



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

June 11, 2018

ENGINE EXAMINATION

ERA18LA038

A. ACCIDENT EXAM

Location: Continental Motors, Inc
Date: Week of June 4th, 2018
Aircraft/Case: ERA18LA038
NTSB IIC: Eric Alleyne

B. ENGINE EXAMINATION PARTICIPANTS:

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C. SUMMARY

The pilot and flight instructor, in a twin-engine airplane, had flown earlier in the day, including practice maneuvers and including takeoff and landings. The pilot reported, that on a touch-and-go landing, he raised the flaps and slowly applied the throttles. Both engines were producing full power and just the rotated the airplane, the airplane yawed left. The airplane then veered off the runway.

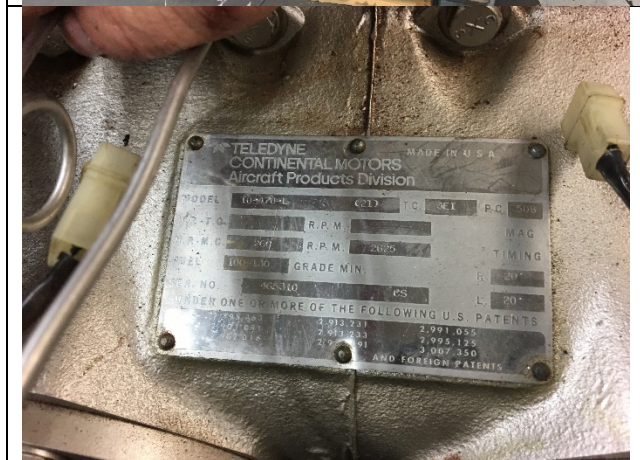
The left engine was separated from the airframe and shipped to Continental Motors, Inc for examination/engine run. The engine is a six-cylinder Continental IO-470 engine.

D. DETAILS OF THE INVESTIGATION

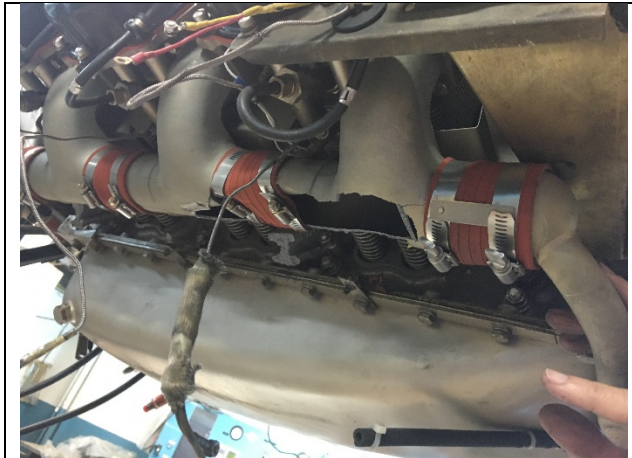
1.1 Exam Photos



Overall condition of the engine, when the shipping crate was opened.



Engine identification plate: IO-470-L



In order to accommodate an engine run, the following items were removed/corrected.

The engine's cooling baffling was removed

The broken intake tubes were replaced

The four engine mounts were replaced



Vacuum pump, alternator, propeller governor were removed

Engine oil was drained, and refilled

A set of straight exhaust stacks were installed

As tested the engine timing was set at 23 degrees. (timing per dataplate is 20 degrees)



Several additional lines, such as fuel, oil lines were connected to the engine



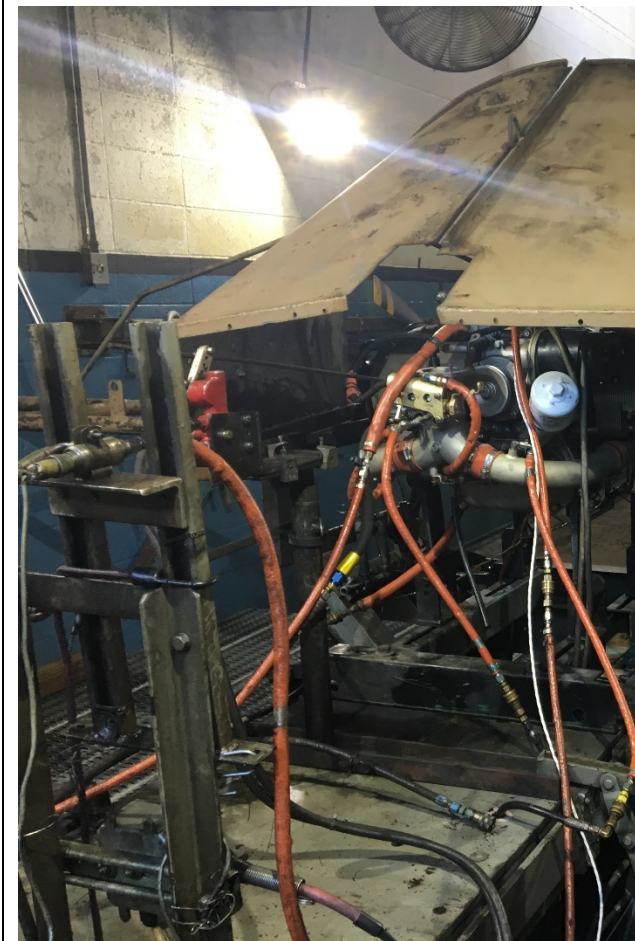
The top set of sparkplugs were removed, the plugs exhibited normal combustion signatures

A cold compression test was done:

19/47/4/4/35/7

After the engine run the compression test was redone, with a “hot” engine

74/73/75/71/76/75



The mixture control was initially “wired” to the full rich position, for the test.



A fix-pitch, test propeller was installed on the engine, and the engine was placed in an engine test cell.

Engine during test run.

The engine started and was run through a series of test points.



The engine would run to full power; However, when “jockeying” the throttle from idle to full power, the engine would stop. However, if the throttle was slowly advanced from idle the engine would continue to run.

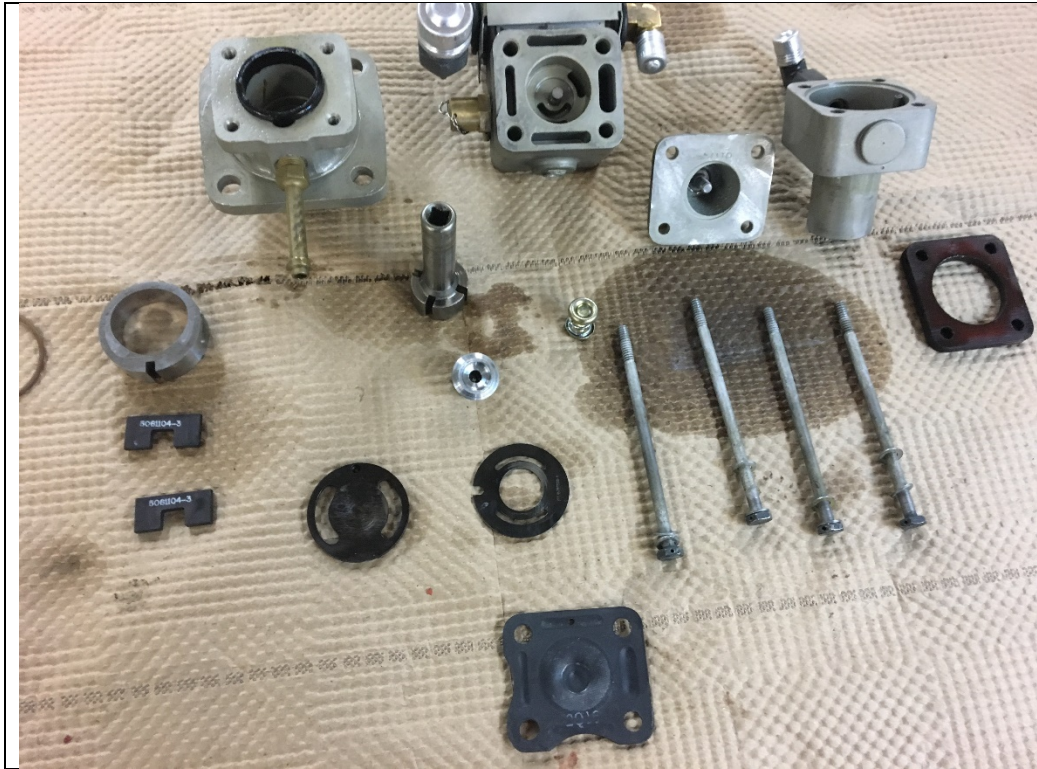
The engine appeared to be running too rich, at the low power settings.

Additionally, during the magneto check, approx. 2100 rpm, the engine slowly stopped (left mag). Even though when tested by hand, the produced a spark, the left mag was then replaced. The test was repeated, and when the right mag was selected, the engine would slowly stop producing power.

Again, the mag appeared to be good, it was

	undetermined why/if the combination of a rich mixture and magneto-engine timing of 3-degrees off, could stop an engine from producing power.
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	After the engine run, the throttle body, fuel pump, and fuel manifold were bench tested: the test revealed that at the lower power settings, the mixture was overly rich.
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After the bench test, the fuel pump was disassembled. A small weep at the back of the pump was observed during the test, however, the diaphragm, appeared to be in good shape, even when viewed thru a microscope.

The engine's fuel mixture was overly rich at low power settings, however, a reason why the engine performed satisfactory on previous flights, but lost power on the accident flight was not found.