



ENGINE RUN REPORT

ENGINE MODEL	IO-520-D30B
ENGINE SERIAL NUMBER	816647
AIRCRAFT MAKE & MODEL	Cessna A185F
AIRCRAFT SERIAL NUMBER	18502526
AIRCRAFT REGISTRATION	C-GOZJ
FILE NUMBER	19-100

NAME	SIGNATURE	DATE
Christopher Lang		November 14, 2019

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GENERAL INFORMATION			
EXAMINATION		ACCIDENT DATA	
DATE	November 13-14, 2019	NTSB ACCIDENT #	CEN19FA325
FACILITY	Continental Motors	NTSB INVESTIGATOR	Courtney Liedler
ADDRESS	Mobile, Alabama 36615	FAA INVESTIGATOR	
		ACCIDENT DATE	9/21/2019
		ACCIDENT LOCATION	Conroe, Texas
ENGINE INFORMATION			
ENGINE POSITION	Front		
TOTAL TIME	Unknown		
TIME SOH	Unknown		
TYPE & TIME SLI	Unknown		
BUILD DATE	July 2, 1999		
IN SERVICE DATE	Unknown		
Significant logbook information: The aircraft and engine logbooks have not been located at the time this report was written. Only copies of four logbook entries were located.			
Report Summary:		Search Code(s):	15-12-68
The examination of this engine did not reveal any anomalies that would have precluded normal operation and the production of horsepower.			
At the request of the NTSB IIC, water was introduced to the fuel system during a run at full power. The engine abruptly sputtered and then shutdown. It was estimated that 4 to 6 ounces of water in the engines' fuel system shut the engine down.			
Disposition of engine following exam: The engine was returned to Air Salvage of Dallas in Lancaster, Texas per NTSB instructions.			

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INSPECTION WITNESSES			
NAME	Phillip Grice	NAME	Randy Bryant
ADDRESS	Mobile Alabama	ADDRESS	Mobile Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE	██████████	PHONE	██████████
NAME	Lisa Jersild	NAME	Chris Lang
ADDRESS	Mobile Alabama	ADDRESS	Mobile Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE	██████████	PHONE	██████████
NAME	Courtney Liedler	NAME	Casey Love
ADDRESS	Denver, Colorado	ADDRESS	Wichita, Kansas
ORGANIZATION	NTSB	ORGANIZATION	Textron Aviation
PHONE	██████████	PHONE	██████████

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EXTERNAL INSPECTION OF ENGINE

The engine was received in a Continental engine shipping crate. Damage was noted to the oil sump, induction and exhaust systems, the forward left crankcase half and the magnetos were impact separated from their mounts. The oil cooler and adaptor exhibited impact damage as well as some of the cylinder heads.



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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:

Propeller governor
Engine baffling
Various lines and cables

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

Oil pickup tube and oil sump
Induction and exhaust systems
Starter adaptor
Throttle body
Oil cooler and adaptor
#2 and #6 exhaust pushrods and tubes
All four engine mount legs
Ignition harness

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

The magnetos were impact separated from the engine. The magnetos were placed on a test bench and they produced spark on all ignition leads. The magnetos were then mounted to the engine and timed at 22° before top dead center.

Magneto-to-Engine Timing (Specified):	Left Magneto:	Right Magneto:
22°BTDC	°BTDC	°BTDC

A cylinder leakage test was performed prior to the test run in accordance with the latest revision of Continental Motors M-0 Maintenance Manual with the engine at room temperature with the following results (master orifice reading – 43 PSI):

Cylinder #1 - 8/80 PSI (rings)	Cylinder #2 - 46/80 PSI (exhaust valve)
Cylinder #3 - 32/80 PSI (exhaust valve)	Cylinder #4 - 8/80 PSI (exhaust valve)
Cylinder #5 - 14/80 PSI (exhaust valve)	Cylinder #6 - 5/80 PSI (rings)

(*) – Leakage Source

The engine was not disassembled prior to the engine run. The crankshaft end-play measured 0.00" and the run-out was 0.025".

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 IO-520-D engine model.

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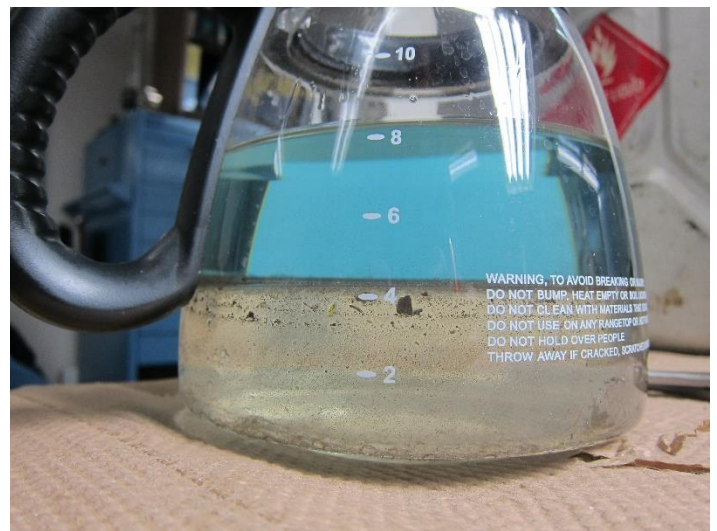
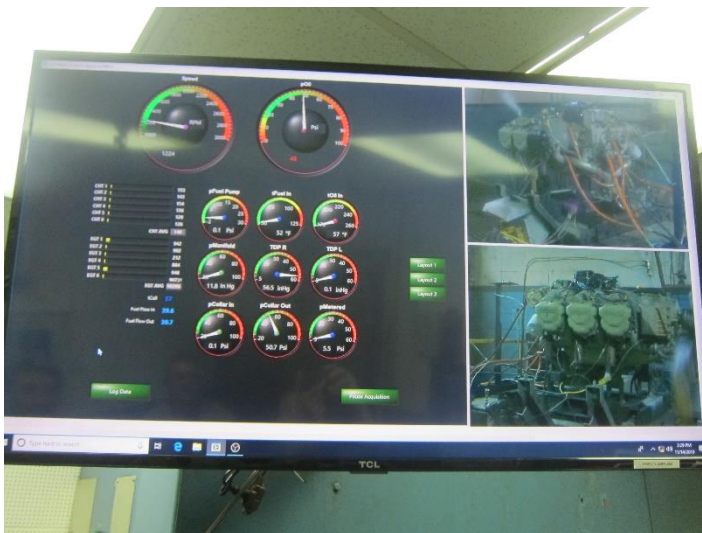
DESCRIPTION OF RUN

The engine experienced a normal start on the first attempt without hesitation or stumbling in observed RPM. As the engine was warming up, the fuel pressure reading was noted to be inaccurate. The engine was shutdown and the test cell fuel pressure sensor had been connected improperly. The connection was secured and the engine was restarted.

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.

At the request of the NTSB after the engine test cell run, an external fuel supply that was contaminated with water was plumbed into the test cell fuel system. The engine was restarted and the throttle was advanced. When the water was introduced to the engine, the engine abruptly shut down.



A cylinder leakage test was performed after the test run in accordance with the latest revision of CMI M-0 Maintenance Manual with the engine hot with the following results (master orifice reading – 42 PSI):

Cylinder #1 - 66/80 PSI (rings)
 Cylinder #3 - 70/80 PSI (rings)
 Cylinder #5 - 64/80 PSI (rings)
 (*) – Leakage Source

Cylinder #2 - 64/80 PSI (rings)
 Cylinder #4 - 17/80 PSI (exhaust valve)
 Cylinder #6 - 66/80 PSI (rings)

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	11.5 / N/A	63	112	40.3	5.5	12.7	51	61	249	186	255	176	226	182
2	5	1600	15.0 / N/A	64	126	52.6	5.8	16.1	52	62	274	206	279	189	256	203
3	5	2100	19.8 / N/A	63	148	75.5	8.1	21.0	53	63	275	275	343	235	302	241
4	5	2450	22.9 / N/A	58	171	102.5	11.3	26.8	62	67	383	394	382	298	347	277
5	5	F/T	28.2 / N/A	54	193	145.7	17.6	32.6	77	69	436	456	428	343	396	318
6	5	Idle	14.8 / N/A	26	173	29.4	5.0	10.3	63	61	291	251	264	197	219	169
7	5		/													

Ambient Air Temperature °F	Ambient Air Pressure	Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters				
54.79	30.148	IN	OUT	RPM	" Hg MP	Fuel Flow Lbs/Hr	Metered PSI	Unmetered PSI
		Inop		2850	N/A	143 - 153	17.0 - 19.4	30.0 – 33.0

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	2050	50	2030	70