

## Engine Teardown Summary

The engine was shipped to the Continental Motors for an engine teardown examination under the oversight of the National Transportation Safety Board's Investigator-in-Charge (IIC), on October 30, 2018.

The engine displayed mechanical damage to the crankcase and there were no signs of impact damage to the engine. The crankcase displayed a large hole on the left crankcase half near the No. 2 cylinder and there was a small hole on the right crankcase half near the No. 1 cylinder. The propeller flange remained attached to the rest of the crankshaft and there were no signs of cracks or other damage to the propeller flange. All six cylinders remained attached to their cylinder bays and there was no external damage noted to the cylinders.

The crankcase halves were split, and the internal portions of the crankcase were visually inspected. It was noted that the crankcase bearing supports displayed signs of bearing shift; the No. 2 and the No. 3 lock tabs displayed significant elongation and all the bearing support mating surfaces displayed varying amounts of fretting with the No. 2 and the No. 3 surfaces displaying the most fretting. It was noted that the left No.3 bearing had shifted a significant amount and a portion was separated. The No. 2 bearing feeds oil to the No. 2 crankshaft main journal which then feeds the No. 2 and the No. 3 connecting rods.

The No.2 connecting rod had released from its journal and displayed damage consistent with lubrication distress, and portions of the connecting rod were in the sump.

The No. 2 connecting rod bearings were in the oil sump and displayed a significant amount of thermal damage consistent with lubrication distress.

The No. 2 piston remained within the cylinder and the piston was noted to have detached from its connecting rod. The observed portion of the piston displayed significant mechanical damage concentrated to the rear of the piston.

The induction system remained attached to the engine; however, several induction coupling clamps were noted to be missing. Further examination revealed that all the induction riser bolts that go on the inside portion of the attach flange were not installed.

The last annual inspection was performed on 04/02/2018 at a tachometer time of 1262.0. The last oil change was performed on 07/08/2018 at a tachometer time of 1315.6. All six cylinders were changed on 09/09/2017 at a tachometer time of 1225.8. The tachometer time at the time of the accident was 1,333.4 hours, which is 107.6 hours since all six cylinders were replaced.