



Continental Motors

ENGINE RUN REPORT

ENGINE MODEL	TSIO520C (2B)
ENGINE SERIAL NUMBER	178450
AIRCRAFT MAKE & MODEL	Cessna TU206C
AIRCRAFT SERIAL NUMBER	U206-1177
AIRCRAFT REGISTRATION	N29225
FILE NUMBER	████████

NAME	SIGNATURE	DATE
████████	████████	03/24/2017

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EXAMINATION		ACCIDENT DATA	
DATE	3-22-2017	NTSB ACCIDENT #	CEN16LA323
FACILITY	Mobile Alabama	NTSB INVESTIGATOR	Alex Lemishko
ADDRESS	[REDACTED] [REDACTED]	FAA INVESTIGATOR	Mark Schurig, FAA IIC, Brian Love, Little Rock FSDO
		ACCIDENT DATE	8-13-16
		ACCIDENT LOCATION	Skiatook, OK

ENGINE INFORMATION

ENGINE POSITION	Single
TOTAL TIME	3687.98 calculated from tach time recorded on last engine annual inspection.
TIME SOH	Undetermined. "Time since overhaul" not recorded by IA on last engine annual inspection.
TYPE & TIME SLI	85.75 since last airframe annual inspection dated 8-1-2015.
BUILD DATE	12-01-1994
IN SERVICE DATE	5-12-1995

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Significant logbook information:

DATE	RECORDING TACH TIME	TODAYS FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations
19				Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.) [REDACTED] N29225 S/N u206-1177 Tach:1515.70 TT:3602.23 08/01/2015 Continental TSIO-520C S/N 178450R Ground ran engine and checked all operating parameters, ck good. Performed hot compression check IAW Continental SB84-15 using master orifice tool. Minimum allowable compression is 36/80 all compressions in limits, #1 60/80 #2 60/80 #3 60/80 #4 50/80 #5 70/80 #6 66/80. Drained oil and removed filter. Cut open filter and inspected for contamination, ck good. Removed oil screen and inspected and cleaned checked good, installed new crush washer and saftied screen. Installed new AA48110 Tempest filter and saftied. Serviced engine with Phillips 20W-50 oil. Removed intake duct and cleaned out bird nest, installed new Brackett BA2405 filter. Removed and cleaned, gapped and tested all plugs, all check good. Installed with new gaskets. Set magneto timing. Checked good. Lubed all engine controls. No new AD's or recurring AD's due. Ground ran engine and leak checked and checked oil pressure and magneto drop, checked good. No leaks at this time. [REDACTED] TOP-FLIGHT AVIATION Get there SAFELY!

Report Summary:

Search Code(s): 15-12-68

The engine did not exhibit any pre-impact conditions that would have prevented the engine from producing rated power.

Disposition of engine following exam: The engine was released by the NTSB IIC and will be returned to Dawson Aircraft, Clinton, Arkansas

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INSPECTION WITNESSES			
NAME		NAME	
ADDRESS	Mobile Alabama	ADDRESS	Mobile Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME		NAME	
ADDRESS	Mobile Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Alex Lemishko	NAME	
ADDRESS	Central Region	ADDRESS	
ORGANIZATION	NTSB	ORGANIZATION	
PHONE		PHONE	

EXTERNAL INSPECTION OF ENGINE

The engine exhibited minimal damage. The left front and rear engine mount were broken and the oil sump quick drain was leaking oil. The exhaust pipe was impact damaged.



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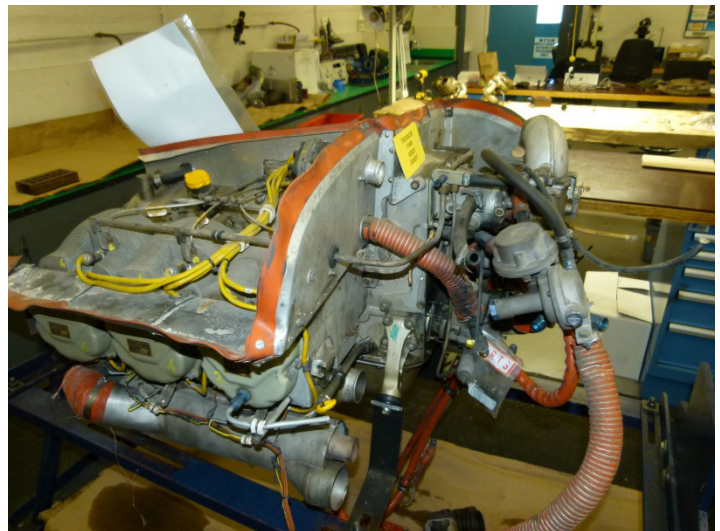
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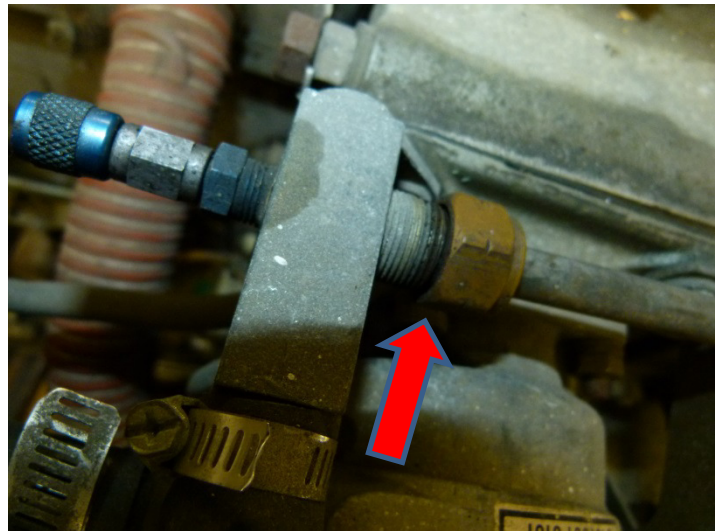
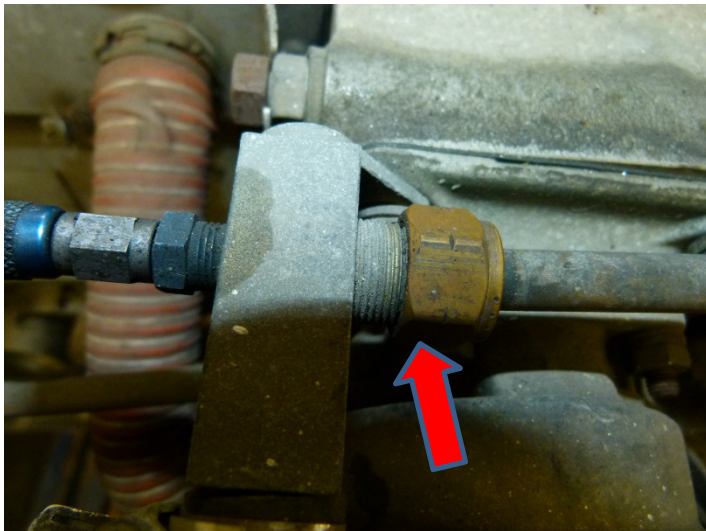
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ENGINE PREPARATION PRIOR TO RUN

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

Items removed:

- 1) Left rear and left forward engine mounts
- 2) Propeller governor
- 3) Airframe cooling baffles
- 4) Oil temperature probe
- 5) Oil sump quick drain valve

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

- 1) Oil sump drain plug
- 2) Left forward and rear engine mounts

The cylinders were borescoped and the following was observed: All intake and exhaust valves were intact. The piston domes and valve faces exhibited normal combustion signatures.

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The magneto-to-engine timing was checked and with the following results:

Magneto-to-Engine Timing (Specified):	Left Magneto:	Right Magneto:
20°BTDC	19°BTDC	19°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 – 44 PSI):

Cylinder #1 - 54/80 PSI (rings)	Cylinder #2 - 13/80 PSI (exhaust valve/rings)
Cylinder #3 - 13/80 PSI (exhaust valve/rings)	Cylinder #4 - 8 /80 PSI (exhaust valve/rings)
Cylinder #5 - 18/80 PSI (exhaust valve/rings)	Cylinder #6 - 11/80 PSI (exhaust valve/rings)
(*) – Leakage Source	

The engine was not disassembled prior to the engine run. The crankshaft end-play measured 0.011” and the run-out was 0.002”.

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 TSIO520C engine model.

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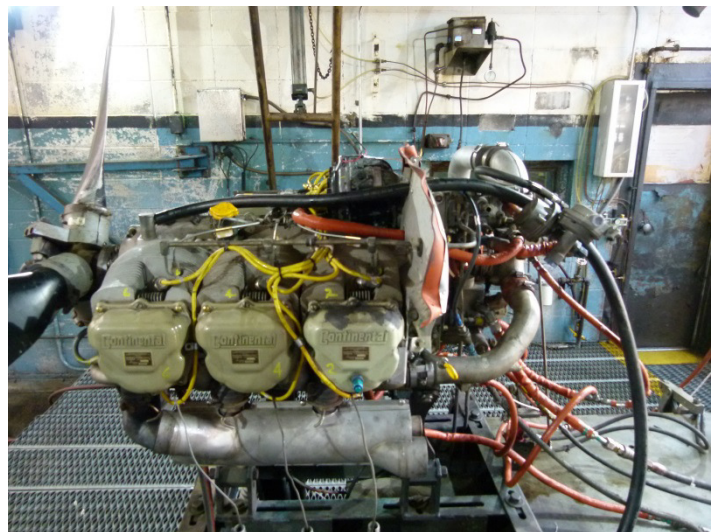
This engine was received at CMI with a known issue. When the engine was inspected by the CMI ASI at the recovery examination, a B-nut in the upper deck pressure was found in a loose condition. Prior to the initial engine test run, the B-nut was tightened. After the initial test run, the B-nut was loosened and the engine was run in the 'as received' condition.

During the initial engine test run, an oil leak was detected. A flexible fluid hose was leaking between the turbo controller to the turbo wastegate. A slave hose was installed for the remainder of the engine 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 (5) minutes to stabilize. The engine throttle was advanced to 1600 RPM and held for five (5) minutes to stabilize. The engine throttle was advanced to 2450 RPM and held for five (5) minutes to stabilize. The engine throttle was advanced to full open position and held for five (5) 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.

After the initial test run the turbo controller was adjust to rated manifold pressure and a second run sheet completed with the upper deck reference line connected and disconnected to simulate the condition found at the field engine inspection.



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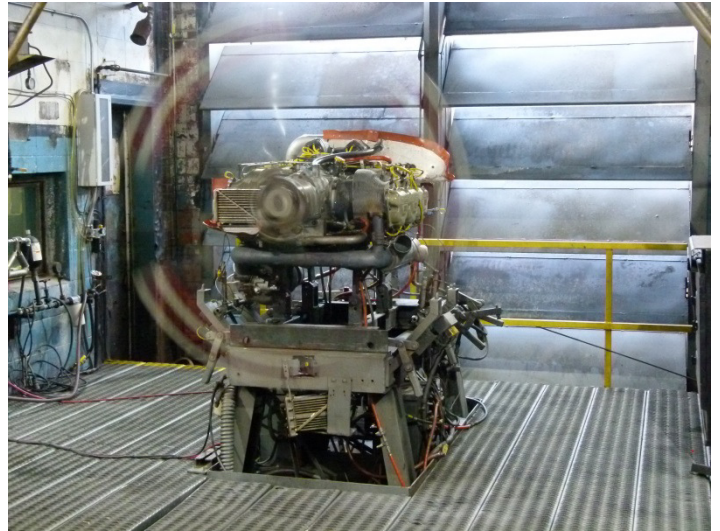
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A cylinder leakage test was performed after the test run in accordance with the latest revision of CMI Service Bulletin SB03-3 with the engine hot with the following results (master orifice reading –44 PSI):

Cylinder #1 -57 /80 PSI (rings)

Cylinder #2 -60 /80 PSI (exhaust valve/rings)

Cylinder #3 -43 /80 PSI (exhaust valve/rings)

Cylinder #4 -60 /80 PSI (exhaust valve/rings)

Cylinder #5 - 63/80 PSI (rings)

Cylinder #6 - 65/80 PSI (exhaust valve/rings)

(*) – Leakage Source

ENGINE RUN PARAMETERS– 1st Run

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	5	1200	19.02/30.14	68	140	32.6	5.05	11.43	72	86	274	264	269	247	232	197
2	5	1600	22.03/30.55	58	165	51.2	6.18	14.57	72	85	304	297	299	271	262	212
3	5	2100	27.70/30.95	50	187	94.6	9.06	20.19	73	85	324	331	351	303	321	251
4	5	2450	30.20/31.70	42	217	126	12.19	26.17	74	85	394	386	427	345	373	290
5	5	F/T 2500	31.01/31.73	42	215	152.7	14.75	26.82	74	84	393	372	415	328	364	283
6	5	Idle 750	18.45/30.01	11	204	15.2	5.07	7.95	73	85	298	316	306	283	225	184
Ambient Air Temperature °F		Ambient Air Pressure		Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters										
78.5		29.59		IN	OUT	RPM		“ Hg MP		Fuel Flow Lbs./Hr.		Metered PSI		Unmetered PSI		
				42	45	2700		32.5		160-170		15.3 – 17.2		29.0 – 32.0		

Notes: Operator – Lisa Jersild. 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	1924	176	1924	176

Note: Controller as received was set below rated manifold pressure of 32.5”.

Note: The use of the aircraft exhaust system prevented the use of the test cell cooling shrouds. Closing of the shrouds normally nets a 100 to 150 rpm rise when engines are tested at full throttle.

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ENGINE RUN PARAMETERS - 2nd Run

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	5	F/T 2600	32.89 / 33.03	48	202	169	17.69	33.07	69	64	394	360	406	316	361	275
2	5	FT 2600	32.74/32.85	46	206	165.6	17.24	32.67	68	64	406	366	408	320	362	278
Ambient Air Temperature °F		Ambient Air Pressure		Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters										
67		29.87		IN	OUT	RPM		" Hg MP		Fuel Flow Lbs./Hr.		Metered PSI		Unmetered PSI		
				46	49	2700		32.5		160-170		15.3-17.2		29.0-32-0		

Notes: Operator – Lisa Jersild. Transfer collar pressure delta measured at full throttle power setting.

NOTE: THIS SECOND RUN WAS MADE TO DETERMINED THE DIFFERENCE IN ENGINE PERFORMANCE WITH THE UPPER DECK PRESSURE B-NUT LOOSE AS FOUND AFTER THE ACCIDENT AND WHEN TIGHTENED AS NORMAL.

Run number one conducted after controller was adjusted to obtain rated manifold pressure.

Run Number two was, after controller adjustment and with the upper deck reference line disconnect to simulate condition found at field engine inspection.