



Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	O-470-K (P. Ponk conversion to O-470-50)
ENGINE SERIAL NUMBER	49180-5-K-R (P. Ponk S/N: 2750)
AIRCRAFT MAKE & MODEL	Cessna 180
AIRCRAFT SERIAL NUMBER	32331
AIRCRAFT REGISTRATION	N4934A
FILE NUMBER	18-346

NAME	SIGNATURE	DATE
Kurt Gibson		03/27/2019

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GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	03/12/2019	NTSB ACCIDENT #	WPR19LA055
FACILITY	Arlin's Aircraft Service	NTSB INVESTIGATOR	Andrew Swick
ADDRESS	[REDACTED]	FAA INVESTIGATOR	Troy McClanahan
		ACCIDENT DATE	01/02/2019
		ACCIDENT LOCATION	Townsend, Montana

ENGINE INFORMATION

ENGINE POSITION	Front (single engine)
TOTAL TIME	1123.6 (time taken at the last annual inspection)
TIME SOH	136.6 (time taken at the last annual inspection)
TYPE & TIME SLI	Unknown
BUILD DATE	10/12/1965
IN SERVICE DATE	Unknown

Significant logbook information:

The engine was converted from an O-470-K to a P. Ponk O-470-50 per STC: SE4985NM/SE4988NM on 09/27/2012. The engine was then installed per the STC: SA00468WI on 08/19/2013, at a tachometer time of 2360.9. On 06/08/2016, at a tachometer time of 2422.1, the engine was disassembled, inspected, and then reassembled due to a propeller strike. The last annual inspection was performed on 07/28/2018 at a tachometer time of 2508.6.

Report Summary:

Search Code(s):

15-12-68

There were no anomalies noted that would have prevented normal operation or production of rated horsepower.

Disposition of engine following exam:

The engine remained at Arlin's Aircraft Services in Belgrade, Montana.

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INSPECTION WITNESSES

NAME	Kurt Gibson	NAME	Andrew Swick
ADDRESS	Mobile, Alabama	ADDRESS	Western Pacific Region
ORGANIZATION	Continental Motors	ORGANIZATION	NTSB
PHONE		PHONE	
NAME	Peter Basile	NAME	
ADDRESS	Wichita, Kansas	ADDRESS	
ORGANIZATION	Textron Aviation	ORGANIZATION	
PHONE		PHONE	
NAME		NAME	
ADDRESS		ADDRESS	
ORGANIZATION		ORGANIZATION	
PHONE		PHONE	

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The engine remained partially attached to the airframe through cables, wires, and hoses; all four engine mounts were broken. The engine displayed impact damage signatures with the damage concentrated to the bottom and rear of the engine. The crankcase remained intact and there were no breaches to indicate a catastrophic internal engine failure. The three blade, constant speed propeller remained attached to the crankshaft, one of the propeller blades had released from the hub. All six-cylinder remained attached to their cylinder bays and displayed minor impact damage signatures.

Both of the magnetos remained attached to their installation points and were undamaged. The ignition harness remained attached to both magnetos and to each spark plug; the harness displayed some impact damage signatures to the bottom ignition leads. All of the spark plugs remained attached to their cylinders and were undamaged.

The carburetor remained attached to its installation point and displayed impact damage signatures. There were no signs of fuel leaks noted around the carburetor.

The induction system displayed impact damage signatures with most of the damage occurring to the rear portion of the induction system. There were no signs of induction leaks noted. The exhaust system displayed impact damage signatures; the heat exchanger and tailpipe had broken free from the rest of the system. There were no exhaust leaks noted.

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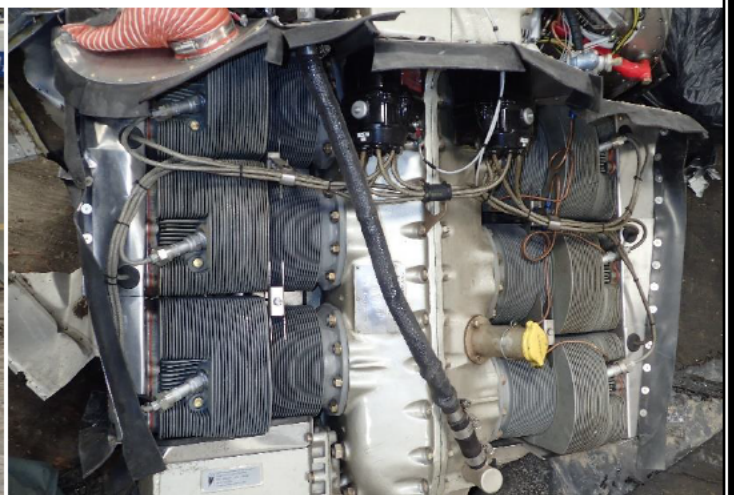
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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition:

The exhaust system displayed impact damage signatures in the forms of crushing, bending, and tearing. The cabin heat exchanger and tailpipe had broken free from the rest of the exhaust system. The cabin heat exchanger shroud was removed and there were no signs of exhaust leaks. There were no anomalies noted with the exhaust system.



INDUCTION SYSTEM

Condition:

The induction system remained attached to the engine and displayed impact damage signatures. There were no signs of induction leaks or other anomalies noted.



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IGNITION SYSTEM

LEFT MAGNETO

Manufacturer: Slick

P/N: 6310

S/N: 12051823

Condition:

The magneto remained attached to its installation point and was undamaged. During crankshaft rotation it was noted that the magneto impulse coupling operated normally. During impulse coupling operation it was noted that the magneto was capable of producing a spark for all six ignition leads. There were no anomalies noted.



RIGHT MAGNETO

Manufacturer: Slick

P/N: 6310

S/N: 12051825

Condition:

The magneto remained attached to its installation point and was undamaged. During crankshaft rotation it was noted that the magneto impulse coupling operated normally. During impulse coupling operation it was noted that the magneto was capable of producing a spark for all six ignition leads. There were no anomalies noted.



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IGNITION HARNESS

Manufacturer: Slick

P/N: RH: M2379, LH: M2380

S/N: Not observed

Condition:

The ignition harness remained attached to both of the magnetos and to each spark plug. The harness displayed some impact damage signatures to some of the leads. During magneto impulse coupling operation all of the ignition leads were able to conduct a spark from the magneto to the lead end with the exception of the #1 bottom ignition lead. The #1 bottom ignition lead displayed some impact damage signatures.

SPARK PLUGS

Manufacturer: Champion

P/N: RHB23E

Condition:

All of the spark plugs remained installed in their cylinders and were undamaged. The top spark plugs were removed, and the electrodes were visually inspected. The electrodes displayed normal operating and wear signatures. The bottom spark plug electrodes were inspected using a lighted borescope; the electrodes displayed normal operating signatures. There were no anomalies noted.



#1 Top Spark Plug



#1 Bottom Spark Plug

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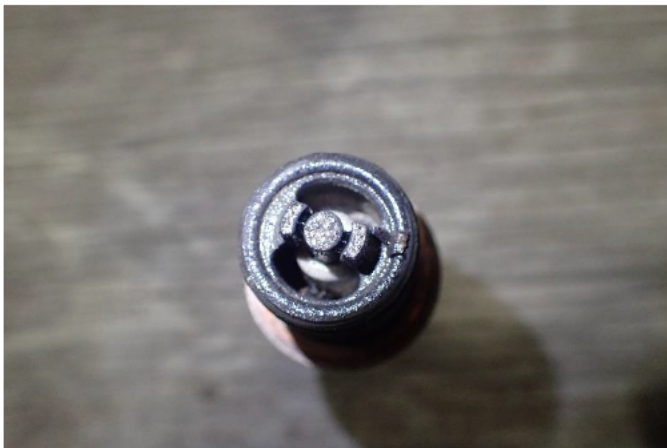
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#3 Top Spark Plug



#3 Bottom Spark Plug



#5 Top Spark Plug



#5 Bottom Spark Plug



#2 Top Spark Plug



#2 Bottom Spark Plug

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#4 Top Spark Plug



#4 Bottom Spark Plug



#6 Top Spark Plug



#6 Bottom Spark Plug

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FUEL SYSTEM

CARBURETOR

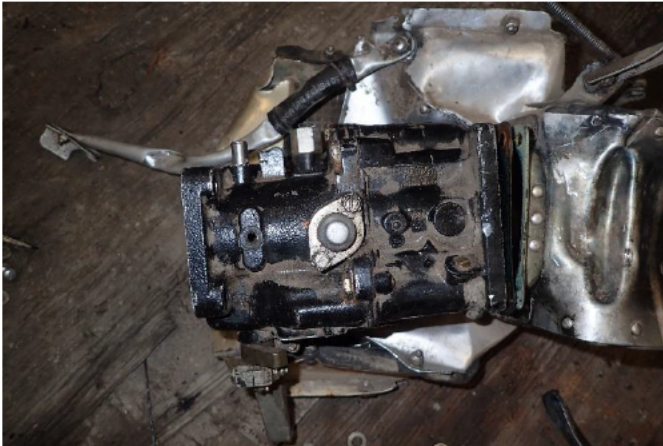
Manufacturer: Marvel Schebler

P/N: 10-4893

S/N: BD-1-2507

Condition:

The carburetor remained attached to its installation point and displayed impact damage signatures; a portion of the mixture control arm had broken free from the rest of the arm. The carburetor was removed and disassembled. The internal components displayed normal operating signatures and there was blue staining near the carburetor jet. The fuel inlet screen was removed and was noted to be free of contaminates.



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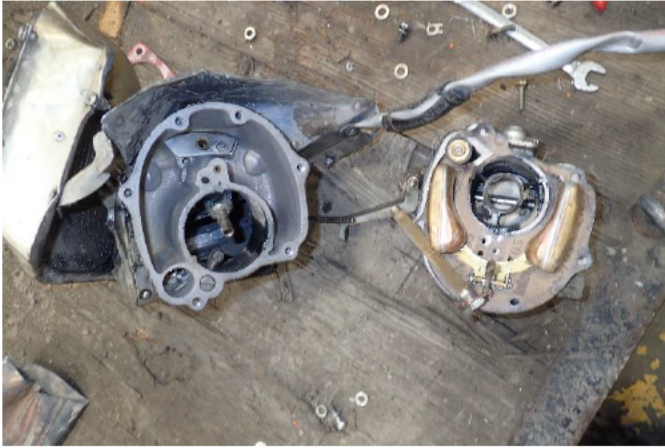
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LUBRICATION SYSTEM

OIL SUMP

Condition:

The oil sump remained attached to the engine and displayed impact damage signatures; the sump was crushed, and the quick drain valve was broken. There were no anomalies noted with the sump.



OIL PICK-UP TUBE & SCREEN

Condition:

Due to the type of inspection performed the oil-pick up tube and screen were not observed.

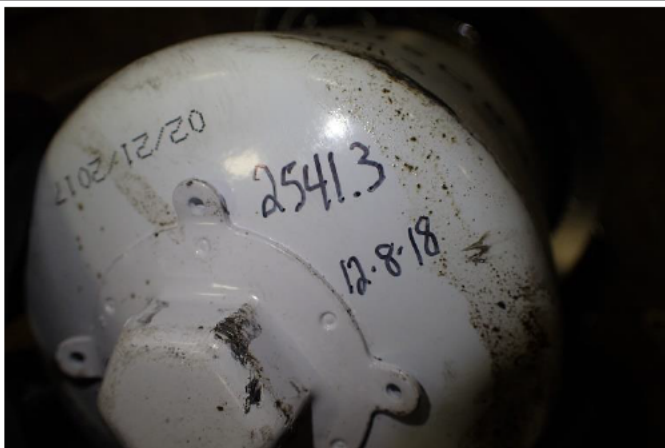
OIL FILTER

Manufacturer: Champion

P/N: CH48106-1

Condition:

The oil filter remained attached to the oil filter adapter and displayed impact damage signatures. The oil filter housing had the following written on it: "2541.3" and "12-8-18". The oil filter housing was cut open and the filter pleats were visually inspected. There was no metallic material found within the filter pleats. There were no anomalies noted.



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OIL COOLER

Manufacturer: Aero-Classics

P/N: 8000545

S/N: 1366383

Condition:

The oil cooler remained attached to its installation point and displayed minor impact damage signatures. There were no anomalies noted.



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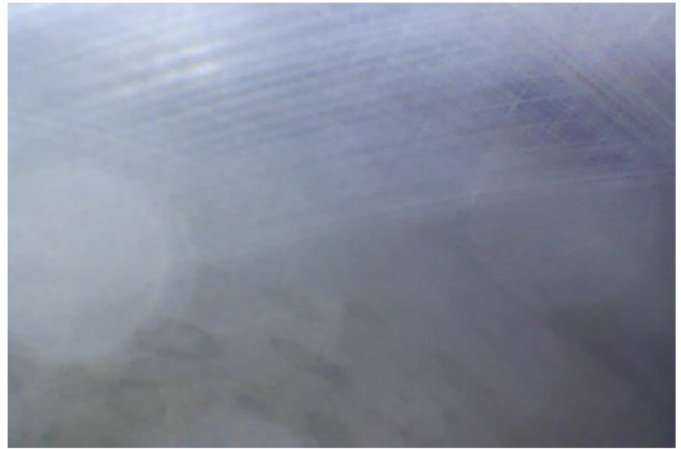
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CYLINDERS

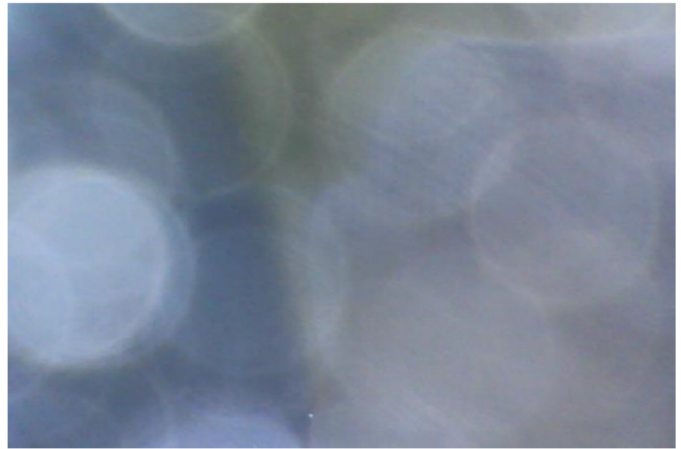
CYLINDERS

Condition:

All of the cylinders remained attached to their cylinder bays and displayed only minor impact damage. The cylinders were inspected using a lighted borescope; the piston faces, cylinder bores, and valve heads displayed normal operating and combustion signatures. During crankshaft rotation all of the cylinders displayed good thumb compression and suction. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures. There were no anomalies noted.



#1 Cylinder



#3 Cylinder (borescope photo obscured by oil on lens)

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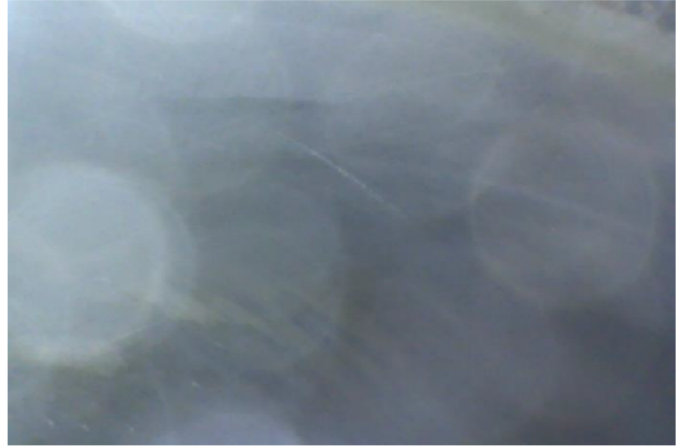
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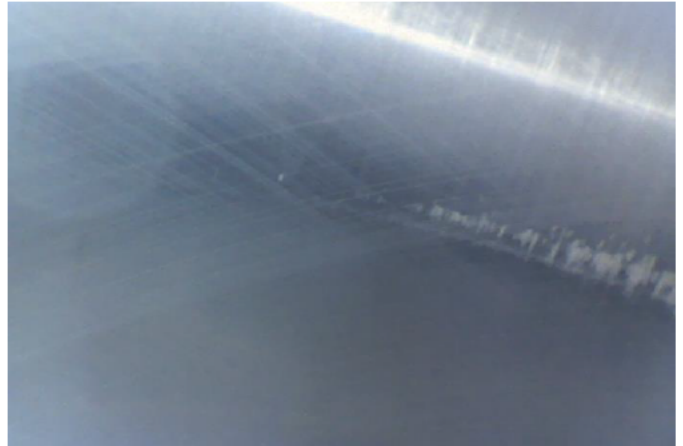
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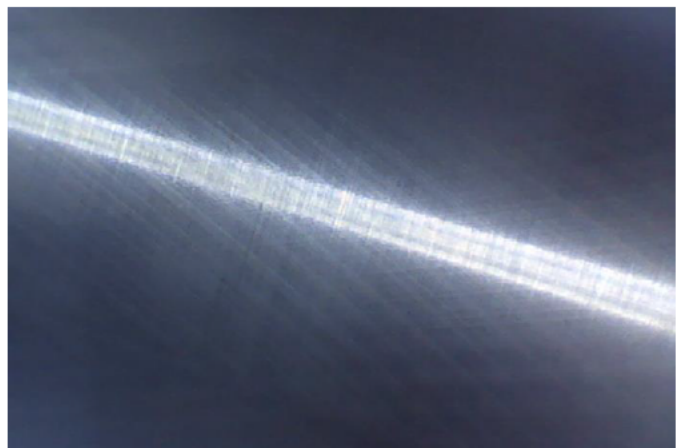
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#5 Cylinder (borescope photo obscured by oil on lens)



#2 Cylinder



#4 Cylinder

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#6 Cylinder (borescope photo obscured by oil on lens)

VALVES AND GUIDES

Condition:

The valve heads were inspected using a lighted borescope. The valve heads displayed normal operating and combustion signatures. During crankshaft rotation all of the valves operated normally. There were no anomalies noted.



#1 Exhaust Valve



#1 Intake Valve

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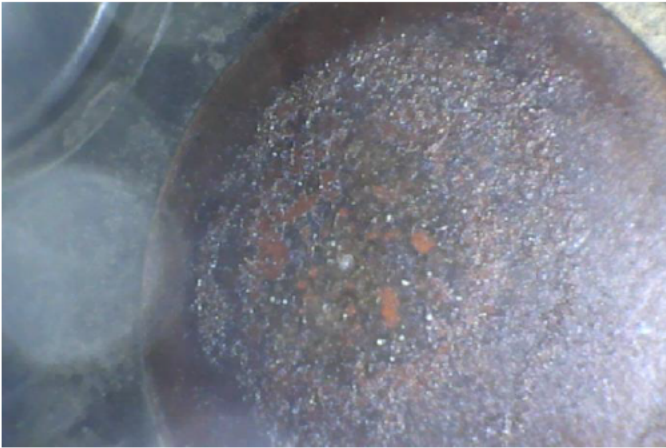
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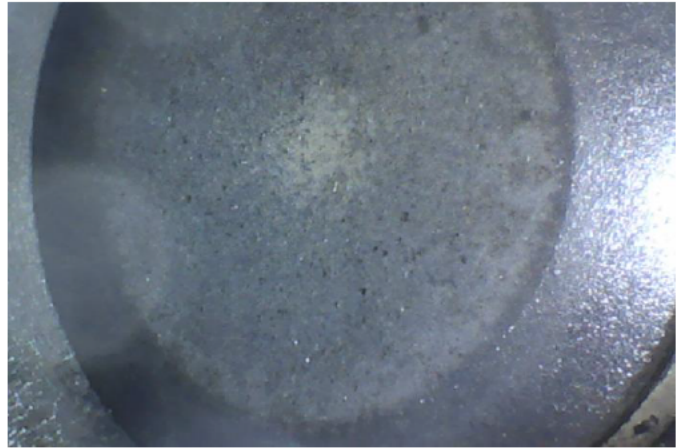
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#3 Exhaust Valve



#3 Intake Valve



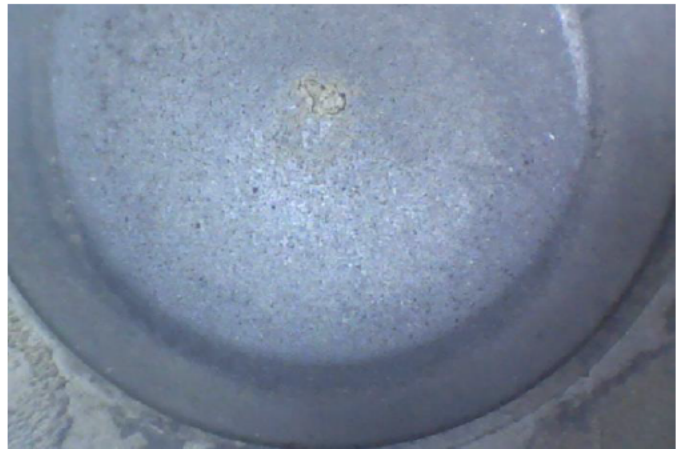
#5 Exhaust Valve



#5 Intake Valve



#2 Exhaust Valve



#2 Intake Valve

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#4 Exhaust Valve



#4 Intake Valve



#6 Exhaust Valve



#6 Intake Valve

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ROCKER ARMS AND SHAFTS

Condition:

All of the rocker arms remained attached to their installation points and were undamaged. The rocker arms displayed normal operating and lubrication signatures. It was noted that during crankshaft rotation all of the rocker arms operated normally.



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PISTONS

Piston P/N: Illegible

Condition:

The piston faces were inspected using a lighted borescope. The piston faces displayed normal operating and combustion signatures. During crankshaft rotation all of the pistons were noted to operate normally. There were no anomalies noted.



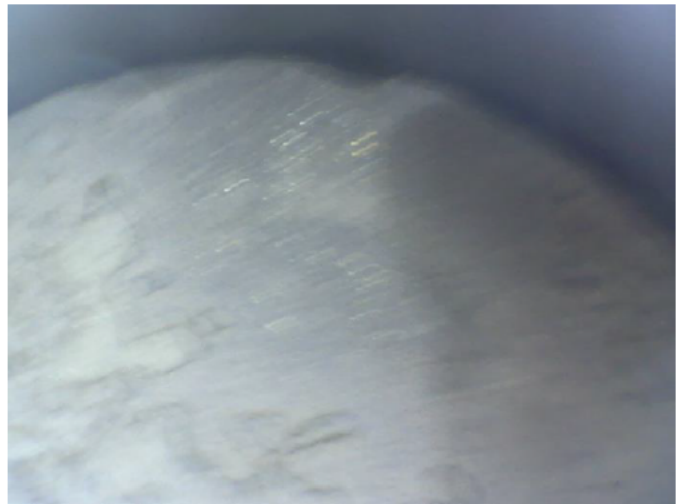
#1 Piston



#3 Piston



#5 Piston



#2 Piston

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#4 Piston



#6 Piston

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CRANKCASE ASSEMBLY

CRANKCASE	Casting Number:	1-3-5: Not observed	2-4-6: 539488	S/N: 723
Condition:	The crankcase remained intact and displayed minor impact damage. There were no breaches in the crankcase that would indicate an internal engine failure. There were no anomalies noted.			



CRANKSHAFT ASSEMBLY

CRANKSHAFT		Forging Number: Inaccessible	S/N: Inaccessible	Heat code: Inaccessible
Condition:	The crankshaft remained intact, and the propeller remained attached to the propeller flange. The crankshaft was rotated by hand and continuity was established between the crankshaft, camshaft, connecting rods, and associated components. There were no anomalies noted with the crankshaft.			
CONNECTING RODS		P/N: Inaccessible	Forging or Serial Number: Inaccessible	
Condition:	Operation of the connecting rods was verified by rotating the crankshaft and observing piston movement. The connecting rods operated normally.			

CAMSHAFT

CAMSHAFT	P/N: Inaccessible	S/N: Inaccessible
Condition:	Operation of the camshaft was verified by rotating the crankshaft and observing rocker arm movement. The camshaft operated normally.	

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ACCESSORIES

STARTER

Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The starter had broken free from the starter adapter and displayed impact damage signatures. There were no anomalies noted.

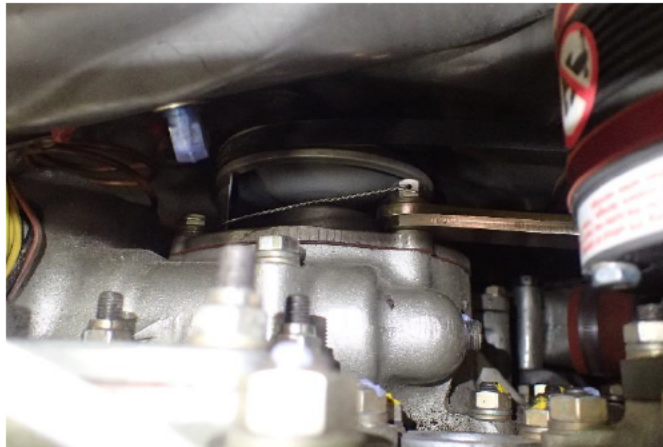


STARTER ADAPTER

P/N: Not observed

Condition:

The starter adapter displayed impact damage signatures; the starter had broken free from the attach flange. There were no anomalies noted with the adapter.



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ALTERNATOR

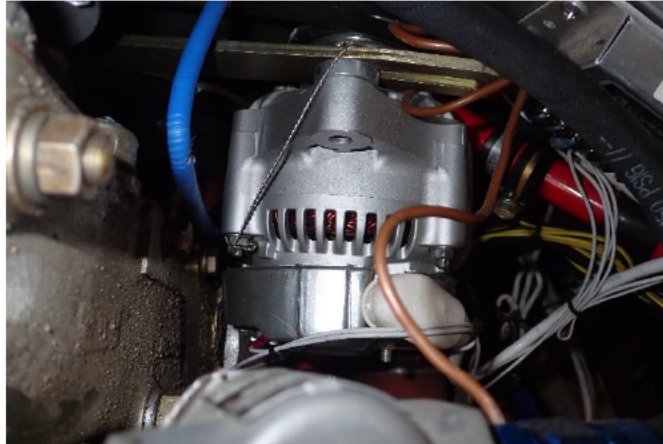
Manufacturer: Plane Power

P/N: SAL12-70C

S/N: A2-121706

Condition:

The alternator remained attached to the engine and was only partially visible. There were no anomalies noted with the visible portions of the alternator.



VACUUM PUMP

Manufacturer: Rapco

P/N: RAP216CW

S/N: B28589

Condition:

The vacuum pump remained attached to its installation point and displayed impact damage signatures. There were no anomalies noted.



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PROPELLER

PROPELLER
GOVERNOR

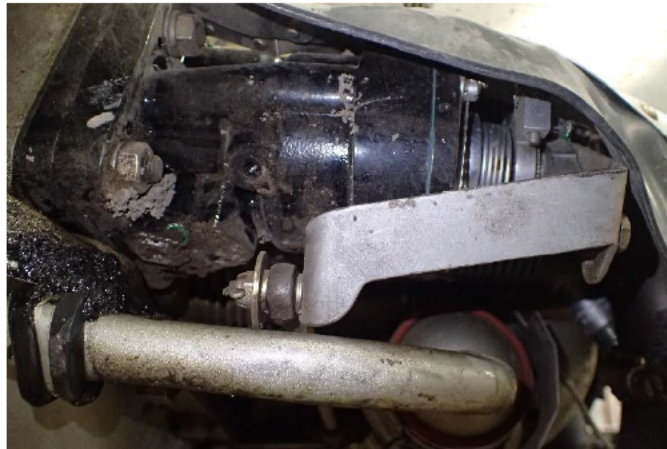
Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The governor remained attached to its installation point and the governor displayed impact damage signatures. There were no anomalies noted with the governor.



PROPELLER

Manufacturer: McCauley

P/N: D3A34C401

S/N: 042279

Condition:

The three blade, constant speed propeller remained attached to the crankshaft and two of the three blades remained within the propeller hub. The propeller blades displayed impact damage signatures. Propeller blade "A" had released from the hub and displayed minor twisting deformation and leading-edge polishing. The propeller blade marked "B" displayed minor twisting and leading-edge polishing. The propeller blade marked "C" displayed aft bending deformation and minor leading-edge polishing.



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Propeller Blade "A"



Propeller Blade "B"



Propeller Blade "C"