

ENGINE TEARDOWN REPORT

INSPECTOR STATEMENT

Engine Model: Continental O-470-K (33)

Engine Serial Number: 049549-R

Aircraft Make: Cessna

Aircraft Model: CE-180-B

Aircraft Serial Number: 50509

Registration Number: N180GK

Date of Examination: October 27, 2014

Requesting FAA Office: NTSB—Brian Rayner

Accident/Incident Number: ERA 14 LA 446

Investigation Party:

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

Philip Grice, Mike Counsel---Continental Motors, Mobile, AL.

Ricardo Asensio—Cessna/Beechcraft Air Safety

Description of Engine:

470 cubic inch displacement six cylinder, air cooled, carbureted engine, developing 230 horsepower at 2600 RPM.

Initial Inspection:

Aircraft engine was located in the Analytical Department at Continental Motors, Mobile, Alabama. The engine was received with the starter, magnetos and harness, carburetor. The engine was removed from a shipping container and placed on an engine stand.

Initial examination of the engine revealed accident related damage to the following items: oil sump, Intake balance tube, #6 rocker cover. Crankshaft freely rotated in crankcase; however loose metal/material was noted inside the oil sump area. There was no drainable oil remaining in the engine.

Engine Disassembly:

- Removal of the oil sump revealed piston material, crankcase lifter boss material and the broken head of #3 exhaust valve.
- All cylinders were removed; noting the following items: #3 cylinder exhaust valve head had separated from the stem; The #3 piston pin was found intact in the rod assembly; both piston pin plugs were found mushroomed; #1, #2, #4, #5 & #6 cylinders a normal operational appearance.
- Crankcase was disassembled noting the #3 lifter boss (exhaust) had broken.
- Crankshaft assembly was disassembled; noting light embedding of metal into the bearing surfaces of both the rod and main bearings.

- Oil pump was disassembled noting metal shaving in the housing and screen; no scoring of the pump walls was noted.

Accessory Testing:

Magneto timing was checked prior to engine disassembly: Left Mag 21.5 degrees BTDC, Right Magneto 22 degrees BTDC.

Magnetos were tested using a slave harness----found satisfactory at 7mm gap.

Installed Accessories:

Starter	ISKRA	655565	s/n 05-41-0067
Carburetor	MA-4-5	10-4893-1	s/n BD123833
Left Magneto	S6RSC-25	BL500556-1	s/n D05EA038R
Right Magneto	S6RSC-25	BL500556-1	s/n D05EA025R

Added Information:

#3 exhaust valve head, stem and rotocoil were sent to Continental Motors Engineering Department for metallurgical evaluation (reference attached report for details). This report stated that the fracture started at the outer surface and grew in fatigue; the valve stem tip showed evidence of turning, but also straight lines, indicating a non-turning condition for a period of time. The rotocoil was tested in the Analytical Department and rotated normally during testing.

Causal Factor:

The #3 exhaust valve failed causing a catastrophic failure of the #3 piston and breaking the #3 lifter boss (exhaust). No other mechanical issues or failures were observed during teardown of this engine. Examination revealed that this engine appeared to be operating normally and within manufactures specifications prior to occurrence.

Jack E. Clark
Aviation Safety Inspector, FSDO SO-09
November 4, 2014

Attachments: Photographs one CD.

Continental Motors Metallurgical Report, dated October 30, 2014.