacturer and none of the nuts tightened before torque indication was reached. The No. 2 and 4 cylinders could not be removed from the crankcase due to internal mechanical damage to their cylinder skirts. The remaining cylinders were removed. The crankcase halves were split, and internal mechanical damage was noted heavily in the No. 1, 2, 3 and 4 crankcase cylinder bay areas. An unidentified steel part was found imbedded in the forward side of the No. 5 cylinder bay area. Mechanical damage was also noted near the lifter areas and near the camshaft lobe working locations.

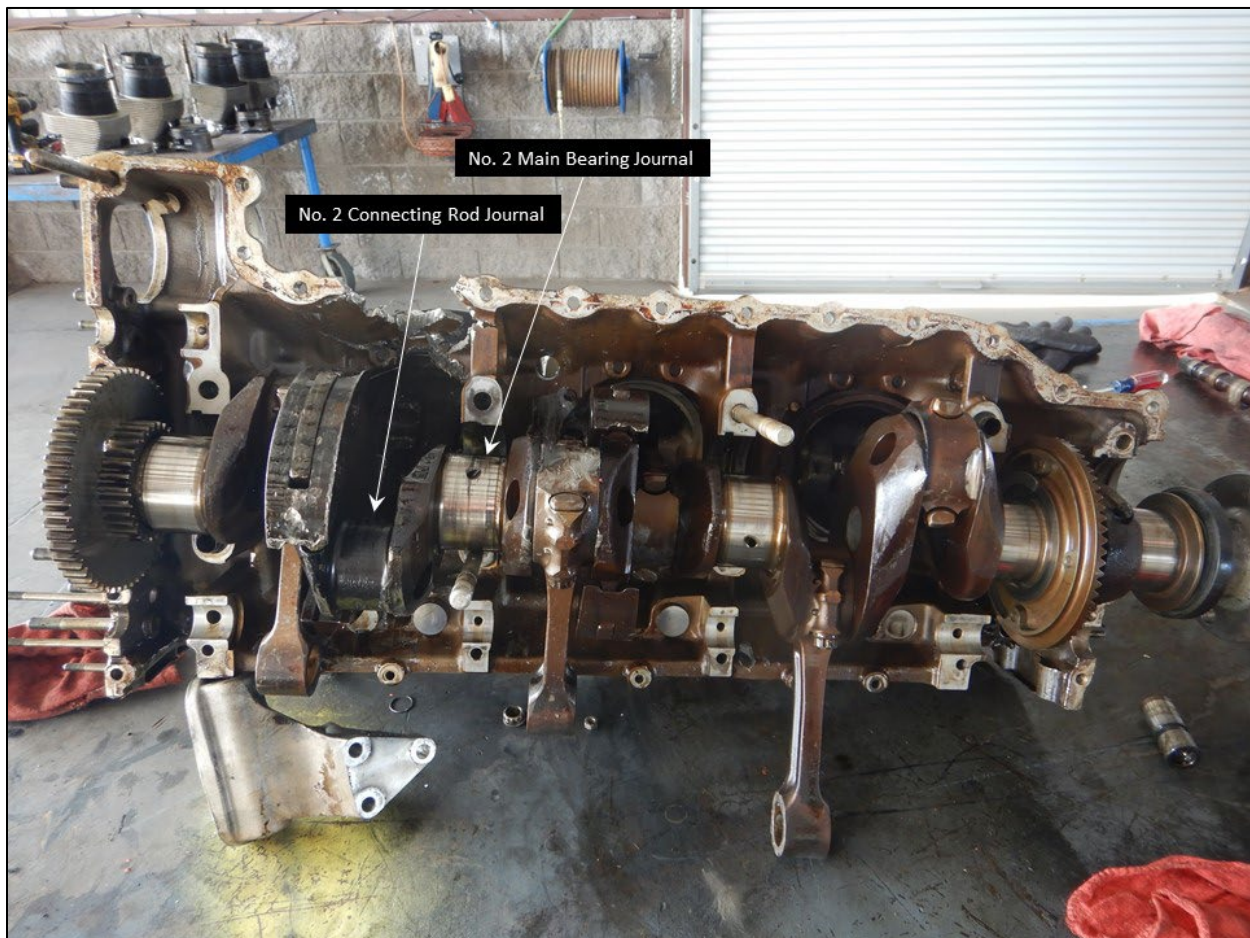


Figure 2-Engine left side crankcase side and crankshaft.

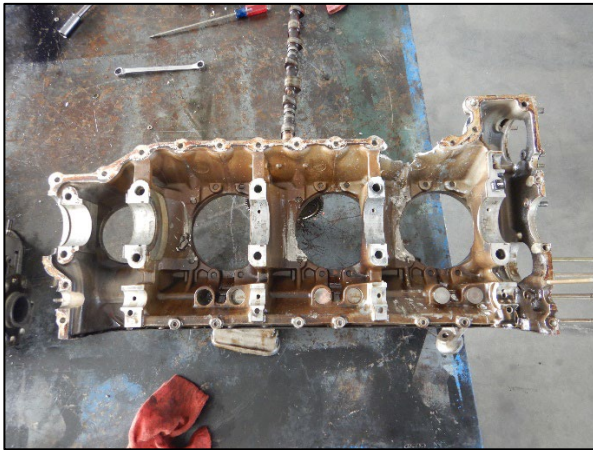


Figure 3-Right-side crankcase half.

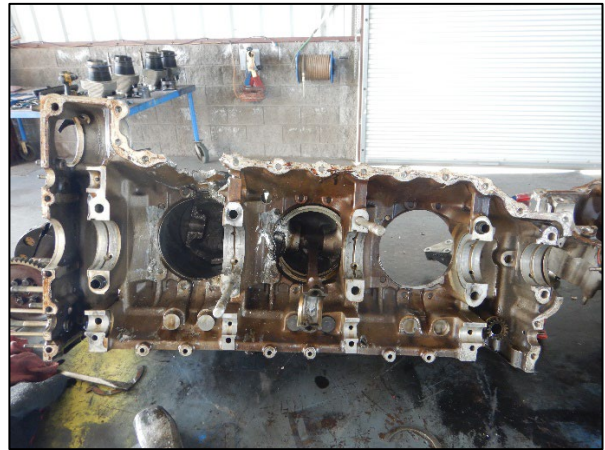


Figure 4-Left-side crankcase half.

The left No. 2 main bearing half was found rotated within the saddle area about 15-degrees, overlapping the right bearing half. The left bearing half was also shifted forward about 1/8th of an inch from its original position. The bearing halves were removed and bearing material from the left-side bearing was found imbedded onto the working surface of the right-side bearing half. The bearing's working surface revealed the copper layer and portions of the copper layer was missing. Both tangs from the bearing halves had mechanical deformation. The back side of the left bearing half showed a dark line consistent with the location of the bearing saddle oil galley but is adjacent of the bearing's oil holes.

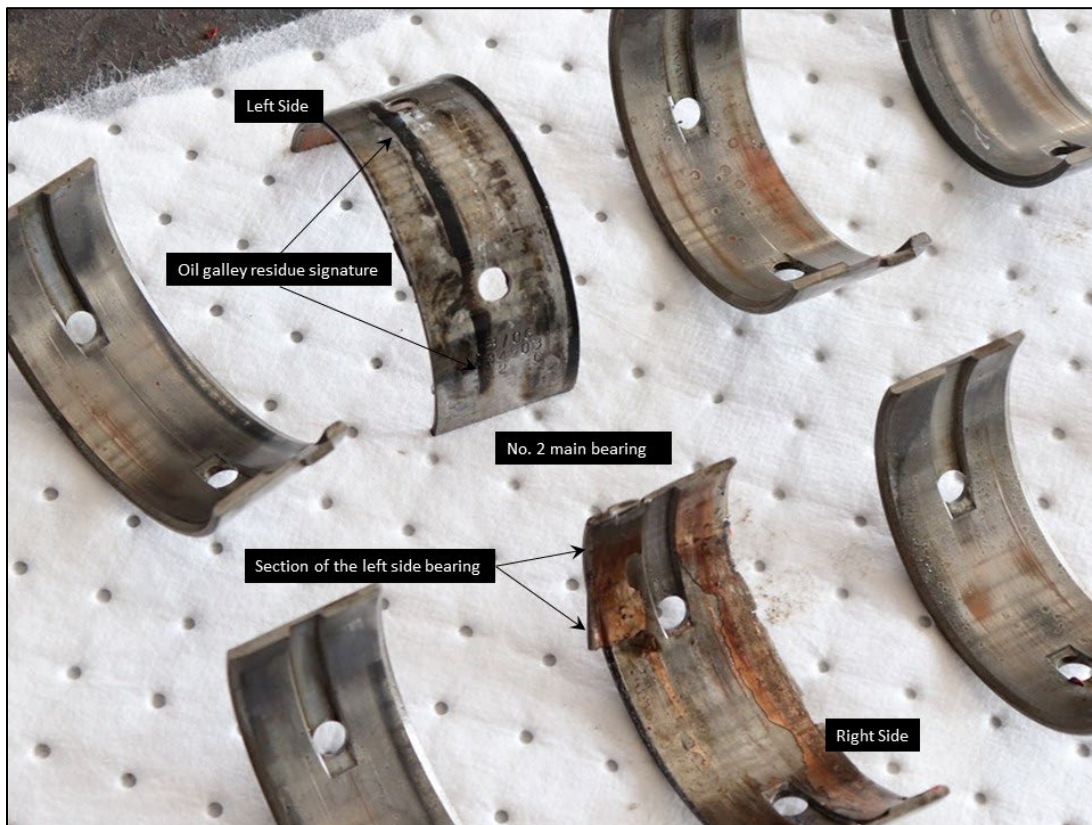


Figure 5-No. 2 crankshaft main bearing.

The No. 2 saddle bearing support on the left crankcase half had mechanical damage. (See figure 6.) The saddle bearing support tang slot was also elongated in the forward and aft direction. The saddle bearing support forward surface area has mechanical damage. The lower side of the saddle bearing support surface had mechanical damage consistent with the movement of the right-side bearing tang. The crankcase halves mating surfaces at the No. 2 saddle bearing support show excessive fretting on their entire surface area.

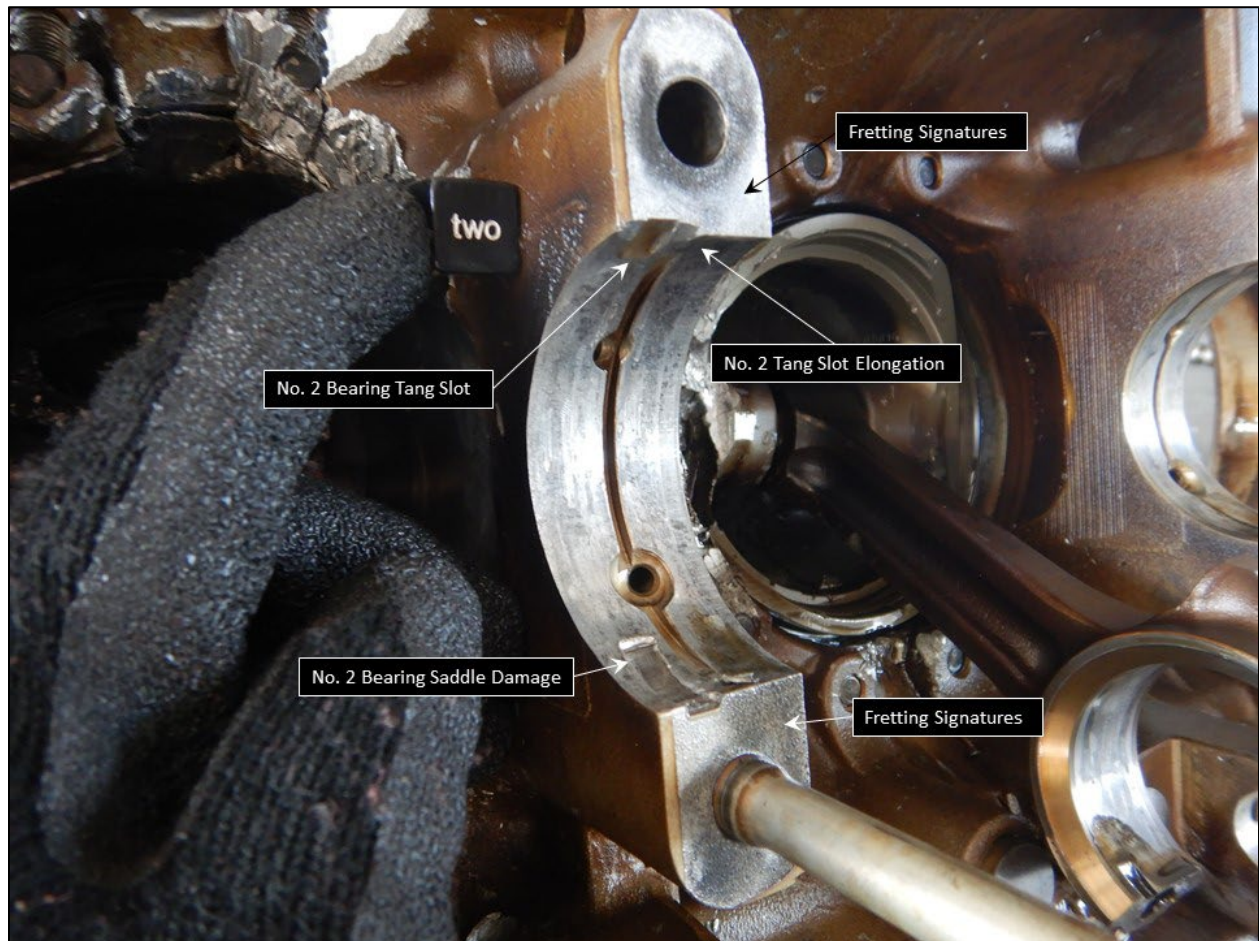


Figure 6-No. 2 crankcase saddle bearing support, left side.

The No. 2 saddle bearing support on the right crankcase half had mechanical damage. (See figure 7.) The saddle bearing support tang slot was not damaged. The saddle bearing support forward surface area has mechanical damage. The right side of the saddle bearing support surface had mechanical damage consistent with the movement of the left-side bearing tang. The crankcase halves mating surfaces at the No. 2 saddle bearing support show excessive fretting on their entire surface area.

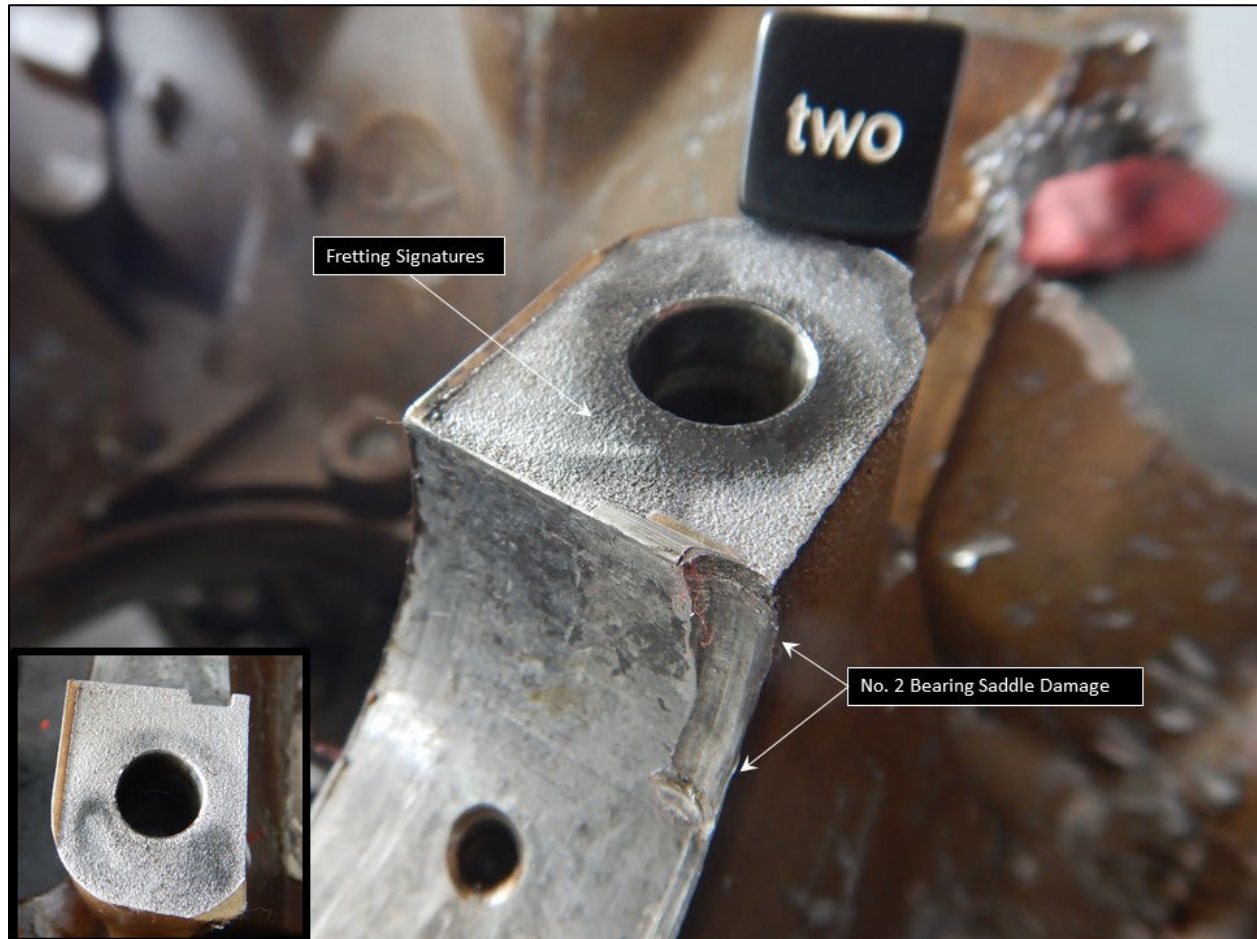


Figure 7-No. 2 crankcase saddle bearing support, right side.

Submitted by: Andrew Swick