



Continental Motors

ENGINE FIELD RUN REPORT

ENGINE MODEL	IO-470-K11B
ENGINE SERIAL NUMBER	092964-R
AIRCRAFT MAKE & MODEL	Beech 35-C33
AIRCRAFT SERIAL NUMBER	CD-1083
AIRCRAFT REGISTRATION	N20XY
FILE NUMBER	15-357

NAME	SIGNATURE	DATE
Nicole L. Charnon		01/22/2016

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EXAMINATION		ACCIDENT DATA	
DATE	01/21/2016	NTSB ACCIDENT #	WPR16LA048
FACILITY	Air Transport	NTSB INVESTIGATOR	Maja Smith
ADDRESS	[REDACTED] Phoenix, AZ 85009	FAA INVESTIGATOR	Paul Alukonis
		ACCIDENT DATE	01/04/2016
		ACCIDENT LOCATION	Henderson, NV

ENGINE INFORMATION

ENGINE POSITION	Single-Engine
TOTAL TIME	609.92 (based on tachometer time at engine installation and at examination)
TIME SOH	152.73
TYPE & TIME SLI	Annual inspection 29.17 hours prior to accident.
BUILD DATE	06/16/1995
IN SERVICE DATE	09/09/1995 at airframe tachometer time of 2,332.5 hours

Significant logbook information:

The tachometer reading at the beginning of the examination read 2,942.42 hours. Review of the engine maintenance records revealed that the last maintenance entry was an annual inspection that took place on March 15, 2015, at a tachometer time of 2,913.25 hours. During the annual inspection, the #2 cylinder was removed and replaced due to a low compression reading. The engine was overhauled on September 27, 2011, at a tachometer time of 2,789.69 hours. Review of the records did not reveal any entries regarding fuel system set-up or testing since the engine overhaul.

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

15-03-63

The engine was run through various power settings to include idle and full power. However, the engine could only be run smoothly at idle after leaning the mixture control. Application of throttle required a richening of the mixture control to obtain full power. No anomalies were noted with the engine core components or the ignition system though the sparkplugs were covered with dark soot prior to the engine test run. The engine's fuel system components were removed and boxed for shipment to Continental Motors where they will undergo further examination/testing.

Disposition of engine following exam:

The engine was retained at the salvage facility and will be released by the NTSB investigator-in-charge following the completion of the investigation.

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NAME	Nicole L. Charnon	NAME	Allison Diaz
ADDRESS	Washington, DC	ADDRESS	Ashburn, VA
ORGANIZATION	Continental Motors	ORGANIZATION	NTSB – Western Pacific Region
PHONE		PHONE	
NAME	Chris Jarman	NAME	
ADDRESS	Phoenix, AZ	ADDRESS	
ORGANIZATION	Air Transport	ORGANIZATION	
PHONE		PHONE	

INSPECTION OF ENGINE

The engine remained attached to the airframe and the engine mounts were intact. The two-bladed propeller remained attached to the crankshaft's propeller flange. One blade tip was bent aft and twisted slightly to lower pitch and displayed leading edge gouges. The other blade displayed span-wise gouges toward its tip and paint burnishing at a 45-degree angle on the cambered side of the blade. Neither blade was loose in the hub.

The engine cowling did not display any signs of an oil leak. The oil dipstick was removed and oil registered near the 8 quart level. The bottom cowling was crushed up and aft. The air filter remained attached to its bracket but was covered with dirt from the accident site. The bracket and filter were removed with no pre-accident anomalies noted with the induction system.

The throttle and mixture controls remained attached to their respective cockpit controls and their control levers. Movement of the controls revealed that heavy force was required to move the controls throughout their range of motion. It is assumed that the displacement of the cowling and engine compartment resulted in higher friction and binding on the control cables. However, movement of the cockpit controls resulted in a corresponding movement of the control levers and shafts.

The magnetos remained secured to the topside of the engine and the ignition harness was in place. The ignition terminals remained secured to the sparkplugs. The tops sparkplugs were removed from their respective cylinders and all displayed dark black soot. The sparkplugs displayed a new-to-normal wear condition. The sparkplugs were reattached to their respective ignition terminals and were placed on top of the cylinders for viewing. The propeller was manually rotated and a spark was observed on each of the sparkplugs in firing order with no anomalies noted.

With the sparkplugs removed the cylinders were borescope inspected with no anomalies noted with the pistons, cylinders, valves, or valve seats. A thumb compression test was conducted and each cylinder produced compression and suction during propeller rotation confirming crankshaft and camshaft continuity.

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With no pre-accident anomalies noted with the engine, a decision was made to test run the engine on the airframe using as much as the airframe fuel system as possible.



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Cylinder Borescope Photographs

NOTE: The following photographs depict the piston, intake, and exhaust valve of the cylinders, in that order.

Cylinder #1



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Cylinder #3



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Cylinder #5



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Cylinder #2



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Cylinder #4



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Cylinder #6



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ENGINE PREPARATION PRIOR TO RUN

The top sparkplugs were reinstalled in their respective cylinders and their ignition leads were reattached. The propeller that was installed at the time of the accident was removed and replaced with a substitute two-blade propeller. An auxiliary fuel tank was plumbed into the right tank's fuel screen/supply line. The fuel selector was moved from the OFF position to the RIGHT fuel selector position.



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DESCRIPTION OF RUN

The engine fuel system was primed using the fuel in the auxiliary tank and the aircraft's electric fuel pump. The engine started and ran roughly at idle until the mixture was adjusted toward lean. The throttle was then advanced toward full power and was able to produce full power by richening the fuel/air mixture. The remaining engine operation was conducted by applying a coinciding movement of the throttle and mixture (i.e. as the throttle was retarded, the mixture had to be leaned; as the throttle was advanced, the mixture had to be richened). The engine produced a maximum of 2,700 RPM and ran smoothly with the richened mixture. The engine idled roughly with smoke observed coming from the exhaust system. The magneto check was conducted and a drop of 100 RPM was observed on both the left and right magnetos. The engine was run for a total of about five minutes and a decision was made to remove the fuel system components and have them examined and tested at the Continental Motors factory.



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ENGINE RUN CONCLUSION

No pre-accident anomalies were noted with the engine core components or the engine ignition system. A decision was made to flow test and further examine the engine's fuel system. The engine's fuel system components were removed from the engine and were boxed for shipment to Continental Motors for testing and examination.

The electric boost pump was operated after the engine test run to ensure it was cutting out of the system when the switch was in the OFF position. The electric boost pump functioned normally. The aircraft's fuel screen was examined and was found to be free of any debris.



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The following components were removed and boxed:

Engine-Driven Fuel Pump – PN: 646212-12, SN: E229521BR

Throttle Body/Fuel Metering Unit – PN: 625219-1, SN: E229521AR

Fuel Manifold Valve – PN: 631427A26, SN: E229523CR



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