



Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	IO-470-J1B
ENGINE SERIAL NUMBER	089109-R
AIRCRAFT MAKE & MODEL	Beech 35-A33
AIRCRAFT SERIAL NUMBER	CD-270
AIRCRAFT REGISTRATION	N9378Y
FILE NUMBER	17-404

NAME	SIGNATURE	DATE
Nicole L. Charnon		02/03/2018

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EXAMINATION		ACCIDENT DATA	
DATE	02/02/2018	NTSB ACCIDENT #	ANC18FA022
FACILITY	Accident Site	NTSB INVESTIGATOR	Brice Banning
ADDRESS	[REDACTED] Old Jamestown Road Helenwood, Tennessee 37755	FAA INVESTIGATOR	Don Williams
		ACCIDENT DATE	01/30/2018
		ACCIDENT LOCATION	Helenwood, Tennessee

ENGINE INFORMATION

ENGINE POSITION	Single-Engine
TOTAL TIME	Unknown
TIME SOH	Unknown
TYPE & TIME SLI	Unknown
BUILD DATE	07/09/1987
IN SERVICE DATE	Unknown

Significant logbook information:

The aircraft maintenance records have not been located or reviewed at the time of this report's writing.

Report Summary:

Search Code(s):

15-12-68

There were no external pre-accident anomalies noted with any of the engine or engine-related components that would have prevented its ability to produce full, rated power. The magnetos produced a spark during an audible snap of the impulse couplings and crankshaft and camshaft continuity was confirmed. Thumb compression was obtained from each cylinder. There was no fuel present in the lines to and from the engine-driven fuel pump and only a teaspoon of fuel was drained from the line between the fuel metering unit and the fuel manifold valve.

Disposition of engine following exam:

The engine will be shipped to Continental Motors for a test run.

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NAME	Nicole L. Charnon	NAME	Brice Banning
ADDRESS	Washington, DC	ADDRESS	Fairbanks, Alaska
ORGANIZATION	Continental Motors	ORGANIZATION	NTSB – Alaska Region
PHONE		PHONE	
NAME	Ricardo Asensio	NAME	Don Williams
ADDRESS	Wichita, Kansas	ADDRESS	Nashville, Tennessee
ORGANIZATION	Textron Aviation	ORGANIZATION	FAA – Nashville FSDO
PHONE		PHONE	
NAME	Neal Thorne	NAME	
ADDRESS	Nashville, Tennessee	ADDRESS	
ORGANIZATION	FAA – Nashville FSDO	ORGANIZATION	
PHONE		PHONE	

EXTERNAL ENGINE CONDITION

The engine remained attached to the aircraft, which came to rest in a wash on steep terrain, downhill from a mountain top. The two-bladed McCauley propeller remained attached to the engine. The spinner remained in place and displayed a dent on one side. Both blades remained attached to the propeller hub. One blade was bent aft about mid-span and the other was bent aft slightly. The cowling was in place over the engine with no external anomalies noted.

The top engine cowling was removed and there were no signs of oil or fuel leaks. All electrical and fuel lines remained secured in place (the battery cable was cut by first responders). Three of the four engine mounts remained intact. There were no external signs of pre-accident anomalies with the engine. The throttle, mixture and propeller control cables remained attached to their respective control levers. The magnetos remained secured in place with the ignition harnesses attached.

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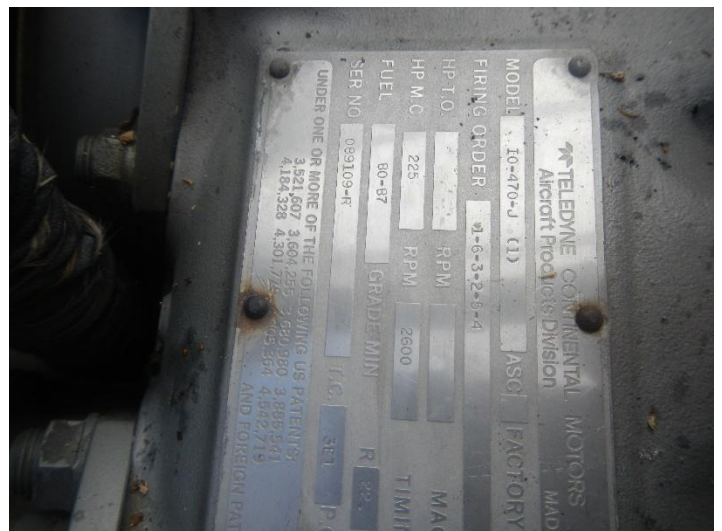
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ENGINE COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition: The exhaust system remained attached to the engine. The left side exhaust system remained intact, but the left muffler/tailpipe was cut away from the exhaust manifold and remained with the aircraft. No pre-accident anomalies were noted with the left side system. The right muffler remained attached to the exhaust system and the right tailpipe was removed from the muffler. No pre-accident anomalies were noted with the right side system.



Left



Left

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Right



Right

INDUCTION SYSTEM

Condition:

The intake system remained intact with no pre-accident anomalies noted. The induction filter was impinged with debris. Examination of the backside of the filter element revealed no blockages or missing portions. The throttle body remained attached to the front side of the oil sump and the wye plenum remained attached to the backside of the oil sump. The intake risers and tubes remained in place.



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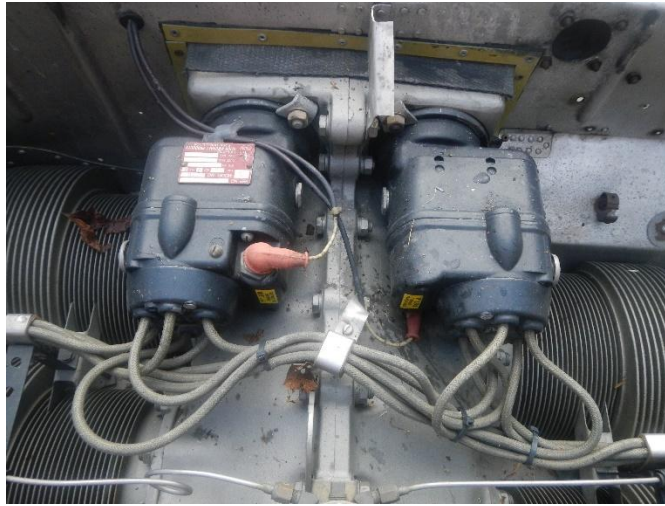
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MAGNETO**

Manufacturer: Slick

P/N: 6210

S/N: Not Observed

Condition: The magneto remained secured in place with the ignition harnesses attached. Each lead remained secured to its respective sparkplug. The sparkplugs were removed from their respective positions and reattached to their respective leads. During manual rotation of the crankshaft, a spark was confirmed on each top sparkplug during an audible snap of the impulse coupling.

**RIGHT
MAGNETO**

Manufacturer: Slick

P/N: 6210

S/N: Not Recorded

Condition: The magneto remained secured in place with the ignition harnesses attached. Each lead remained secured to its respective sparkplug. The sparkplugs were removed from their respective positions and reattached to their respective leads. During manual rotation of the crankshaft, a spark was confirmed on each top sparkplug during an audible snap of the impulse coupling.



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HARNESS**

Manufacturer: Slick

P/N: Left M-2380, Right M-2379

Condition:

The harness remained in place and intact. Functional testing of the magnetos revealed that the top ignition leads were functional. No pre-accident anomalies were noted.

**SPARK
PLUGS**

Manufacturer: Champion

P/N: RHM40E

Condition:

All of the sparkplugs remained secured in place. The top sparkplugs were removed and all displayed a normal worn condition with lean mixture signatures (no signs of lead or carbon fouling). The bottom sparkplugs were examined/documentated with a lighted borescope.



1T



1B

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3T



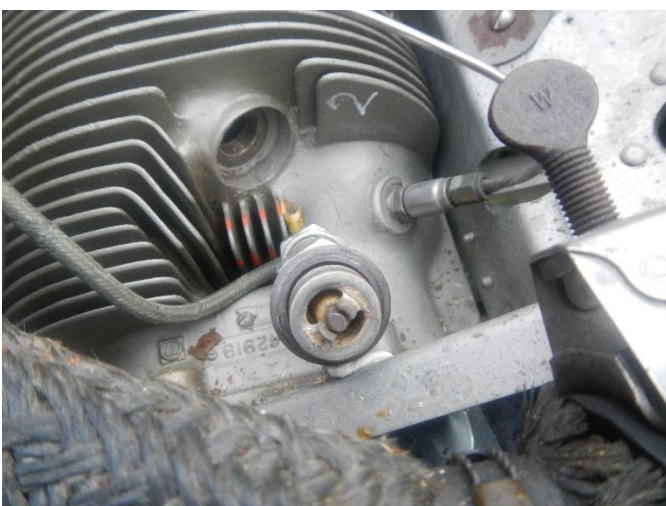
3B



5T



5B



2T



2B

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4T



4B



6T



6B

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FUEL SYSTEM

FUEL PUMP

Manufacturer: Not Observed

P/N: Not Observed

S/N: Not Observed

Condition:

The engine-driven fuel pump remained attached to the back side of the engine and all of the fuel lines to and from the pump remained intact and secured in place. The fuel inlet line was removed from the fuel pump fitting and no fuel was present. The fuel return line was removed from the firewall fitting and no fuel was present.



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THROTTLE BODY METERING UNIT

Manufacturer: Not Observed

P/N: Not Observed

S/N: Not Observed

Condition:

The throttle body remained attached to the front side of the oil sump and the throttle and mixture control cables remained attached to their respective levers. The fuel lines to and from the fuel metering unit remained intact and secured in place. The fuel line from the fuel metering unit to the fuel manifold valve was removed at the metering unit fitting and a capful (approximately a teaspoon) of blue aviation gasoline was retrieved from the line.



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FUEL MANIFOLD VALVE

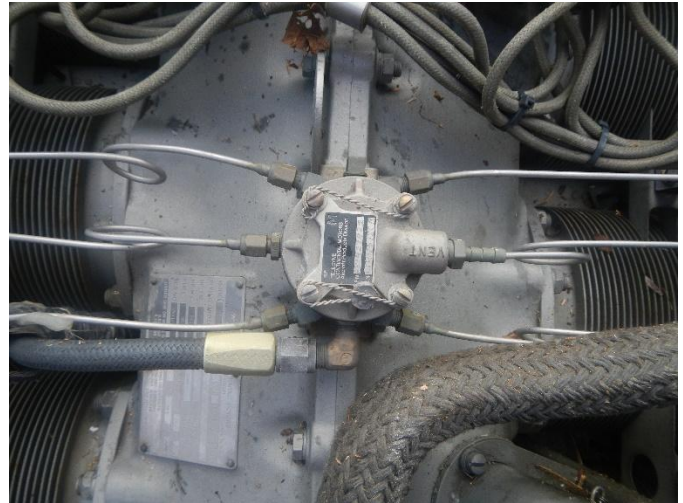
Manufacturer: Continental Motors

P/N: 631427-A22

S/N: C149512CR

Condition:

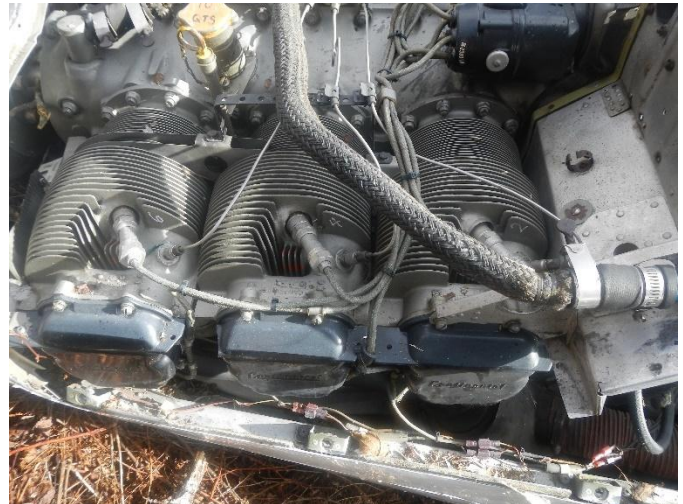
The fuel manifold valve remained secured to the topside of the engine and all the fuel lines remained secured in place. The original safety-wire lead seal was in place.



FUEL NOZZLES AND LINES

Condition:

The fuel lines remained secured to their respective fuel injector nozzles. Some blue staining was observed in the vicinity of the #6 fuel injector nozzle.



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LUBRICATION SYSTEM

OIL SUMP

Condition: The oil sump remained in place and intact on the bottom side of the engine. There was no sign of oil leaks and oil registered on the oil dipstick. There was no sign of a pre-existing oil leak on the external engine components, engine nacelle, or firewall.



OIL PICKUP TUBE & SCREEN

Condition: The oil pickup tube was not observed.

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OIL PUMP

Condition:

The oil pump remained secured to the backside of the engine with no signs of oil leaks noted.



OIL FILTER

Manufacturer: Not Recorded

P/N: Not Recorded

Condition:

The oil filter remained attached to the oil filter adapter. It displayed a dent, but did not appear to be punctured. The following information was hand-written next to the date and tach time, respectively: 12-8-17 1783.1. The oil filter adapter was loose but the safety wire was intact and it did not display any evidence of a pre-existing oil leak.



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OIL COOLER

Manufacturer: Unknown

P/N: Unknown

S/N: Unknown

Condition:

The oil cooler remained attached to the front right side of the engine with no signs of oil leaks noted. Duct tape was placed over some of the cooling fins. The oil cooler was accidentally cut during the aircraft recovery process.



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CYLINDERS

NOTE: The photographs that follow the cylinder condition description represent the external cylinder condition, the piston, the intake valve, and exhaust valve in that order.

CYLINDER #1

Condition:

The cylinder remained secured to the crankcase with no external anomalies noted. The cylinder was examined/documentated via a lighted borescope and no pre-accident anomalies were noted. The cylinder produced thumb compression during crankshaft rotation.



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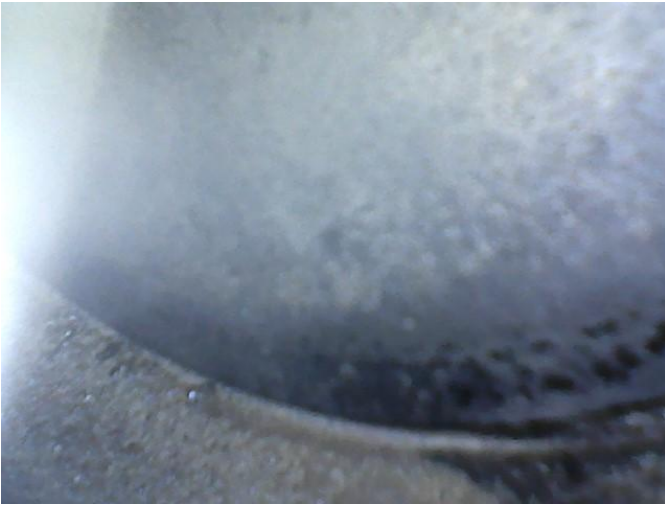
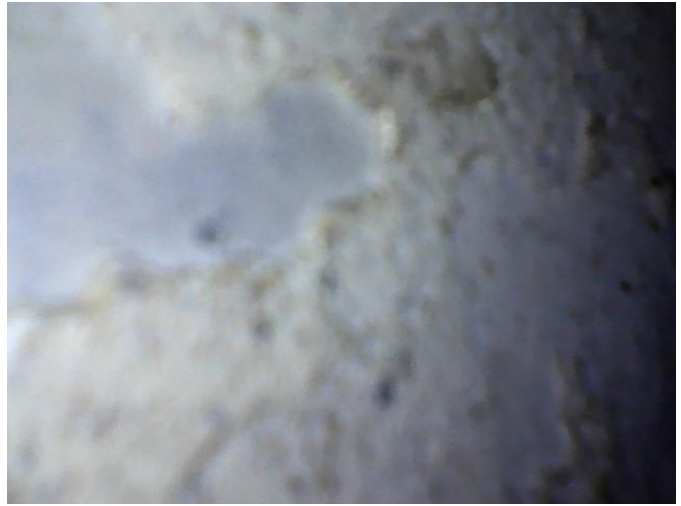
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CYLINDER #3

Condition: The cylinder remained secured to the crankcase with no external anomalies noted. The cylinder was examined/documentated via a lighted borescope and no pre-accident anomalies were noted. The cylinder produced thumb compression during crankshaft rotation.



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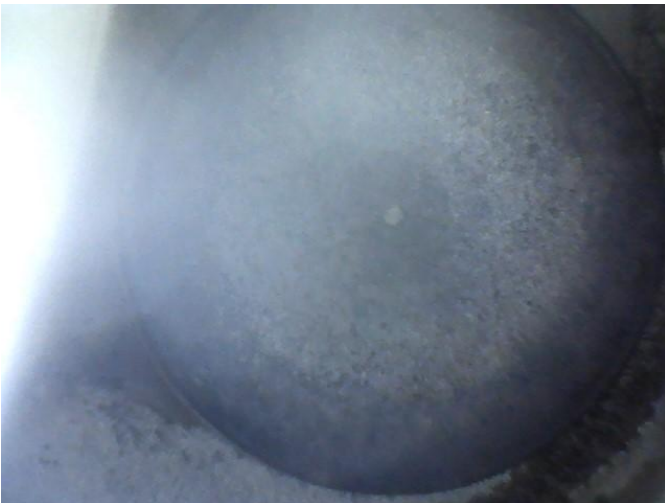
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CYLINDER #5

Condition: The cylinder remained secured to the crankcase with no external anomalies noted. The cylinder was examined/documentated via a lighted borescope and no pre-accident anomalies were noted. The cylinder produced thumb compression during crankshaft rotation.



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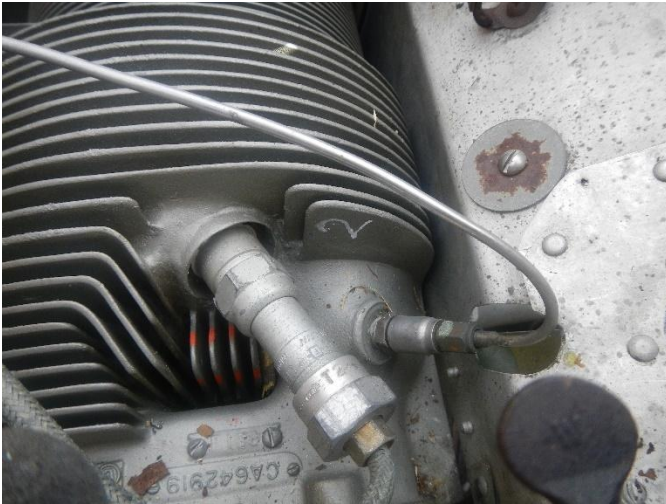
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CYLINDER #2

Condition: The cylinder remained secured to the crankcase with no external anomalies noted. The cylinder was examined/documentated via a lighted borescope and no pre-accident anomalies were noted. The cylinder produced thumb compression during crankshaft rotation.



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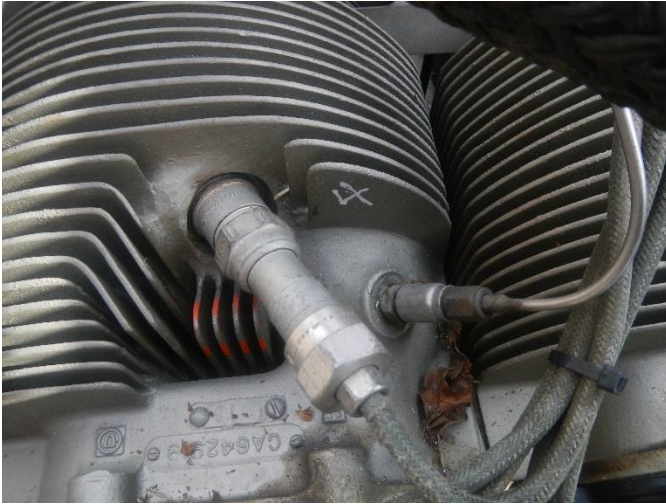
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CYLINDER #4

Condition: The cylinder remained secured to the crankcase with no external anomalies noted. The cylinder was examined/documentated via a lighted borescope and no pre-accident anomalies were noted. The cylinder produced thumb compression during crankshaft rotation.



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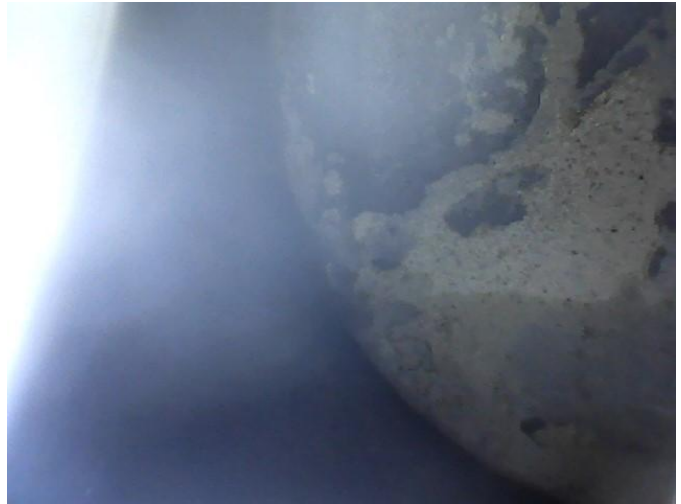
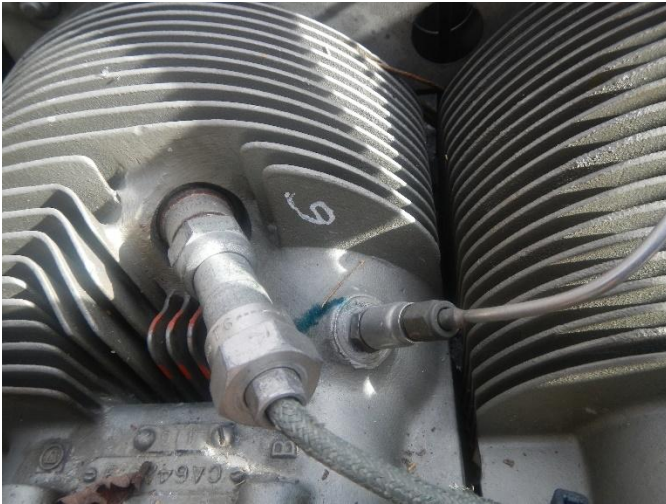
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CYLINDER #6

Condition: The cylinder remained secured to the crankcase with no external anomalies noted. Some blue staining was observed near the fuel injector. The cylinder was examined/documentated via a lighted borescope and no pre-accident anomalies were noted. The cylinder produced thumb compression during crankshaft rotation.



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CRANKCASE	Casting Number:	1-3-5: Unknown	2-4-6: Unknown	S/N: Unknown
Condition:	The crankcase remained intact with no external anomalies noted. Rotation of the crankshaft did not result in any binding from the main bearings.			

**CRANKSHAFT ASSEMBLY**

CRANKSHAFT	Forging Number: Unknown	S/N: Unknown	Heat code: Unknown
Condition:	Though the crankshaft was not observed in its entirety, crankshaft continuity was confirmed from the propeller flange aft to the accessory gears and out to each connecting rod/piston during manual rotation of the propeller. There was no binding noted during rotation of the crankshaft.		

CAMSHAFT

CAMSHAFT	P/N: Unknown	S/N: Unknown
Condition:	Though the camshaft was not observed, valve train continuity was confirmed during rotation of the crankshaft and a thumb compression test of the cylinders.	

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Manufacturer: Energizer

P/N: 646238

S/N: D-278703

Condition:

The starter motor remained attached to the adapter with no external pre-accident anomalies noted.

**STARTER ADAPTER**

Condition:

The starter adapter remained intact with no pre-accident anomalies noted. The alternator drive pulley rotated during manual rotation of the crankshaft.

ALTERNATOR

Manufacturer: Unknown

P/N: Unknown

S/N: Unknown

Condition:

The belt-driven alternator remained attached to the backside of the engine and the drive belt was in place. Rotation of the crankshaft resulted in a rotation of the drive pulley and belt. No pre-accident anomalies were noted.



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VACUUM PUMP

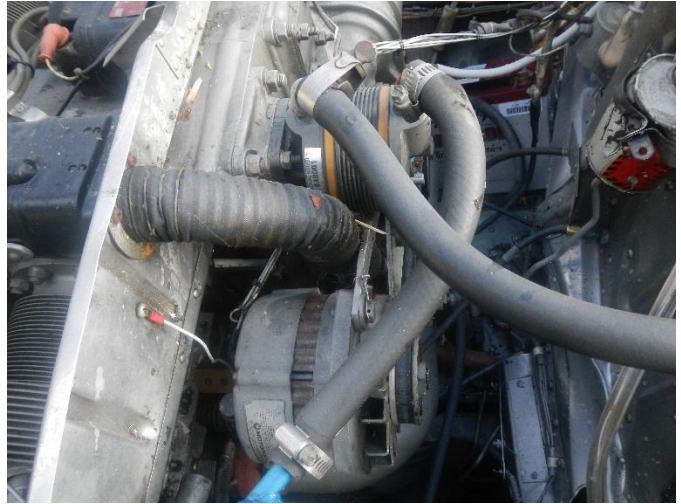
Manufacturer: Airborne

P/N: Unknown

S/N: 848001

Condition:

The vacuum pump remained secured on the backside of the engine with no pre-accident anomalies noted. Rotation of the propeller resulted in rotation of the vacuum pump drive coupling.



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Manufacturer: McCauley

P/N: Not Recorded

S/N: Not Recorded

Condition:

The propeller governor remained secured to the front left side of the engine. There were no pre-accident external anomalies noted. The propeller control cable remained attached to the control lever.

**PROPELLER**

Manufacturer: McCauley

P/N: 2A37C223-C

S/N: 051746

Condition:

The two-bladed McCauley propeller remained attached to the engine. The spinner remained in place and displayed a dent on one side. Both blades remained attached to the propeller hub. One blade was bent aft about mid-span and the other was bent aft slightly.



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