

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA210

ENGINE EXAMINATION

July 25, 2024

A. ACCIDENT

Location: Fortuna, California
Date: June 20, 2024
Airplane: Lancair LC42-550FG, N141PB

B. ENGINE EXAMINATION

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C. SUMMARY

The airplane had lost most of its engine oil in flight, with only 1 quart remaining. The limited oil resulted in a partial seizure of the engine. Examination revealed that the number 2 cylinder rocker cover gasket was misaligned and not providing an adequate seal, this was allowed oil to escape from the engine. No other anomalies were noted to the engine that would have precluded normal operation.

D. DETAILS OF THE EXAMINATION

1.0 Engine Examination

The airplane came to rest inverted following the accident. At that time, the entire belly was coated in oil through to the tail (figure 1, 2).



Figure 1 - Oil on belly of airplane (photo courtesy of the pilot)



Figure 2 - Oil on belly of airplane at the tail (photo courtesy of the pilot)

The engine remained attached to the firewall and appeared intact and undamaged. With the cowling was removed, oil observed on the left side of the engine.

The oil cooler and all oil lines were intact and showed no evidence of leakage. Both the oil sump drain plug, and the quick drain plug were intact and locked. The oil filter, which was mounted behind the aft engine baffle and forward of the firewall, was clean and dry, and firmly attached to its adapter. One quart of brown colored oil was then drained from the sump, the dipstick indicated that the engine had a capacity of 8 quarts.

According to representatives from Continental Motors, 1 quart of oil was too low for it to be picked up by the pickup tube/suction screen and would have resulted in oil starvation to the engine.

The oil filter was removed, and its paper element was covered in fine metallic particles (see figure 3). The engine breather tube behind the engine baffle appeared

twisted and had a kink midspan. The tube was stiff but could be twisted to a blocked position by hand at the kink.

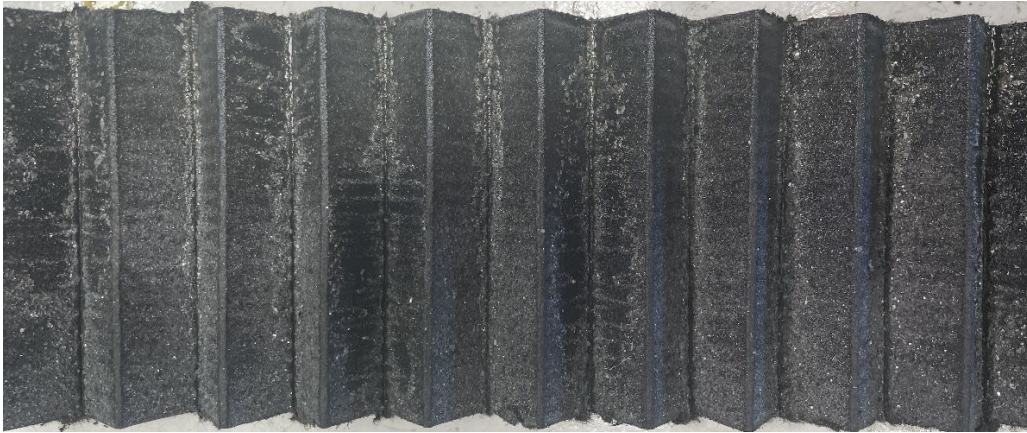


Figure 3 - Oil filter paper media with metallic particles

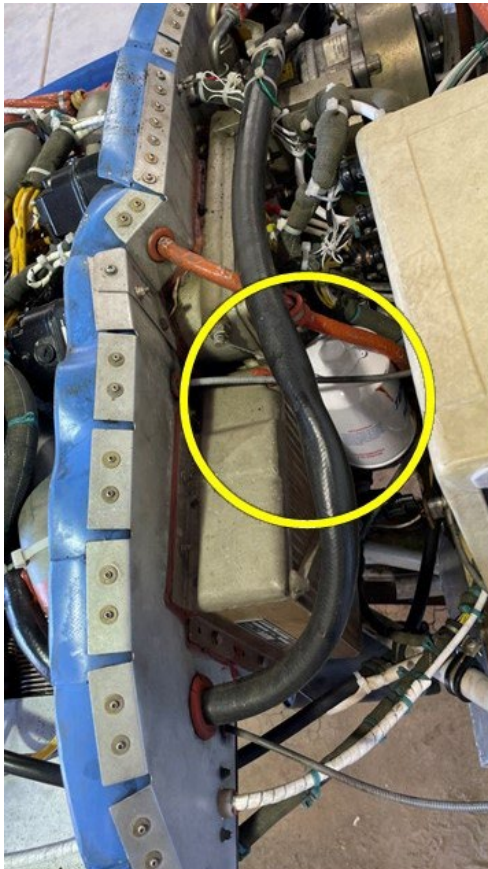


Figure 4 - Oil breather tube with kink circled on left and twisted closed on right.

The propeller governor along with all engine accessories were firmly attached, and both magnetos remained attached to their respective pads. All engine cylinders were in place and firmly attached to the crankcase.

Examination of the rocker covers revealed that the gasket for the exhaust rocker for cylinder number 2 was misaligned and out of place in the lower right hand corner, such that a gap between the rocker cover and cylinder head was present (see figure 5). The rocker cover and milled gasket contact area of the cylinder head were flat.

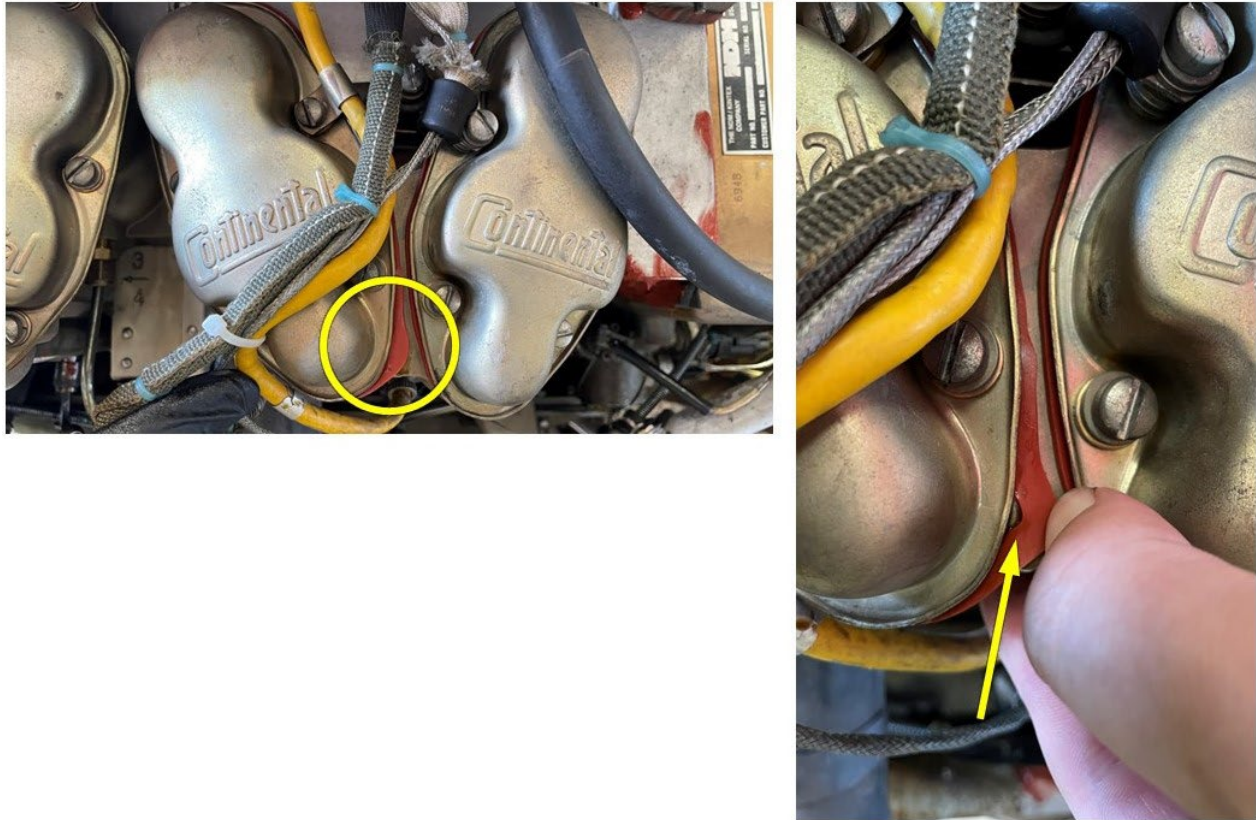


Figure 5 -Left shows the misaligned gasket of exhaust rocker for cylinder number 2, and on the right a gap in the gasket seal.

The surrounding area, including the adjacent lower left cowling (see figure 7) was coated in a light sheen of oil. The rocker cover was removed, and a dark stain was present in the face of the gasket mating surface on both the rocker and cover, which mirrored the misalignment of the gasket (see figure 6).

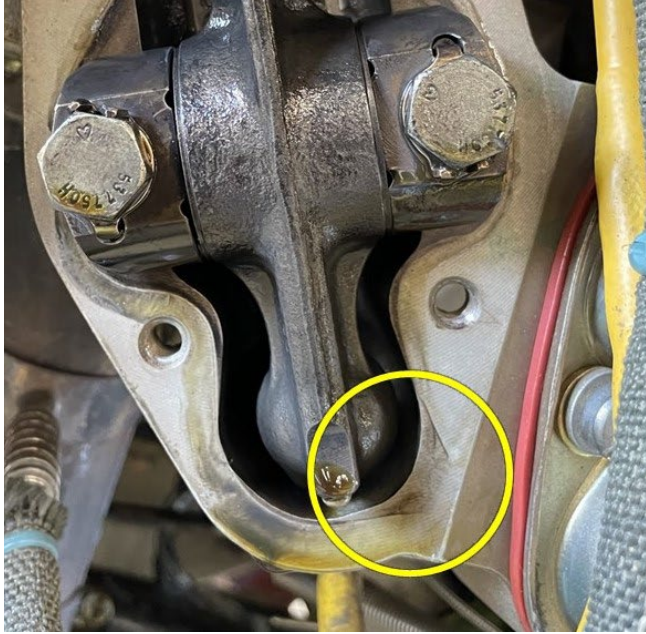


Figure 6 - Witness mark of misaligned gasket.

All the other rocker cover gaskets were tight and in place.



Figure 7 - Oil predominantly in lower left of cowling adjacent to cylinder 2.

The engine crankshaft could be rotated at the propeller hub by hand, however its motion felt stiff with more resistance than typical. Drive train continuity was confirmed through to the accessory case and thumb compression was present at all spark plug bores. The cylinder chambers were inspected with a borescope, and there was no evidence of internal catastrophic failure.

All induction and exhaust tubes were intact.

Submitted by:

Elliott Simpson
Senior Aviation Accident Investigator