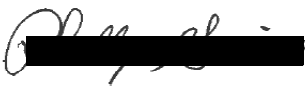




Continental Motors

ENGINE RUN REPORT

ENGINE MODEL	LTSIO360EB3B
ENGINE SERIAL NUMBER	807971-R
AIRCRAFT MAKE & MODEL	Piper PA-34-200T
AIRCRAFT SERIAL NUMBER	34-8070037
AIRCRAFT REGISTRATION	N81291
FILE NUMBER	14-369

NAME	SIGNATURE	DATE
Phillip Grice		05/27/2015

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EXAMINATION		ACCIDENT DATA	
DATE	05/27/2015	NTSB ACCIDENT #	ERA15FA088
FACILITY	Mobile CMI	NTSB INVESTIGATOR	Heidi Motes
ADDRESS	2039 Broad Street Mobile, Alabama. 36615	FAA INVESTIGATOR	Charles Holsclaw
		ACCIDENT DATE	01/02/2015
		ACCIDENT LOCATION	Kuttawa, KY.

ENGINE INFORMATION

ENGINE POSITION	Right
TOTAL TIME	3029.7
TIME SOH	123.7
TYPE & TIME SLI	33.7
BUILD DATE	01/24/2005
IN SERVICE DATE	Not reported

Significant logbook information:

The engine was overhauled on 12/13/2012 by Western Skyways under work order 0028220. The last annual inspection was completed on March 16, 2014 at 90.5 hours since major overhaul.

Report Summary:

Search Code(s):

15-12-68

The engine was returned to CMI with the Crankshaft flange fractured from impact forces. The flange was weld repaired for the test run. The fuel pump was fractured from impact. Portions of the induction system and exhaust system were impact damaged and replaced for the engine test. There were no pre-impact anomalies noted that would have prevented engine operation to rated power.

Disposition of engine following exam:

Engine returned to AMF Aviation on CMI shipper request AD00803 dated 06/01/2015.

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NAME	Phillip Grice	NAME	Johnny Little
ADDRESS	██████████	ADDRESS	██████████
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE	██████████	PHONE	██████████
NAME	Greg Eastburn	NAME	Chris Lang
ADDRESS	██████████	ADDRESS	██████████
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE	██████████	PHONE	██████████
NAME	Heidi Moats	NAME	Charles Holsclaw
ADDRESS	████████████████████ Ashburn, VA 20147	ADDRESS	████████████████████ ██████████ Louisville, KY 40223
ORGANIZATION	National Transportation Safety Board	ORGANIZATION	Federal Aviation Administration
PHONE	██████████	PHONE	██████████
NAME	Brian Shaughnessy	NAME	
ADDRESS	████████████████████ ██████████ Louisville, KY 40223	ADDRESS	
ORGANIZATION	Federal Aviation Administration	ORGANIZATION	
PHONE	██████████	PHONE	

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EXTERNAL INSPECTION OF ENGINE



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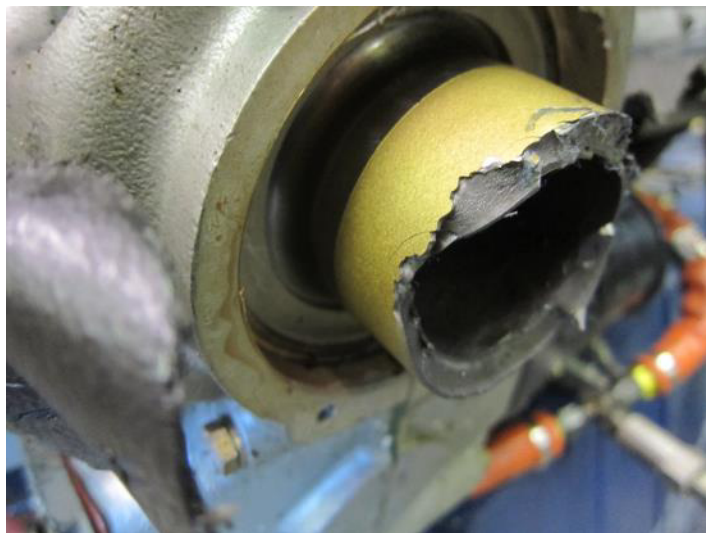
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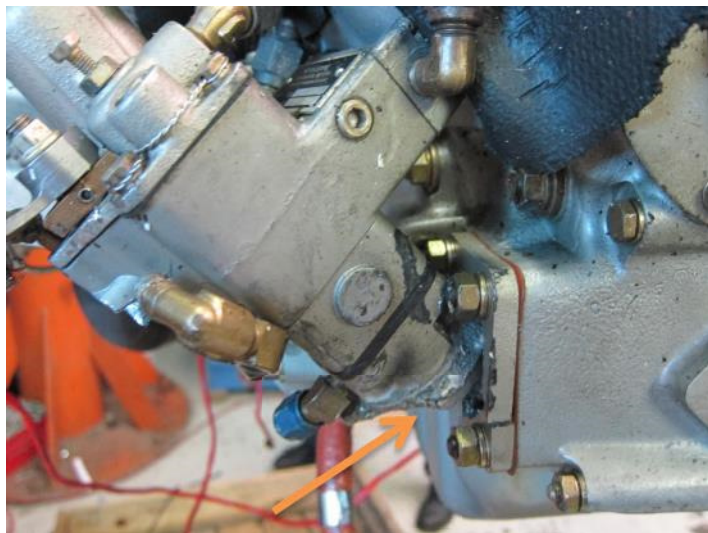
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ENGINE PREPARATION PRIOR TO RUN

There were a number of airframe related items removed in preparation for operation on the CMI test bed.

Items removed:

Engine baffling

Vacuum pump

Damaged exhaust system

Oil cooler adaptor

Propeller governor

Various fuel and oil hoses

The following substitute or repaired parts were required for engine operation:

Oil cooler adaptor

Engine mount legs

Right induction elbow

Exhaust system

The crankshaft propeller flange was welded back on to the crankshaft.

The crankshaft nose seal was removed and replaced to enable welding of the flange.

The original fuel pump was repaired using a substitute front and rear housing.

The cylinders were borescoped and the following was observed: No anomalies were observed.

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Magneto-to-Engine Timing (Specified):	Left Magneto:	Right Magneto:
20°BTDC	21°BTDC	20°BTDC

A cylinder leakage test was performed prior to the test run in accordance with the latest revision of CMI Service Bulletin SB03-3 with the engine at room temperature with the following results (master orifice reading – 43 PSI):

Cylinder #1 - 20/80 PSI (exhaust valve/rings)	Cylinder #2 - 75/80 PSI (exhaust valve/rings)
Cylinder #3 - 37/80 PSI (exhaust valve/rings)	Cylinder #4 - 52/80 PSI (exhaust valve/rings)
Cylinder #5 - 21/80 PSI (exhaust valve/rings)	Cylinder #6 - 05/80 PSI (exhaust valve/rings)

(*) – Leakage Source

The engine was not disassembled prior to the engine run. The crankshaft end-play measured 0.012” and the run-out was 0.017”. These measurements were completed after the weld repair to the crankshaft flange.

The engine was then prepared for operation by installing the appropriate thermocouples, pressure lines and test pads for monitoring purposes. The engine was then moved to CMI test cell number 43 and mounted for operation. The engine was fitted with a test club propeller for the LTSIO360EB engine model.

FUEL PUMP REPAIR PRIOR TO RUN:

The fuel pump exhibited impact damage to the mounting flange, rear aneroid housing, and the fuel outlet boss. The mounting flange and the rear aneroid housing were replaced with serviceable units. The outlet fitting was replaced and epoxied to seal the damaged boss. The pump adjustments were measured and reset to the same extension of the as received fuel pump. The remainder of the fuel pump components was reused for the engine test.



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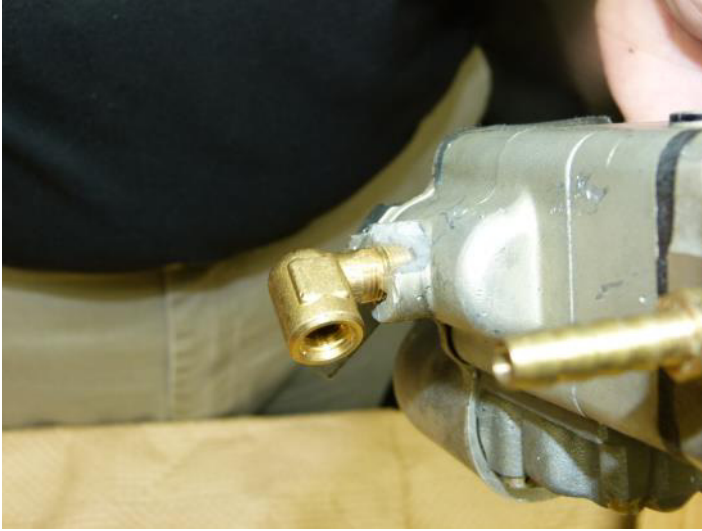
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DESCRIPTION OF RUN

The engine experienced a normal start on the first attempt without hesitation or stumbling in observed RPM. The engine RPM was advanced in steps for warm-up in preparation for full power operation. The engine throttle was advanced to 1200 RPM and held for five (2) minutes to stabilize. The engine throttle was advanced to 1600 RPM and held for five (2) minutes to stabilize. The engine throttle was advanced to 2450 RPM and held for five (2) minutes to stabilize. The engine throttle was advanced to full open position and held for five (2) minutes to stabilize. The engine throttle was rapidly advanced from idle to full throttle five times where it performed normally without any hesitation, stumbling or interruption in power.

Throughout the test phase, the engine accelerated normally without any hesitation, stumbling or interruption in power and demonstrated the ability to produce rated horsepower.

Note: due to the repaired (welded) crankshaft flange the run time at each power setting was reduced to 2 minutes each. Upon completion of the test the crankshaft flange was sectioned to prevent further operation of engine with the welded flange.

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Time		RPM	MP / TDP “ Hg	Oil		Fuel				Cell ° F	Cylinder Head Temperature ° F					
Reading	Minutes			PSI	° F	Lbs./Hr.	Nozzle PSI	Pump PSI	Fuel ° F		# 1	# 2	# 3	# 4	# 5	# 6
1	2	1200	19/30	30	172	16.0	4.4	6.4	77	79	243	258	285	221	260	211
2	2	1600	22/30.9	40	158	34.5	5.0	8.3	77	79	311	305	286	323	260	210
3	2	2100	33/37	40	198	87.5	9.8	16.3	77	79	319	313	306	333	268	320
4	2	2450	40/45	44	197	137	12.8	31.8	82	79	318	321	303	341	274	327
5	2	F/T 2470	40/45	48	187	144	15.7	30.1	80	80	312	321	290	338	262	373
6	2	Idle 770	18/30	22	170	13.8	4.4	6.2	77	79	240	237	213	272	212	253
Ambient Air Temperature °F		Ambient Air Pressure		Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters										
78.8		29.30		IN	OUT	RPM		“ Hg MP		Fuel Flow Lbs./Hr.		Metered PSI		Unmetered PSI		
				53	45	2575		40.0		130-140		15.8-18.3		43.0-46.0		

Notes: Operator – Johnny Little, 30524. Transfer collar pressure delta measured at full throttle power setting.

Engine Performance Test				
Test RPM	Left Magneto	Left Magneto	Right Magneto	Right Magneto
	RPM	RPM Drop	RPM	RPM Drop
2100	2088	1976	2148	2064