

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA22LA097

AIRFRAME AND ENGINE EXAMINATION FACTUAL REPORT

November 1, 2022

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A. ACCIDENT

Location: Marathon, Florida
Date: December 29, 2021
Time: 1622 Local
2122 UTC
Airplane: Cessna 207, N1596U

B. AIRFRAME AND ENGINE EXAMINATION

FACTUAL REPORT

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C. SUMMARY

On December 29, 2021, at 1622 eastern standard time, a Cessna 207 airplane, N1596U, sustained minor damage when it was involved in an accident in the Florida Bay near Marathon, Florida. The pilot sustained serious injuries and the two passengers sustained minor injuries. The airplane was operated by ExecAir of Naples as an on-demand passenger flight under the provisions of Title 14 Code of Federal Regulations Part 135.

D. DETAILS OF THE INVESTIGATION

The NTSB investigator-in-charge traveled to the recovery facility on February 8, 2022, and was assisted by Textron Aviation and an FAA Inspector. The wreckage and maintenance records were examined on February 8-9, 2022 at Florida Air Recovery, Ft. Pierce, Florida. This document contains the factual findings related to the examination.

E. AIRFRAME EXAMINATION

The airplane remained in-tact during the impact sequence. Flight control continuity was confirmed for all flight control surfaces. The flaps were found in the 20° position. The elevator trim was found in the takeoff position. The fuel selector handle was found selected to the right tank. There were no reported or identified preimpact mechanical malfunctions or failures with the airframe.



Figure 1: View of the accident airplane partially submerged in the Florida Bay as viewed during recovery operations.



Figure 2: View of the engine area and propeller post-recovery

Under the passenger seats and loose within the wreckage, four life preservers were found. One life preserver was found to have a zip tie placed around the package,

which restricted the ability to tear it open. The figure below shows the life preservers, as recovered by this investigation.



Figure 3: View of the four life preservers found in the cabin and an additional view of the zip tied life preserver (NTSB Photo)

F. ENGINE EXAMINATION

The engine was a Continental IO-520-F, serial number 291297-R. The propeller was a three-bladed McCauley, serial number PY196B, model HC-C3YF-1 RF/F8068-1.

The engine remained attached to its engine mounts and sustained minor impact damage. A large fracture hole was present at the No. 2 cylinder with internal core engine components protruding through the fracture hole. The engine contained several gallons of saltwater due to its multiple day submersion in the Florida Bay. The water was drained from the oil quick drain, where water and oil were observed to empty from the engine. Saltwater corrosion was present throughout several components and surfaces.

All crankcase thru bolts required force to loosen and remove. The threads appeared normal.

No fretting was observed on the crankcase halves. All of the crankshaft main bearings were intact and in place except for one half of the #2 bearing, which was partially cracked. The cracked side was on the side of the damaged connecting rod. Neither the crankshaft main bearings nor the crankshaft main journals were discolored.

The Nos. 2, 4, and 6 cylinders were removed from the crankcase. Subsequently, when the propeller was rotated by hand through a full 360° rotation, crankshaft, camshaft, propeller governor, and engine accessory continuity and rotation was confirmed.

The pistons were removed from cylinder 2, 4, and 6. The pistons and cylinder interiors exhibited saltwater corrosion but otherwise appeared normal. All six cylinders were examined with a borescope. Each valve displayed varying degrees of carbon deposit build-up and heavy saltwater corrosion. There was no obvious damage or fractures to any of the valves.

The No. 2 cylinder connecting rod crankshaft end was heavily fragmented and had fractured. The piston pin had separated and was found intact in the bottom of cylinder 3. Several fragments of the connecting rod were located in the oil pan. Presumed bearing material belonging to the No. 2 cylinder connecting rod attachment area was located in the oil pan as well. It appeared severely worn, thin, and displayed evidence of heat transfer.

The crankshaft journal for the No. 2 connecting rod and its oil transfer hole displayed wear marks, heat transfer, and deformation of the oil transfer hole. There was a small fragment of debris located in the oil transfer hole that was consistent in color to the fragmented bearing material located in the oil pan. This oil transfer hole displayed no other deformation or blockage at the other end of the oil entry hole.

All other oil transfer holes along the crankshaft appeared normal without deformation and were clear of debris.

The oil pump was removed and disassembled. Its gears appeared to grind when rotated and scoring was observed. The oil screen displayed a significant amount of metal debris. All other connecting rod bearings displayed varying degrees of scoring. The No. 3 cylinder bearing, displayed some dark discoloration. All other bearings did not display discoloration.

The No. 2 piston pin bosses and attach points had fractured and had disconnected from the piston and connecting rod. It displayed evidence of rotational scoring but did not display heat discoloration. The No. 2 piston pin caps remained installed but displayed significant impact mechanical damage.

All connecting rods (with exception to the No. 2) appeared normal and their associated connecting bolts were tight when removed. They all also did not display heat discoloration (except No. 2).

The top spark plugs were removed, examined, and displayed combustion signatures consistent with normal combustion when compared to the Champion Aerospace Aviation Check-A-Plug chart. They also displayed saltwater corrosion. The propeller governor appeared unremarkable.

The Number 2 connecting rod assembly and bearing pieces and bearings from the Nos. 1 and 3 connecting rods were sent to the NTSB Materials Laboratory¹ for further forensic examination.

G. MAINTENANCE RECORDS

According to maintenance records², the engine was overhauled on December 10, 2014, and subsequently installed on the airplane January 20, 2016. The tachometer reading as found displayed 175.2 hours. The tachometer was replaced on October 15, 2019, with a zero hour tachometer.

On November 23, 2021, the Nos. 2 and 6 cylinders were removed and replaced with new Superior Cylinders (P/N SA52006-A20P cylinder kits). The oil was also changed, and the left exhaust collector was removed and replaced with a new unit. The tachometer reading was 168.1 hours, 7.1 hours before accident. At the time of this inspection, the Time Since Major Overhaul (TSMOH) was noted as 854.0 hours and the engine total time since new was recorded as 3723.2.

On December 23, 2021, an overhauled propeller and propeller governor were reinstalled at a noted tachometer time of 173.0 hours, 2.2 hours before accident. This was the most recent and last maintenance event before the accident flight. The TSMOH was noted as 858.9 with an engine total time since new noted as 3728.1.

The current engine and airframe time, based upon the maintenance log entries and the current tachometer reading, was TSMOH 861.1 hours and 3730.3 engine total time since new. The total airframe time was 13,496 hours.

The most recent annual and 100 hour inspection was completed on September 27, 2021.

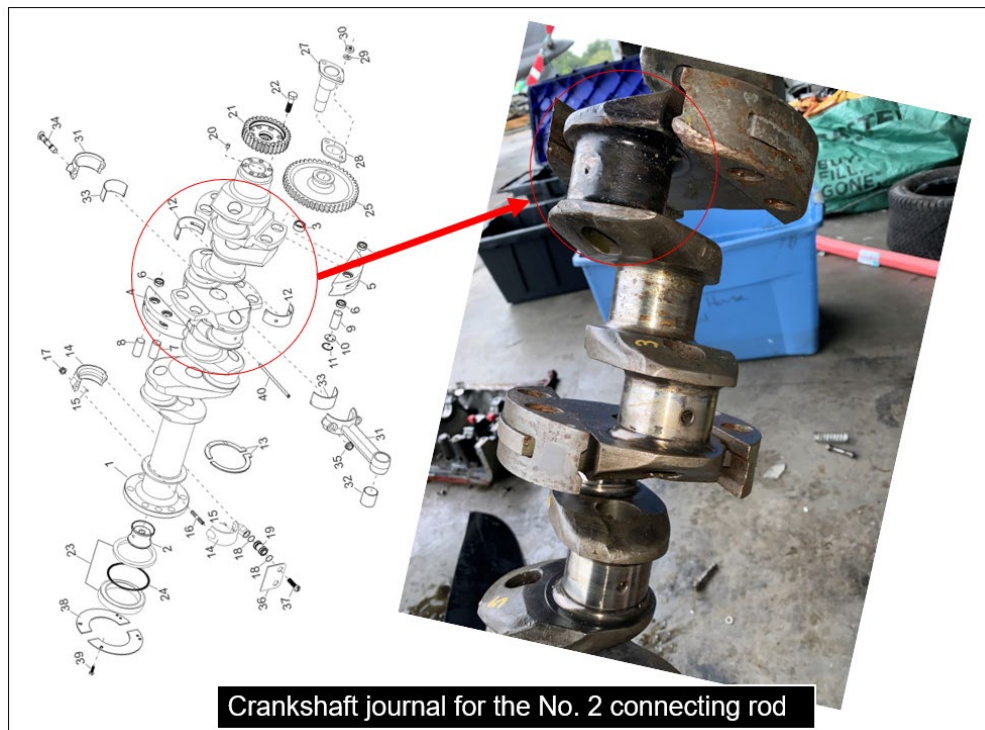
¹ The Public Docket contains NTSB report No. 22-070 detailing the NTSB Materials Laboratory findings.

² The Public Docket contains photographs of excerpts of recent maintenance records.

H. PHOTOGRAPHS AND FIGURES



Figure 4: Overview of the engine post-recovery



Crankshaft journal for the No. 2 connecting rod

Figure 5: View of the crankshaft with the No. 2 journal circled in red and compared to the Continental Motors engine drawing.

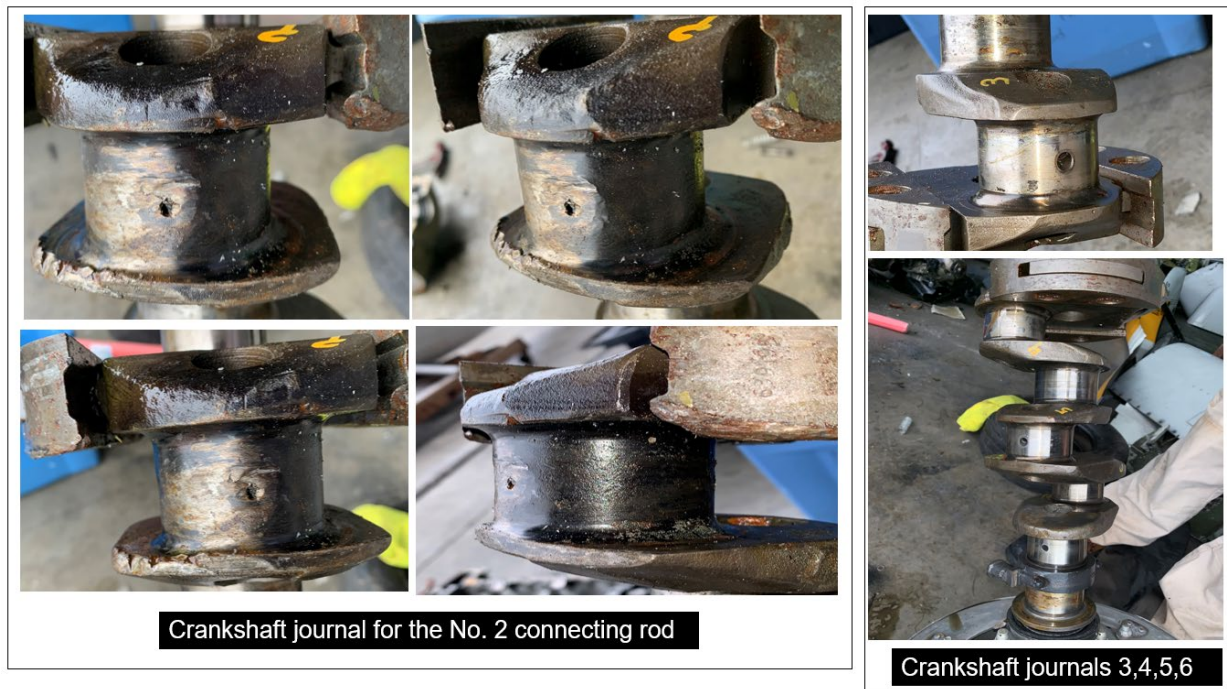


Figure 6: Photographs showing the crankshaft journals, with detailed photos showing the No. 2 journal.

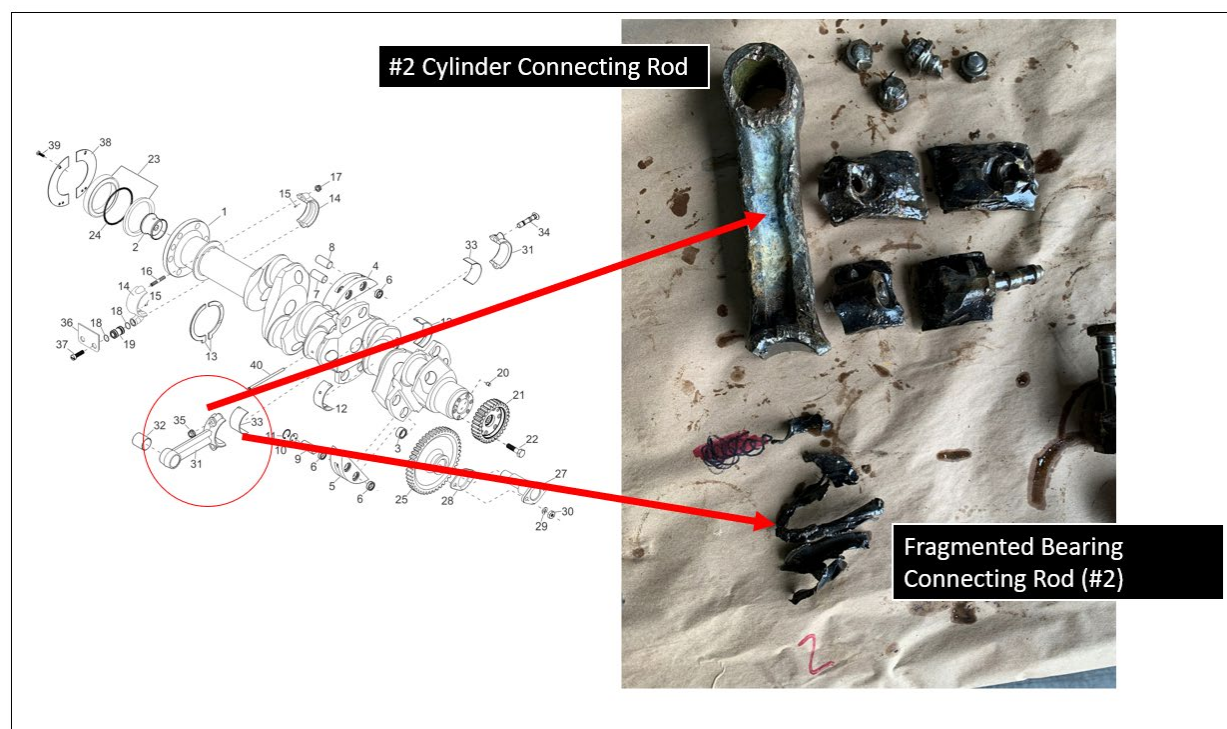


Figure 7: Overview of the No. 2 cylinder connecting rod and bearing fragments.

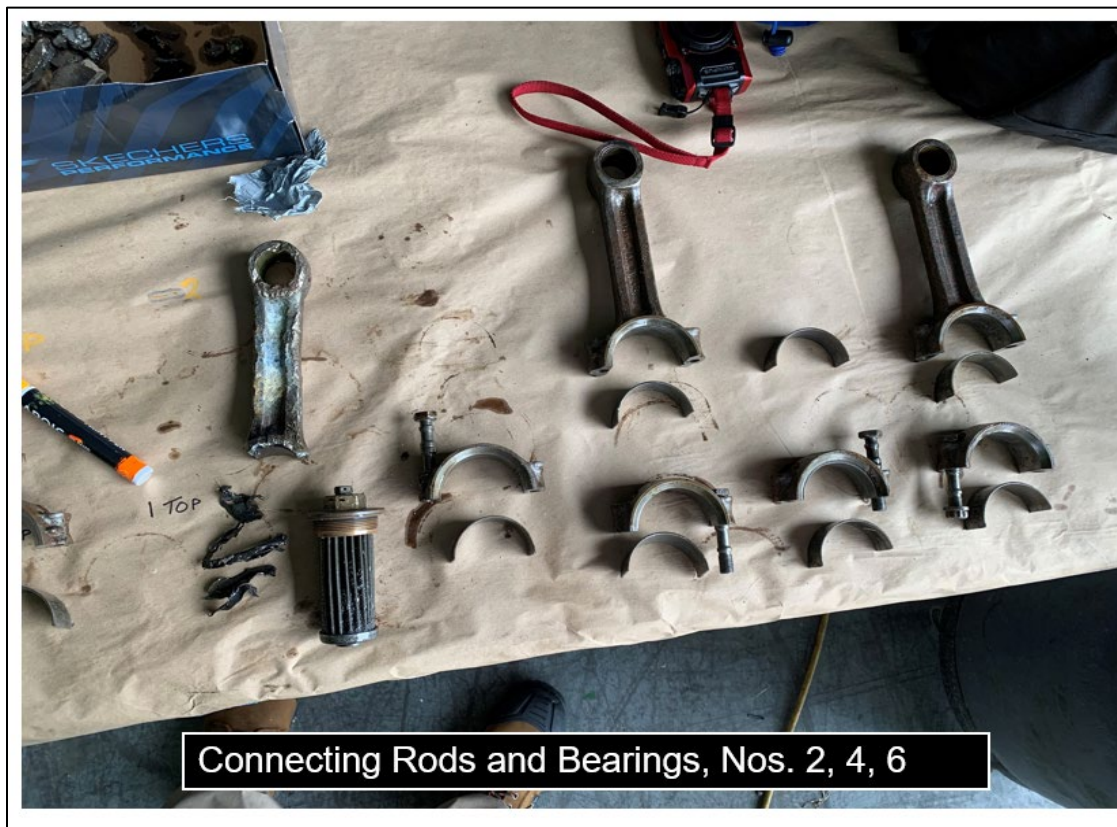


Figure 8: Connecting rods No. 2, 4, and 6 as viewed from left to right.

Submitted by:

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