



Continental Motors

ENGINE RUN REPORT **LEFT**

ENGINE MODEL	IO520CB (6B)
ENGINE SERIAL NUMBER	1033161
AIRCRAFT MAKE & MODEL	Beechcraft E-55 Baron
AIRCRAFT SERIAL NUMBER	TE-922
AIRCRAFT REGISTRATION	N711YK
FILE NUMBER	16-401

NAME	SIGNATURE	DATE
Mike Council		7-13-2017

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GENERAL INFORMATION			
EXAMINATION		ACCIDENT DATA	
DATE	7-11-2017	NTSB ACCIDENT #	WPR17LA059
FACILITY	Mobile Alabama	NTSB INVESTIGATOR	Josh Cawthra
ADDRESS	[REDACTED] Mobile, Alabama 36615	FAA INVESTIGATOR	Troy Wise (did not witness engine run)
		ACCIDENT DATE	1-31-2017
		ACCIDENT LOCATION	Bakersfield, CA
ENGINE INFORMATION			
ENGINE POSITION	Left		
TOTAL TIME	5.2 hours according to the NTSB IIC.		
TIME SOH	NA		
TYPE & TIME SLI	No Inspection was listed in engine logbook installation entry, only a return to service statement - 5.2 hours		
BUILD DATE	10-20-2016		
IN SERVICE DATE	10-25-2016		

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Significant logbook information: NOTE: The engine log book entry below indicates that fuel pressure was set after engine installation. Factory torque putty had not been disturbed on the unmetered fuel adjustment screw located on the engine driven fuel pump indicating that the fuel pressure had most likely not been adjusted.

YEAR	REG#	A/C	TT	DATE	WO
	711YK		8055.2	25 OCT 2016	2016 00111
	RENG:	1748.2	RETSMOH:	-1.6	
	RPROP:	43.0	RPTSMOH:	43.0	
DATE	LENG:	1748.2	LETSMOH:	852.4	LPROP: 43.0 LPTSMOH:
	43.0				

Removed left engine S/N 267945-R; propeller S/N 776388 and governor S/N 1046019N due to alternator shaft failure. Installed Continental rebuilt engine S/N 1033161 with flushed out propeller S/N 776388 and overhauled governor S/N 1046019N. Installed original exhaust with new gaskets. Installed all new fuel hoses and oil lines. Repaired baffling as required and reinstalled. Added 13 quarts of Phillips 66 Type M SAE 20W-50 aviation motor oil.

---Continued---

REG#	A/C	TT	DATE	WO
711YK		8055.2	25 OCT 2016	2016 00111
RENG:	1748.2	RETSMOH:	-1.6	
RPROP:	43.0	RPTSMOH:	43.0	
LENG:	1748.2	LETSMOH:	852.4	LPROP: 43.0 LPTSMOH:
	43.0			

Pre-oiled engine I/A/W Teledyne Continental Aircraft Engine Service Bulletin M89-7R1. Ground run engine and checked for leaks. No leaks found. Set idle mixture and fuel pressures. Final ground run performed. This engine is approved for return to service with respect to the work performed.

[Signature]
Jimmy V Garcia
A&P

Report Summary:**Search Code(s):**

The examination and testing of this engine did not reveal any preimpact anomalies which would have prevented normal operation and production of rated horsepower.

Disposition of engine following exam:

The engine was released by the NTSB IIC and was returned to Plain Parts, Pleasant Grove, CA. See shipper # AD01002

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INSPECTION WITNESSES			
NAME	Phillip Grice	NAME	Greg Eastburn
ADDRESS	Mobile Alabama	ADDRESS	Mobile Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Lisa Jersild	NAME	Mike Council
ADDRESS	Mobile Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Kurt Gibson (Observing)	NAME	Josh Cawthra, IIC
ADDRESS	Mobile, Alabama	ADDRESS	Western Pacific Region
ORGANIZATION	CMI	ORGANIZATION	NTSB
PHONE		PHONE	

EXTERNAL INSPECTION OF ENGINE

The engine was received in a shipping container furnished by CMI for this purpose. The shipping crate was opened and exhibited an accident engine with a data plate which identified the engine as serial number 1033161. The engine exhibited impact damage to cylinder 6 forward cooling fins, and the right rear and left upper engine mounts were impact damaged. The starter motor was missing and not shipped with the engine. The starter adapter was damaged at the starter motor mount. The right rear intake manifold tube separated and was not shipped with the engine. The impact damaged left rear intake manifold tubes separated and were loose in the shipping container along with the damaged throttle body/metering valve, instrument air pump and various hoses and plumbing pipes. The engine oil sump received impact damage but remained intact. The engine driven fuel pump received impact damage to hose fittings but the unmetered fuel pressure screw was intact and exhibited factory torque putty. The oil pump rear cover was impact damaged.

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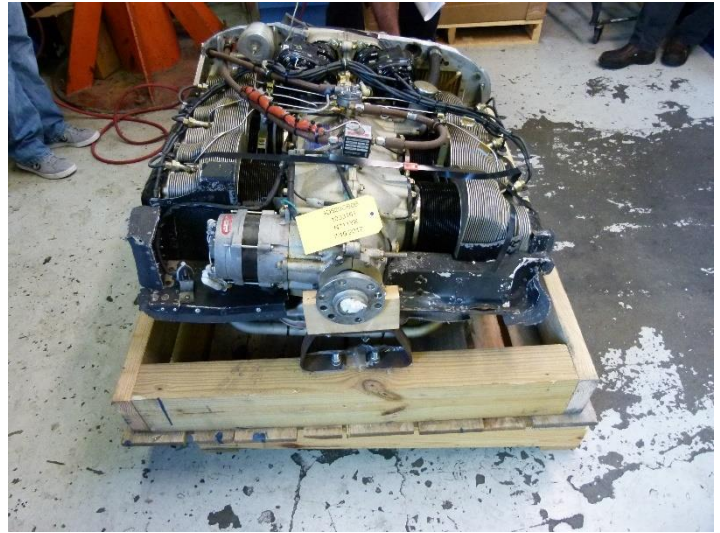
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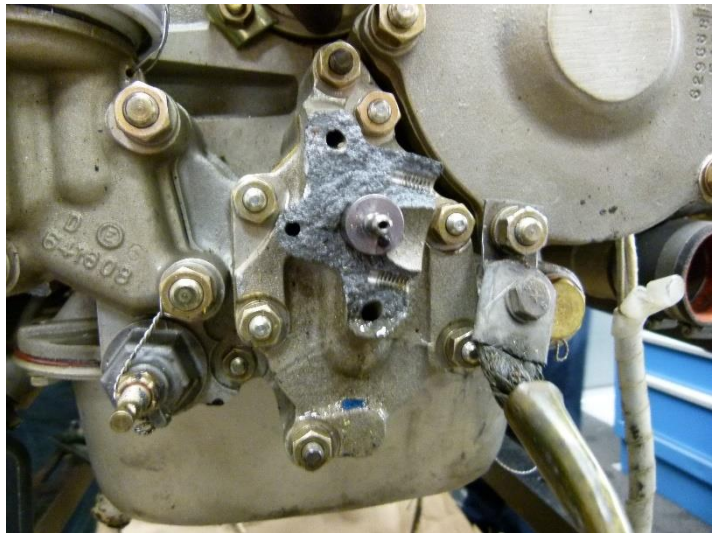
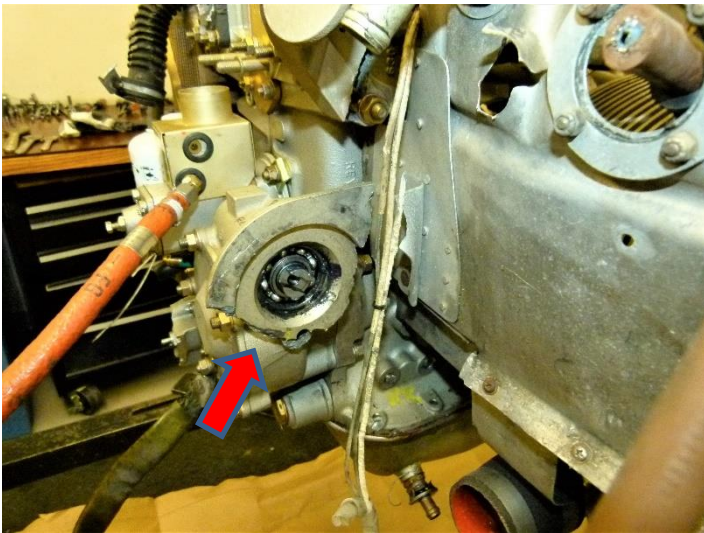
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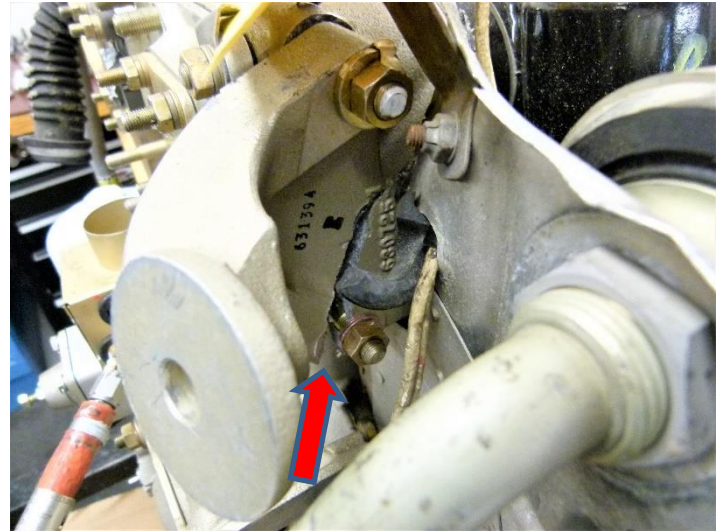
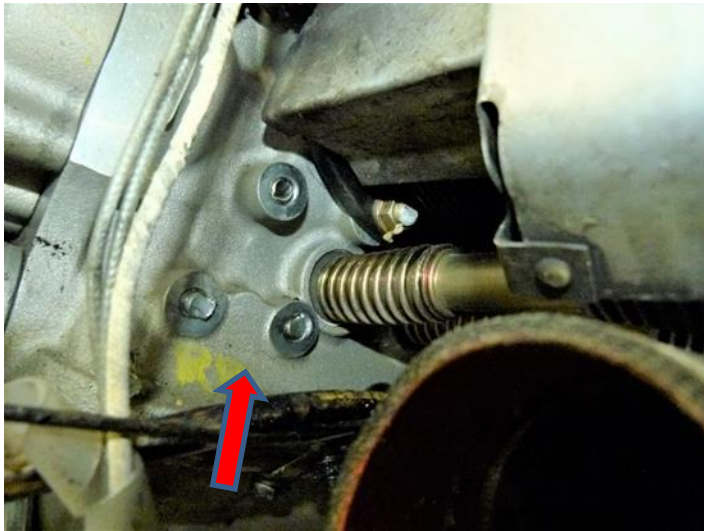
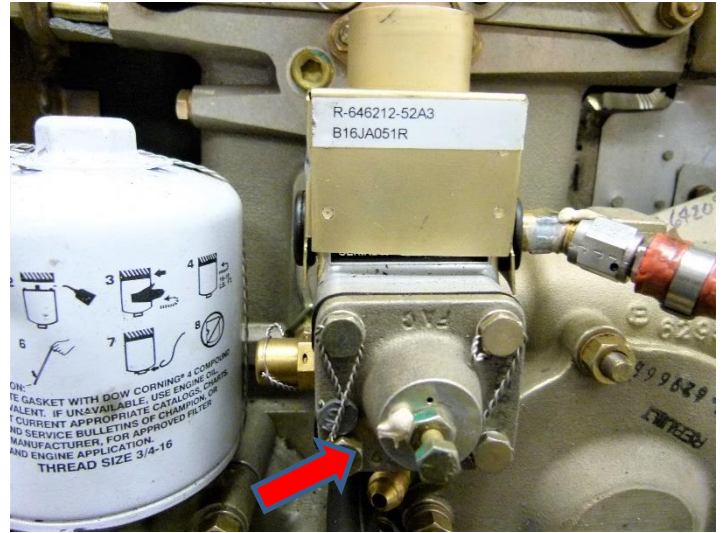
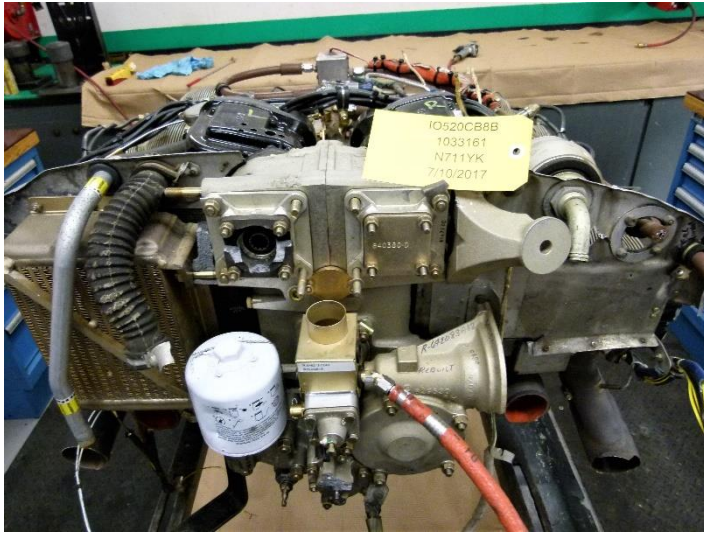
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ENGINE PREPARATION PRIOR TO RUN

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

Items removed:

Airframe cooling baffles

Propeller governor

Fuel flow transducer

Damaged instrument air pump mounting flange

Crankcase vent tube

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

Starter adapter and starter motor

Throttle body housing

Oil pump housing rear cover

Engine driven fuel pump fittings

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

Magneto-to-Engine Timing (Specified):	Left Magneto:	Right Magneto:
22 °BTDC	23 °BTDC	24 °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 - 19/80 PSI (rings)

Cylinder #2 - 53/80 PSI (rings)

Cylinder #3 -12/80 PSI (exhaust valve)

Cylinder #4 - 15/80 PSI (exhaust valve and rings)

Cylinder #5 - 15/80 PSI (rings)

Cylinder #6 - 20/80 PSI (exhaust valve)

(*) – Leakage Source

The engine was not disassembled prior to the engine run. The crankshaft end-play measured 0.009” and the run-out was 0.007”.

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 IO520 engine model.

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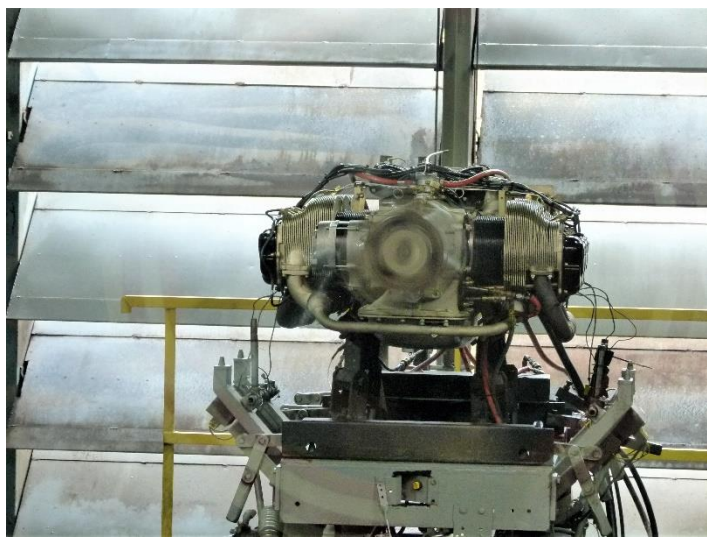
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DESCRIPTION OF RUN

Once the test cell was correctly configured for the test 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.



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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 - 75/80 PSI (rings)

Cylinder #2 - 73/80 PSI (rings)

Cylinder #3 - 73/80 PSI (rings)

Cylinder #4 - 73/80 PSI (rings)

Cylinder #5 - 75/80 PSI (rings)

Cylinder #6 - 74/80 PSI (rings)

(*) – Leakage Source



ENGINE RUN PARAMETERS

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	15.13/	44	163	17.26	3.30	13.93	81	84	300	276	272	238	245	195
2	5	1600	18.16/	47	191	36.03	3.80	18.09	82	83	330	299	312	268	284	230
3	5	2100	21.75/	50	215	72.4	6.55	23.35	82	84	371	339	373	312	355	278
4	5	2450	24.54/	48	239	101.2	9.50	26.58	83	84	422	373	421	351	400	311
5	5	F/T 2736	28.04/	48	244	132.2	14.84	31.15	84	86	390	454	374	412	424	339
6	5	Idle 820	16.18/	22	235	12.03	3.80	11.66	81	86	302	259	255	261	234	203
Ambient Air Temperature °F		Ambient Air Pressure		Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters										
84.1		29.26		IN	OUT	RPM	" Hg MP	Fuel Flow Lbs/Hr	Metered PSI	Unmetered PSI						
				30	31	2700		136/146	14.9	28-31						

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	(2148) 2044	104	(2156) 2068	88



Continental Motors

ENGINE RUN REPORT **RIGHT**

ENGINE MODEL	IO520C (7B)
ENGINE SERIAL NUMBER	267946
AIRCRAFT MAKE & MODEL	Beechcraft E-55 Baron
AIRCRAFT SERIAL NUMBER	TE-922
AIRCRAFT REGISTRATION	N711YK
FILE NUMBER	16-401

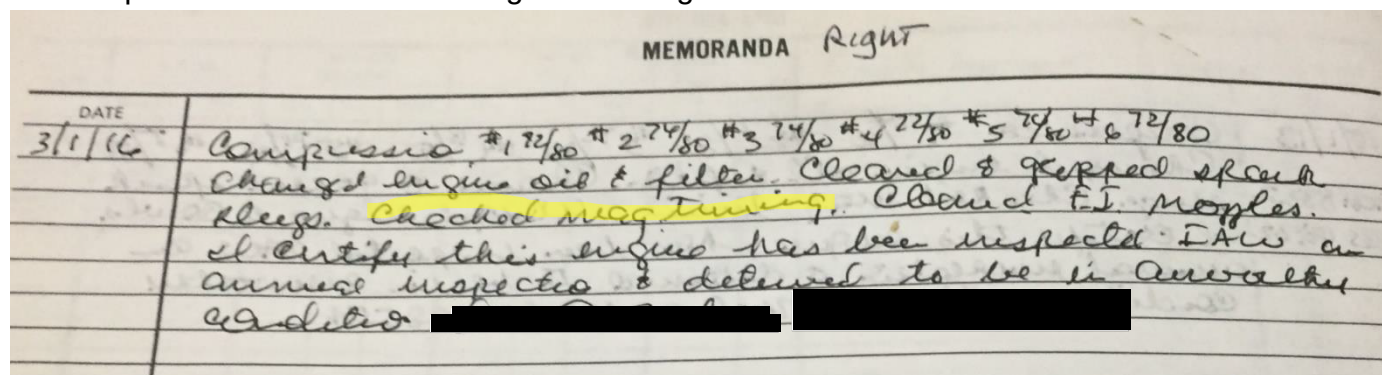
NAME	SIGNATURE	DATE
Mike Council		6-13-2017

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GENERAL INFORMATION			
EXAMINATION		ACCIDENT DATA	
DATE	7-12-2017	NTSB ACCIDENT #	WPR17LA059
FACILITY	Mobile Alabama	NTSB INVESTIGATOR	Josh Cawthra
ADDRESS	[REDACTED] Mobile, Alabama 36615	FAA INVESTIGATOR	Troy Wise (did not witness engine run)
		ACCIDENT DATE	1-31-2017
		ACCIDENT LOCATION	Bakersfield, CA

ENGINE INFORMATION	
ENGINE POSITION	Right
TOTAL TIME	1754.2 (calculated by the NTSB IIC)
TIME SOH	854
TYPE & TIME SLI	48.7 since Annual Inspection dated 3-1-2016
BUILD DATE	5-31-1991
IN SERVICE DATE	9-9-1991

Significant logbook information: NOTE: The logbook entry below is from the last annual/100-hour inspection and indicated that ignition timing was checked.



Report Summary:	Search Code(s):
The left magneto was found attached in its mount but not correctly secured allowing the magneto to move freely in the mount. The engine was tested with the right magneto as found without noticeable effect. Otherwise, the examination and testing of this engine did not reveal any preimpact anomalies which would have prevented normal operation and production of rated horsepower.	
Disposition of engine following exam: The engine was released by the NTSB IIC and was returned to Plain Parts, Pleasant Grove, CA. See shipper # AD01002	

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INSPECTION WITNESSES			
NAME	Phillip Grice	NAME	Greg Eastburn
ADDRESS	Mobile Alabama	ADDRESS	Mobile Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Lisa Jersild	NAME	Mike Council
ADDRESS	Mobile Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Josh Cawthra, IIC	NAME	
ADDRESS	Western Pacific Region	ADDRESS	
ORGANIZATION	NTSB	ORGANIZATION	
PHONE		PHONE	

EXTERNAL INSPECTION OF ENGINE

The engine was received in a shipping container furnished by CMI for this purpose. The shipping crate was opened and exhibited an accident engine with a data plate which identified the engine as serial number 267946. The damaged right and left exhaust collectors remained attached but the recovery team had cut and removed the aft sections to allow the engine to be mounted in the shipping crate. The induction forward balance tube exhibited impact damage and the top left and right engine mounts were broken. The lower right engine mount was damaged.

The starter adapter was damaged at the starter motor mount. The right and left rear intake manifold tubes were impact damaged and separated from the engine. Both damaged rear manifold tubes and the throttle body/metering unit were shipped loose in the engine container. The throttle body housing was impact damaged. The metering unit fuel fittings were damaged. The engine driven fuel pump received impact damage to hose fittings and to the unmetered fuel pressure adjustment screw.

The propeller mounting bolts had sheared and remained in the crankshaft propeller flange.

The left magneto was loose at its mount and free to rotate. Caked residual oil beneath the left magneto indicated an oil leak at that location.

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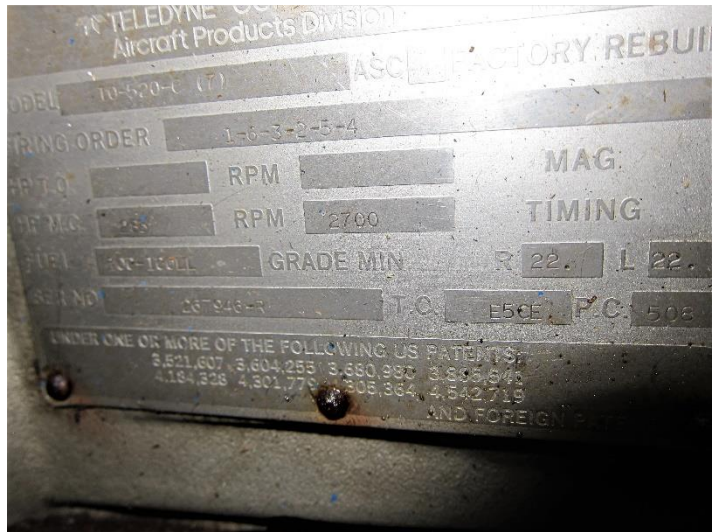
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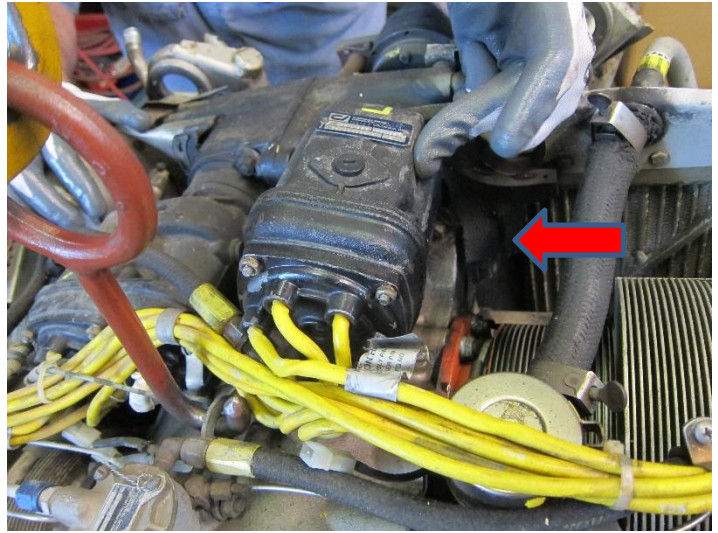
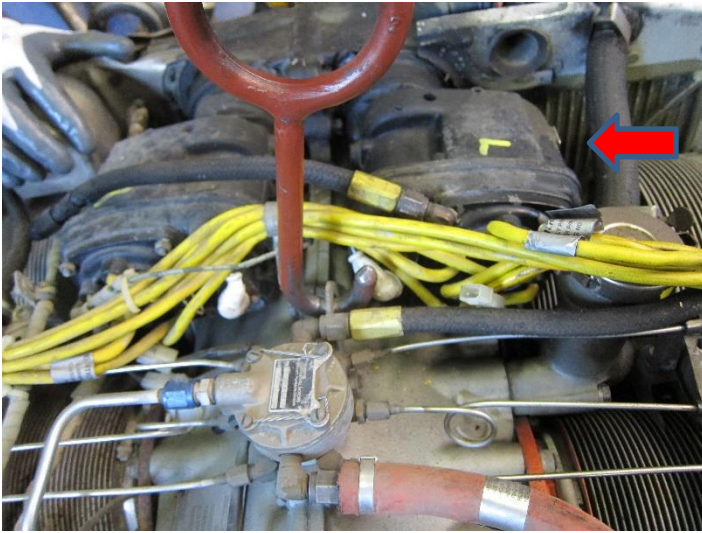
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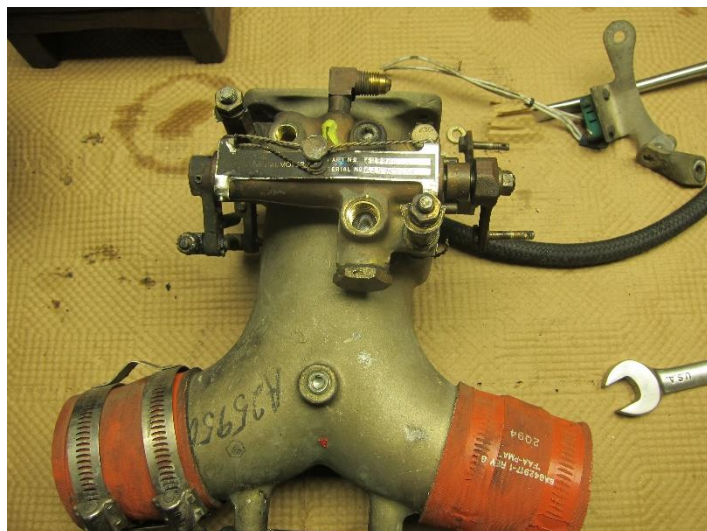
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ENGINE PREPARATION PRIOR TO RUN

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

Items removed:

Airframe cooling baffles

Propeller governor

Fuel flow transducer

Instrument air pump, filter housing, filter and various plumbing components

Crankcase vent tube

Damaged rear engine mount frame

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

Starter adapter

A slave engine-driven fuel pump was substituted with no adjustments made to the fuel settings

Induction throttle body (impact damage repaired) and two broken fuel fittings replaced

Right and left induction rear intake manifold tubes (wye)

Impact damaged exhaust collectors were cut to remove impact damaged sections

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

Magneto-to-Engine Timing (Specified):	Left Magneto:	Right Magneto:
22 °BTDC	40°BTDC Magneto was loose on its engine mount as received	23 °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 -19/80 PSI (rings)

Cylinder #2 - 53/80 PSI (rings)

Cylinder #3 - 12/80 PSI (exhaust valve)

Cylinder #4 - 15/80 PSI (exhaust valve/rings)

Cylinder #5 - 15/80 PSI (rings)

Cylinder #6 - 20/80 PSI (exhaust valve)

(*) – Leakage Source

The engine was not disassembled prior to the engine run. The crankshaft end-play measured 0.007” and the run-out was 0.003”.

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 IO520 engine model.

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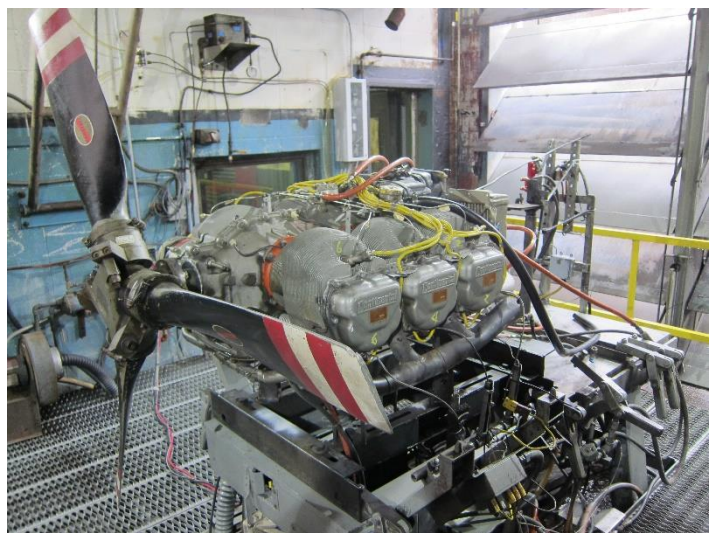
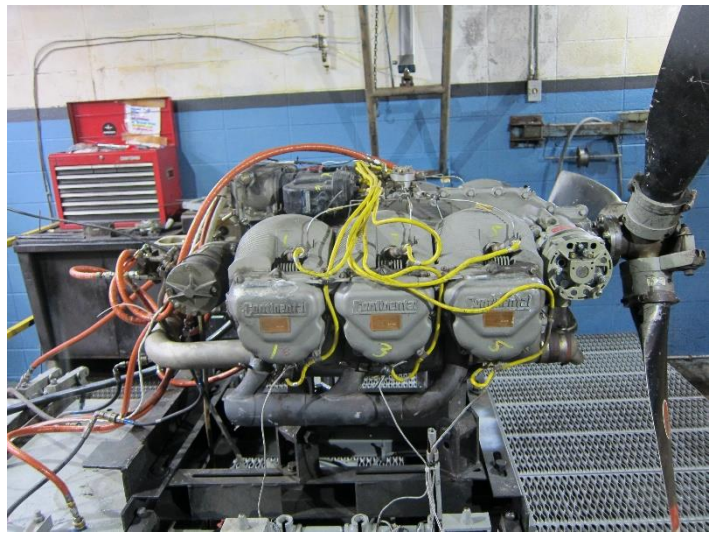
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DESCRIPTION OF RUN

Once the test cell was correctly configured for the test 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.



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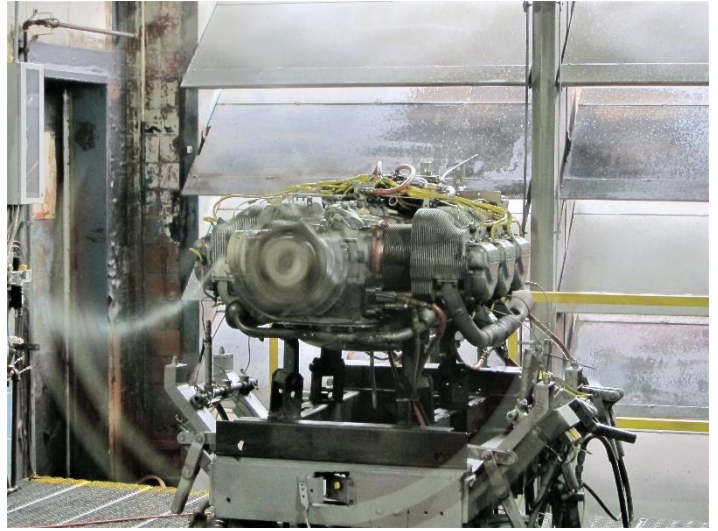
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A cylinder leakage test was performed after the test run in accordance with the latest revision of CMI Service Bulletin SB03-3 with the engine hot with the following results (master orifice reading – 44 PSI):

Cylinder #1 - 68/80 PSI (rings)

Cylinder #2 - 53/80 PSI (rings)

Cylinder #3 - 67/80 PSI (rings)

Cylinder #4 - 40/80 PSI (exhaust valve)

Cylinder #5 - 60/80 PSI (rings)

Cylinder #6 - 62/80 PSI (rings)

(*) – Leakage Source



ENGINE RUN PARAMETERS

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	15.48/	48	145	23.06	3.24	14.80	79	81	321	253	240	227	266	177
2	5	1600	19.10/	46	184	41.42	4.00	18.87	80	81	349	291	283	256	273	211
3	5	2100	23.54/	49	215	87.39	9.25	25.79	81	81	419	331	343	307	347	258
4	5	2450	27.17/	46	251	131.80	13.95	28.71	82	82	436	356	381	332	377	282
5	5	F/T 2640	29.13/	49	244	148.35	15.96	32.21	83	82	399	423	337	375	365	297
6	5	Idle 884	18.06/	19	110	15.85	3.62	12.33	79	82	347	251	261	269	233	171
7	5		/													

Ambient Air Temperature °F	Ambient Air Pressure	Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters				
82	29.25	IN	OUT	RPM	“ Hg MP	Fuel Flow Lbs/Hr	Metered PSI	Unmetered PSI
		11	29	2700		136-146	14.9 - 17.2	28.0 - 31.0

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	2160	0	2112	48