

ENGINE TEARDOWN REPORT INSPECTOR STATEMENT

Engine Model: Continental IO-360-KB (2)

Engine Serial Number: 356100

Aircraft Make: Cessna

Aircraft Model: CE-R172-K

Aircraft Serial Number: R1723011

Registration Number: N758DK

Date of Examination: 10/28/2015

Requesting FAA Office:

NTSB—Brain Rayner

FAA IIC—Christopher T. Zuza; AEA-TEB-FSDO-25

Accident/Incident Number: ERA 15 LA 338

Investigation Party:

Jack E. Clark----Birmingham, Al. FSDO SO-09

Philip Grice---Continental Motors, Mobile, Al.

Description of Engine:

360 cubic inch displacement, six cylinders, air cooled, horizontally opposed, fuel injected engine, developing 210 horsepower at 2800 RPM i/a/w STC SE1436CE.

Initial Inspection:

Aircraft engine was located in the Analytical Department at Continental Motors, Mobile, Alabama. The engine was removed from a shipping container and placed on an engine stand. This engine was received with baffling, alternator vacuum pump, propeller governor, magneto`s and harness, starter, fuel system, exhaust headers and oil filter.

Initial examination revealed the following impact damage; right magneto flange was broken and hanging loose from the engine; right front engine mount broken; misc. harness leads cut, fuel pump housing broken.

Engine Disassembly:

- Engine baffle was removed.
- Cylinder flange nuts were checked for security and breakaway torque. #2 & #3 cylinder through bolts nuts and perimeter nuts were below factory specifications for breakaway. The #2 cylinder through bolts breakaway torque was 236/365 in. lbs. respectively. The #3 cylinder through bolts breakaway was 286/351 in. lbs. respectively. (Factory Specification 590-610 in lbs.)

- Cylinders were removed--#3 & #4 cylinders removed by cutting piston skirts; pistons and cylinders had normal operating appearance.
- Crankcase was disassembled—a loss of bearing pinch was noted with the #2 main bearing; #2 main bearing shifted forward contacting crankshaft; crankshaft broke through the #4 throw. Remnants of the #2 main bearings were found in the oil sump. The #1 main bearing displayed signature of fatigue/stress from oil starvation. The #3 and #4 (front main) bearing had no signature of fatigue/stress. Fretting was noted around the #1, #2- #3 through bolt bosses and the #2 & #3 cylinder deck pads.
- Crankshaft was disassembled- #1 & #2 main journals and bearings displayed signatures of fatigue/stress from oil starvation; #3 & #4 main journals revealed no sign of fatigue/stress.
- #1, #2, #3 & #4 connecting rod bearings and journals displayed fatigue/stress from oil starvation; #1, #2 & #3 connecting rods were rusty, indicating a high temperature during last moments of engine operations.

Accessory Testing:

Both magneto's were tested and satisfactory—7MM spark gap.
No other accessories were tested during this examination.

Left magneto	p/n 6314	s/n 05081136
Right magneto	p/n 6314	s/n 05081137
Starter Delco	p/n MHJ 4003	s/n 9M000082
Throttle Body	p/n 640563-15	s/n 0159909-AR
Fuel Pump	p/n 649364-4	s/n 0159911-BR
Fuel Manifold Valve	p/n 631351-1A8	s/n L1549116-R
Governor	p/n 0290D3J/T6	s/n 840074
Alternator	p/n DOFF10300ER	s/n K0671584
Vacuum Pump	p/n RA215CC	s/n A36133
Spark Plugs	p/n RHM-38S	

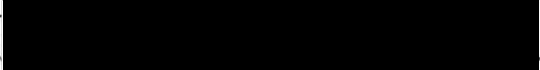
Added Information/Other:

None

Causal Factor/ Observations:

This engine examination revealed the #2 and #3 cylinder through bolt nut torques were below factory specifications, allowing for a loss of bearing pinch of the #2 main bearings, the #2 main bearing shifted forward into the crankshaft, breaking the crankshaft through the #4 throw.

Review of engine maintenance records revealed the #3 & #4 cylinders had been removed and reinstalled for maintenance on May 11, 2012, approximately 231.5 hours of operation prior to failure of this engine.



Jack E. Clark
Aviation Safety Inspector, FSDO SO-09
November 16, 2015

Enclosures: Photographs one CD.
Copy of CMI's Cylinder Nut Breakaway Torque form.