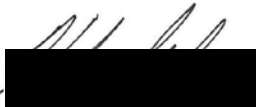




Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	IO-470-C
ENGINE SERIAL NUMBER	71706-9-C
AIRCRAFT MAKE & MODEL	Beechcraft K35
AIRCRAFT SERIAL NUMBER	D-6003
AIRCRAFT REGISTRATION	N803R
FILE NUMBER	17-377

NAME	SIGNATURE	DATE
Kurt Gibson		01/24/2018

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 2 of 27

GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	01/17/2018	NTSB ACCIDENT #	CEN18LA076
FACILITY	Vance Brand Airport	NTSB INVESTIGATOR	Joshua Lindberg
ADDRESS	229 Airport Rd Longmont, CO 80503	FAA INVESTIGATOR	Cody Ingemansen
		ACCIDENT DATE	1/13/2018
		ACCIDENT LOCATION	Longmont, CO

ENGINE INFORMATION

ENGINE POSITION	Single (front)
TOTAL TIME	Unknown
TIME SOH	977.92
TYPE & TIME SLI	7.53 since the last annual inspection
BUILD DATE	05/13/1959
IN SERVICE DATE	

Significant logbook information:

The last annual inspection was performed on 09/10/2017 at a tachometer time of 1615.69.

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 inside the owner's hangar at the Vance Brand Airport, in Longmont, Colorado.

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 3 of 27

INSPECTION WITNESSES

NAME	Kurt Gibson	NAME	Ricardo Asensio
ADDRESS	Mobile, Alabama	ADDRESS	Wichita, Kansas
ORGANIZATION	Continental Motors	ORGANIZATION	Textron Aviation
PHONE		PHONE	
NAME	Cody Ingemansen	NAME	Travis Novak
ADDRESS	Denver, Colorado	ADDRESS	Denver, Colorado
ORGANIZATION	FAA	ORGANIZATION	FAA
PHONE		PHONE	
NAME	Richard Hosker	NAME	
ADDRESS	Denver, Colorado	ADDRESS	
ORGANIZATION	FAA	ORGANIZATION	
PHONE		PHONE	

ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 4 of 27**EXTERNAL INSPECTION OF ENGINE**

The engine remained partially attached to the airframe though one engine mount, cables, hoses, and wires. The engine was removed from the airframe to facilitate the inspection. The engine sustained impact damage signatures with the most damage occurring to the front of the engine. The propeller flange had broken free from the rest of the crankshaft and the crankcase displayed impact damage to the front bottom portions of the crankcase. The two blade, variable pitch propeller remained attached to the propeller flange; however, the flange had broken free from the rest of the crankshaft. Both propeller blades remained installed in the hub; both propeller blades displayed minor impact damage signatures. All six cylinders remained installed to their cylinder bays and were undamaged.

The fuel pump remained attached to its installation point and displayed impact damage signatures. The fuel inlet line and the vapor return line AN fittings had broken free from the fuel pump. The throttle and metering assembly remained attached to its installation point and displayed impact damage signatures with the most damage occurring to the fuel metering portion of the assembly. The fuel manifold valve remained attached to its installation point and was undamaged. All of the fuel lines were checked and were found to be secure to their attachment fittings.

Both magnetos remained attached to their installation points and were undamaged. The ignition harness remained attached to the magnetos and to the spark plugs; the ignition harness displayed impact damage signatures to several of the ignition leads. Several of the leads were torn and partially severed. All of the spark plugs remained installed in their cylinders and were undamaged.

The induction system displayed impact damage signatures. The induction balance tube and the induction Y-tube displayed the most impact damage signatures. The exhaust risers remained attached to their cylinders and displayed impact damage signatures. There were no signs of exhaust or induction leaks noted.

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 5 of 27



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

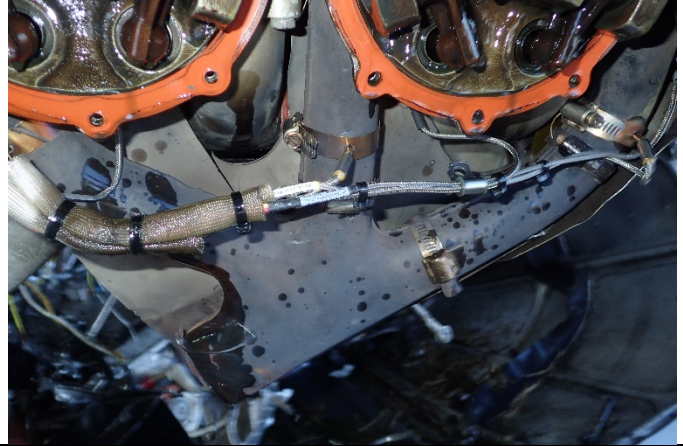
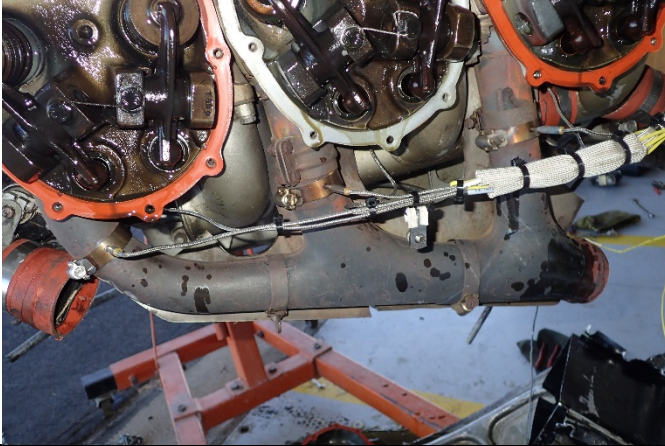
71706-9-C

PAGE 6 of 27

ENGINE TEARDOWN AND COMPONENT EXAMINATION

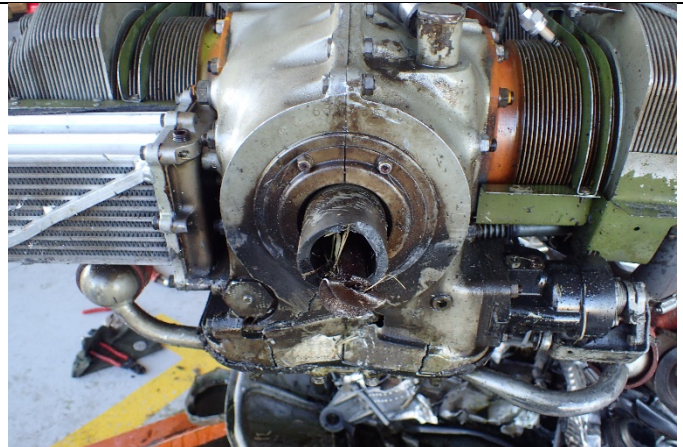
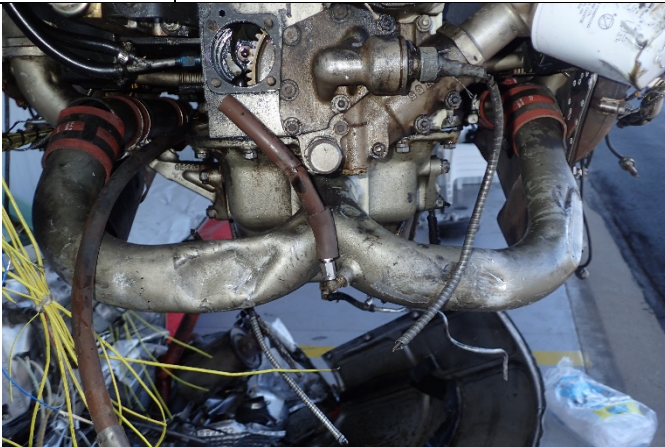
EXHAUST SYSTEM

Condition: The exhaust system displayed impact damage signatures; both of the exhaust mufflers and tailpipes had broken free from the exhaust risers. There were no signs of exhaust leaks or any other anomalies noted.



INDUCTION SYSTEM

Condition: The induction system displayed impact damage signatures to several of the components. The induction balance tube and the Y-tube displayed the most impact damage signatures. There were no signs of induction leaks or any other anomalies noted.



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 7 of 27

IGNITION SYSTEM

LEFT MAGNETO

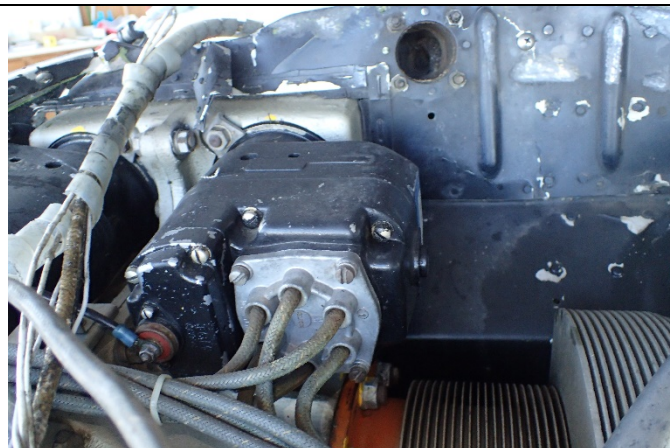
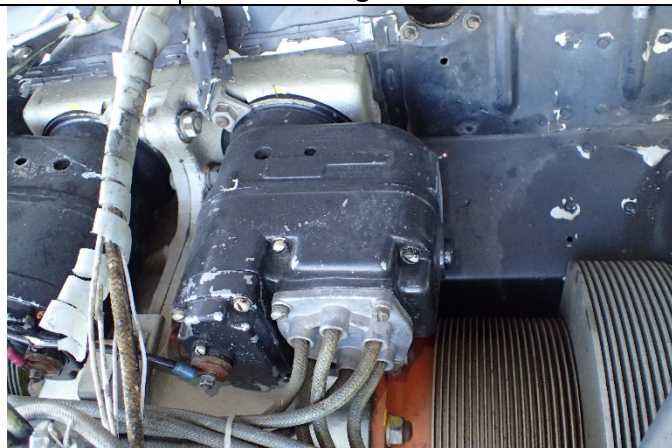
Manufacturer: CMI

P/N: 10-500556-1

S/N: H299703DR

Condition:

The magneto remained attached to its installation point and was undamaged. The impulse coupling was noted to operate during crankshaft rotation. During impulse coupling operation it was noted that magneto was capable of producing a spark on all six posts in the correct order and was in sync with the right magneto. There were no anomalies noted with the magneto.

RIGHT
MAGNETO

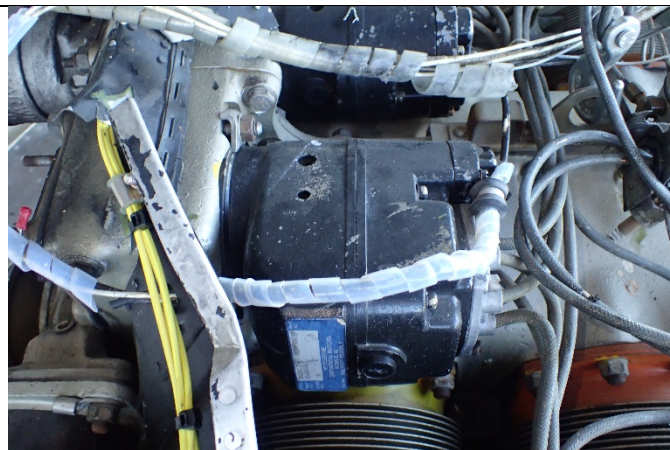
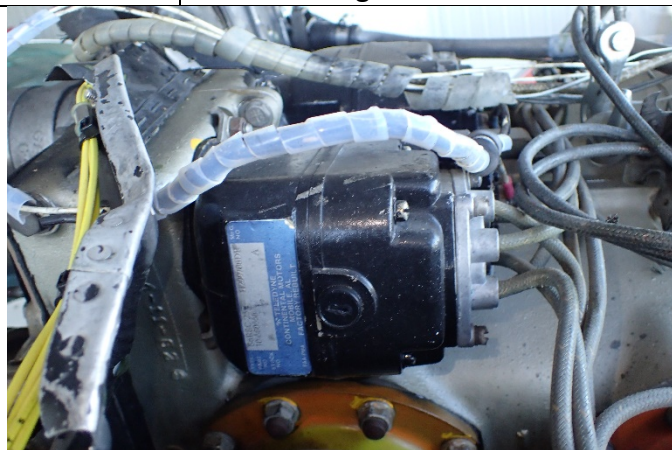
Manufacturer: CMI

P/N: 10-500556-1

S/N: H299706DR

Condition:

The magneto remained attached to its installation point and was undamaged. The impulse coupling was noted to operate during crankshaft rotation. During impulse coupling operation it was noted that magneto was capable of producing a spark on all six posts in the correct order and was in sync with the left magneto. There were no anomalies noted with the magneto.



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 8 of 27

IGNITION HARNESS

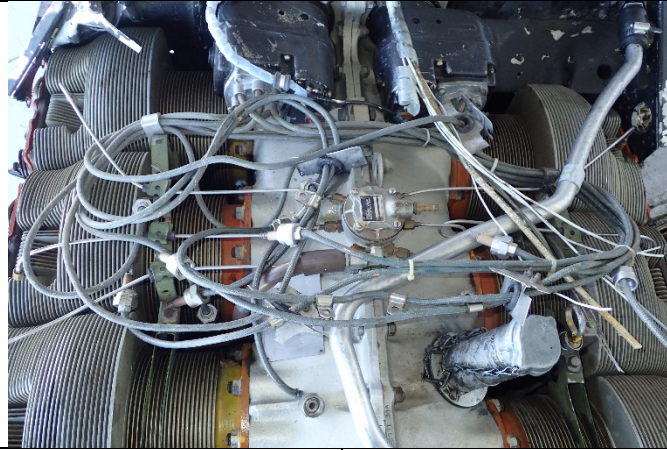
Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The ignition harness remained attached to the magnetos and to the spark plugs. The harness displayed impact damage signatures; several of the ignition leads were torn and partially severed. During magneto impulse coupling operation, the harness was capable of conducting a spark from the magneto to the ignition lead end or to the first portion of the lead that was partially severed. There were no anomalies noted with the ignition harness.



SPARK PLUGS

Manufacturer: Champion

P/N: REM40E

Condition:

All of the spark plugs remained installed in their cylinders and were undamaged. The top spark plugs were removed from their cylinders and visually inspected. The top spark plugs displayed normal operating and wear signatures when compared with Champion Aviation Service Manual AV6-R. The bottom spark plugs were inspected using a lighted borescope; the #5 bottom spark plug was not examined due to being submersed in engine oil which was consistent with post-accident accumulation. The visible spark plugs displayed normal operating and wear signatures.



#1 Top Spark Plug



#1 Bottom Spark Plug

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 9 of 27



#3 Top Spark Plug



#3 Bottom Spark Plug



#5 Top Spark Plug



Oil covering the #5 Spark Plug



#2 Top Spark Plug



#2 Bottom Spark Plug

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 10 of 27



#4 Top Spark Plug



#4 Bottom Spark Plug



#6 Top Spark Plug



#6 Bottom Spark Plug

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 11 of 27

FUEL SYSTEM

FUEL PUMP

Manufacturer: CMI

P/N: 646212-9

S/N: G149216BR

Condition:

The fuel pump remained attached to its installation point and displayed impact damage signatures. The fuel inlet and the vapor return AN fitting had broken free from the fuel pump. All of the fuel lines were noted to be secure to their respective AN fittings. The fuel pump was removed and it was noted that the fuel pump drive coupling remained intact. The fuel pump was partially disassembled. There were no anomalies noted with the fuel pump.



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 12 of 27

THROTTLE BODY METERING UNIT

Manufacturer: CMI

P/N: 625219-2

S/N: G159207AR

Condition:

The throttle and metering assembly remained attached to its installation point and displayed impact damage signatures concentrated to the fuel metering portion of the assembly. The throttle and metering assembly was removed and was disassembled. The internal components displayed normal operating signatures and the fuel inlet screen was clear of any contaminants. There were no anomalies noted.



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 13 of 27

FUEL MANIFOLD VALVE

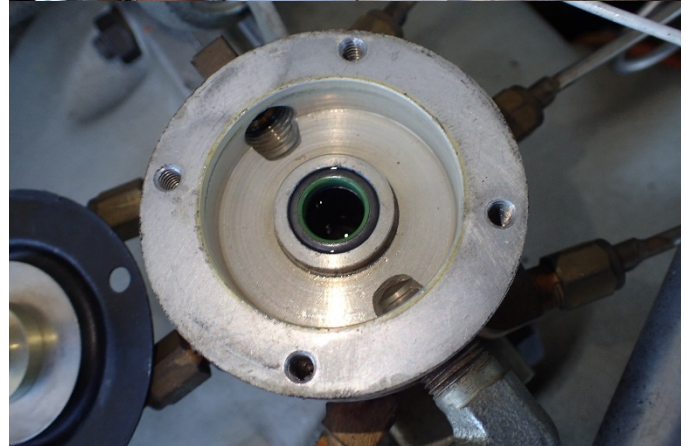
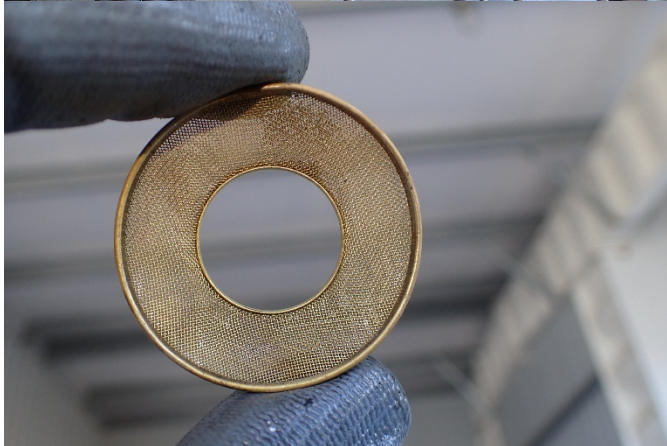
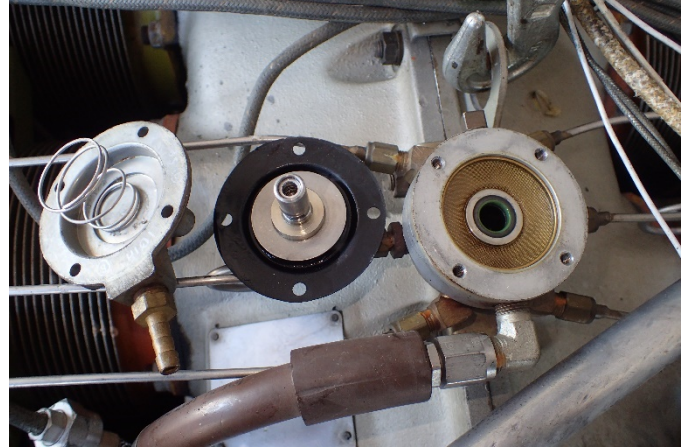
Manufacturer: CMI

P/N: 631427A22

S/N: G139224CR

Condition:

The fuel manifold valve remained attached to its installation point and was undamaged. The manifold valve was disassembled and it was noted that the internal components displayed normal operating signatures. There were no anomalies noted with the manifold valve.



FUEL NOZZLES AND LINES

Manufacturer: CMI

Position	#1	#3	#5	#2	#4	#6
Size	D120	D120	D120	D120	D120	D120
Condition:	The fuel nozzles were removed and visually inspected. The nozzles displayed normal operating signatures and there were no anomalies noted					

ENGINE FIELD INSPECTION REPORT

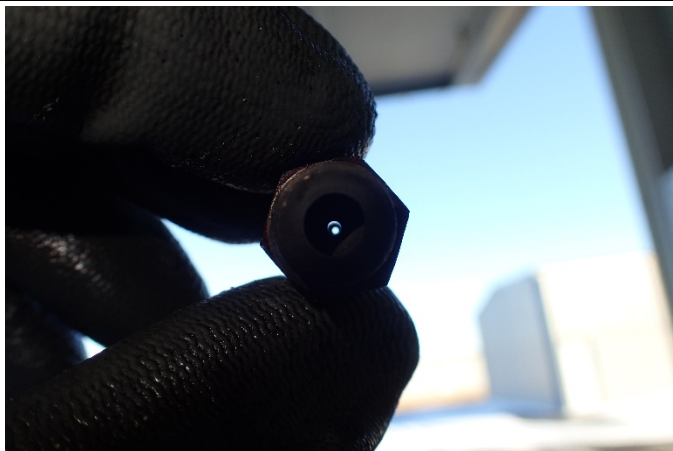
FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

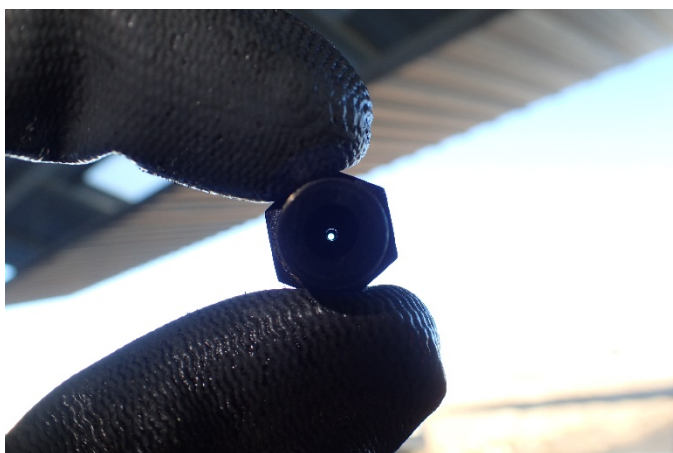
PAGE 14 of 27



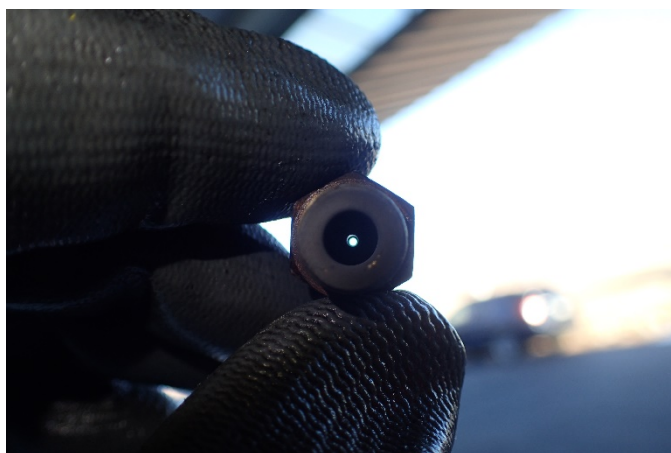
#1 Nozzle



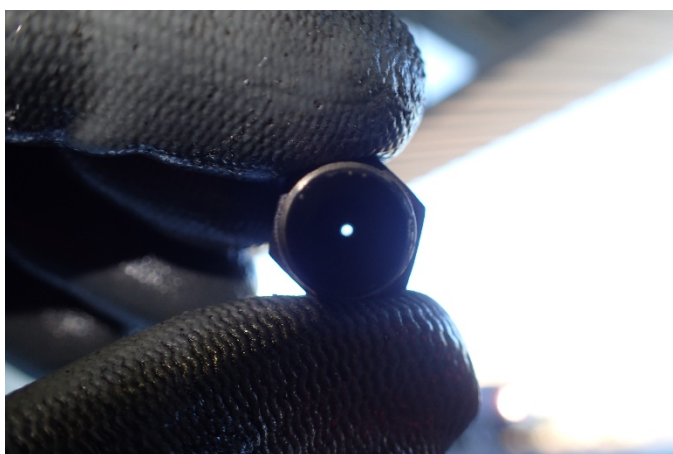
#3 Nozzle



#5 Nozzle



#2 Nozzle



#4 Nozzle



#6 Nozzle

ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 15 of 27**LUBRICATION SYSTEM****OIL SUMP**

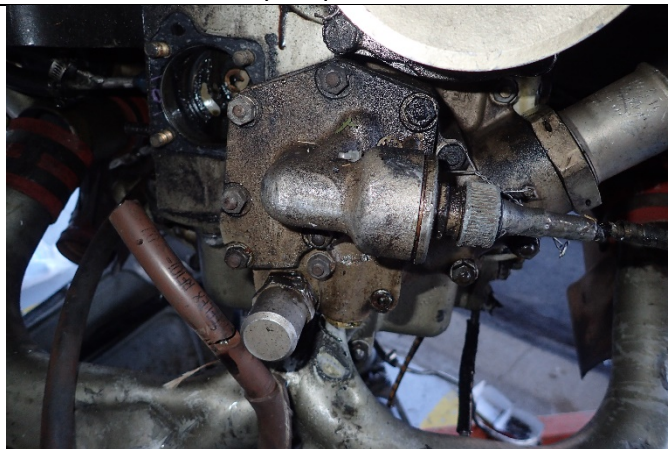
Condition: The oil sump remained intact; however, the oil sump quick-drain displayed impact damage and had partially broken off. A significant amount of oil drained from the oil sump; the oil displayed normal color and there were no contaminants noted within the oil.

**OIL PICK-UP
TUBE & SCREEN**

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

OIL PUMP

Condition: The oil pump remained attached to its installation point and was undamaged. There were no anomalies noted with the oil pump.



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 16 of 27

OIL FILTER

Manufacturer: Champion

P/N: CH48110-1

Condition:

The oil filter remained attached to the oil filter adapter and displayed impact damage signatures. The oil filter was removed and the housing was cut open. The oil filter pleats displayed normal operating signatures and there were no signs of metallic material within the filter pleats.



OIL COOLER

Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

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



ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

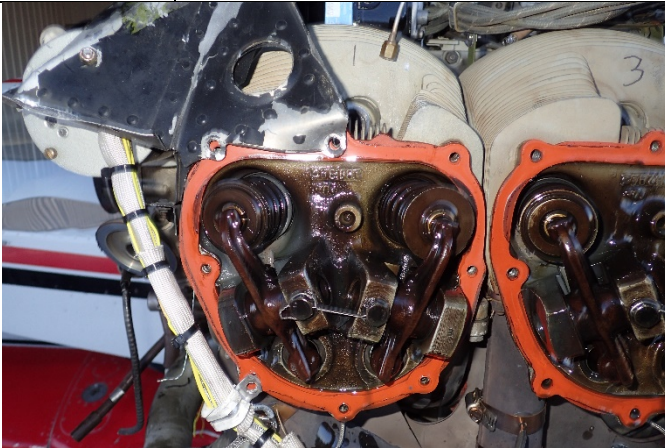
71706-9-C

PAGE 17 of 27

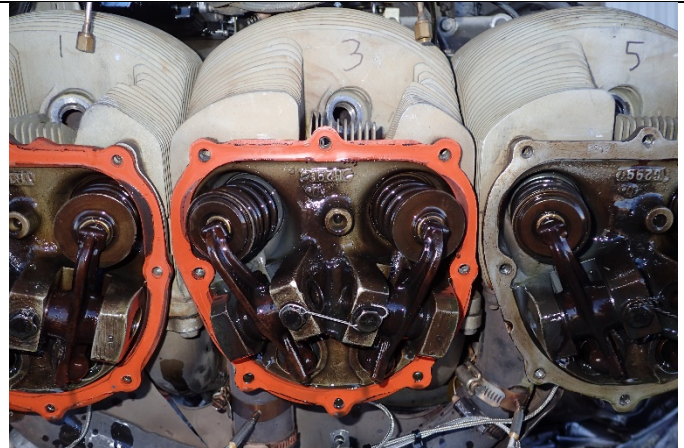
CYLINDERS

CYLINDERS

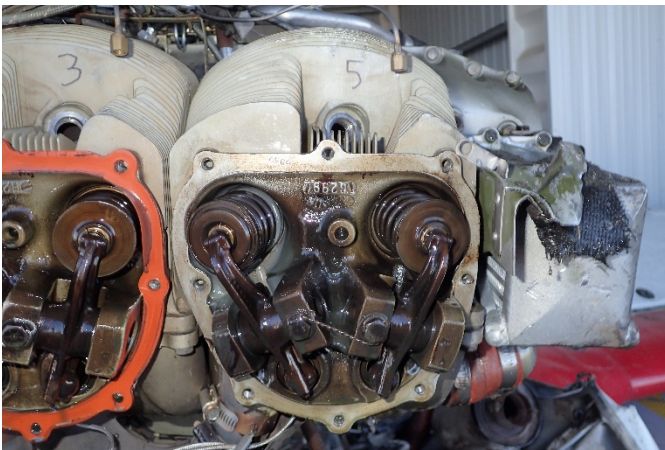
Condition: All of the cylinders remained attached to their cylinder bays and were undamaged. The inside of the cylinders were inspected using a lighted borescope. The piston faces, valve heads, and cylinder bores displayed normal operating and combustion signatures. The crankshaft was rotated using a hand tool and all six 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



#5 Cylinder



#2 Cylinder

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 18 of 27



#4 Cylinder



#6 Cylinder

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 with the valves.



#1 Exhaust Valve



#1 Intake Valve

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 19 of 27



#3 Exhaust Valve



#3 Intake Valve



#5 Exhaust Valve



#5 Intake Valve



#2 Exhaust Valve



#2 Intake Valve

ENGINE FIELD INSPECTION REPORT

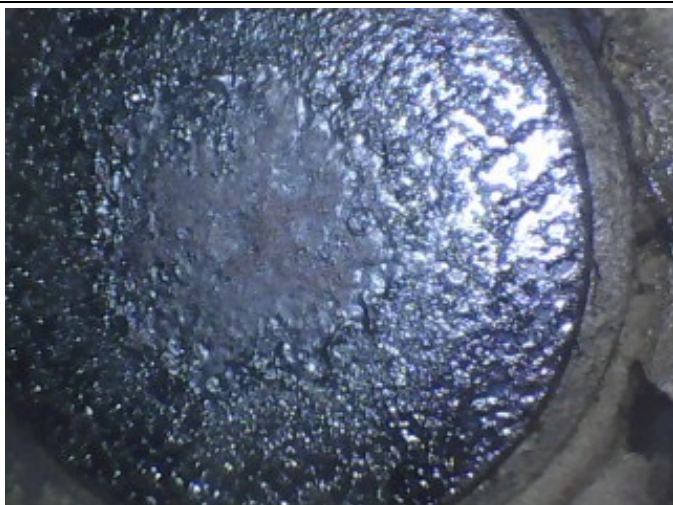
FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 20 of 27



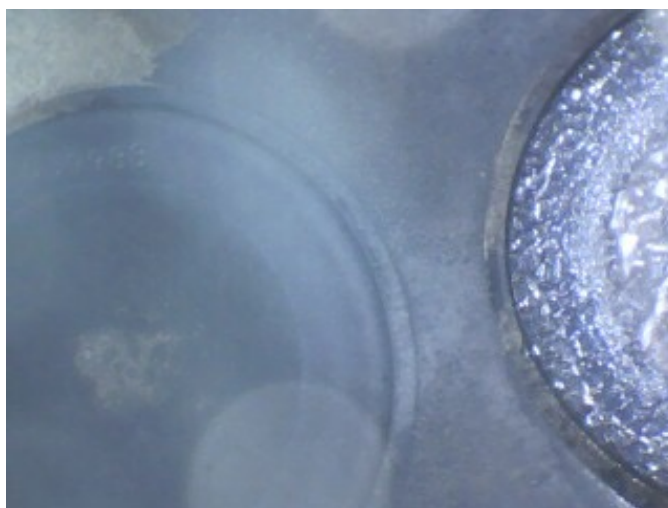
#4 Exhaust Valve



#4 Intake Valve



#6 Exhaust Valve



#6 Intake Valve

ROCKER ARMS AND SHAFTS

Condition:

All of the rocker arms displayed normal operating and lubrication signatures. During crankshaft rotation the rocker arms operated normally. There were no anomalies noted with the rocker arms.



ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 21 of 27**PISTONS**

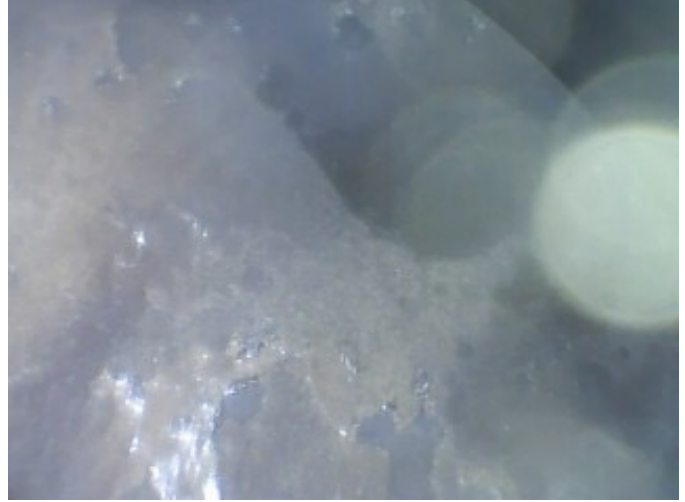
Piston P/N: Inaccessible

Condition:

All of 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 operated normally. There were no anomalies noted with the pistons.



#1 Piston



#3 Piston



#5 Piston



#2 Piston

ENGINE FIELD INSPECTION REPORT

FILE NUMBER:

17-377

ENGINE S/N:

71706-9-C

PAGE 22 of 27



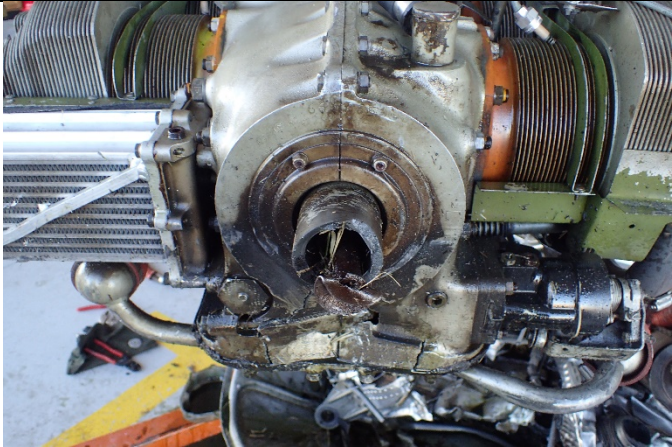
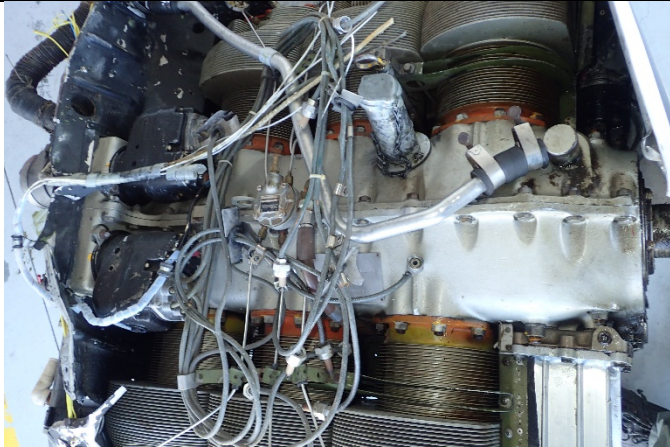
#4 Piston



#6 Piston

CRANKCASE ASSEMBLY

CRANKCASE	Casting Number:	1-3-5: Not observed	2-4-6: Not observed	S/N: 665
Condition:	The crankcase displayed impact damage signatures to the front bottom portion of the crankcase. There were no anomalies noted with the crankcase.			



ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 24 of 27**CRANKSHAFT ASSEMBLY****CRANKSHAFT**Forging Number:
Inaccessible

S/N: Not observed

Heat code: Inaccessible

Condition:

The propeller flange had broken free from the crankshaft and remained attached to the propeller hub. The crankshaft was rotated by inserting a hand tool in one of the accessory drive gears. 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.

**ACCESSORY
GEARS**

Condition:

Operation of the magneto drive gears was verified by rotating the crankshaft and observing magneto impulse coupling operation. The magneto drive gears operated normally.

ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 25 of 27**ACCESSORIES****STARTER**

Manufacturer: Delco

P/N: 1109678

S/N: 3102143

Condition:

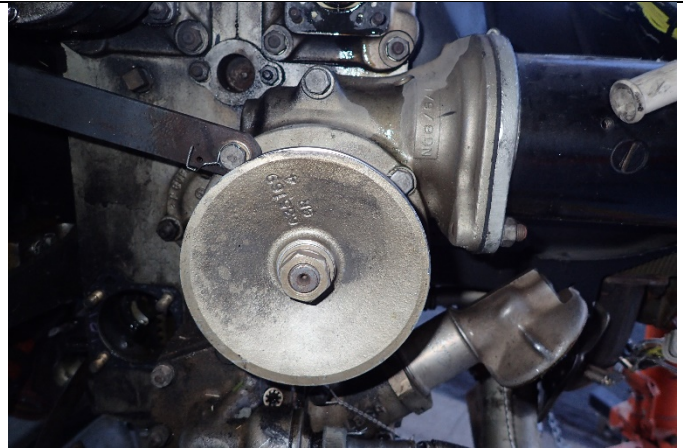
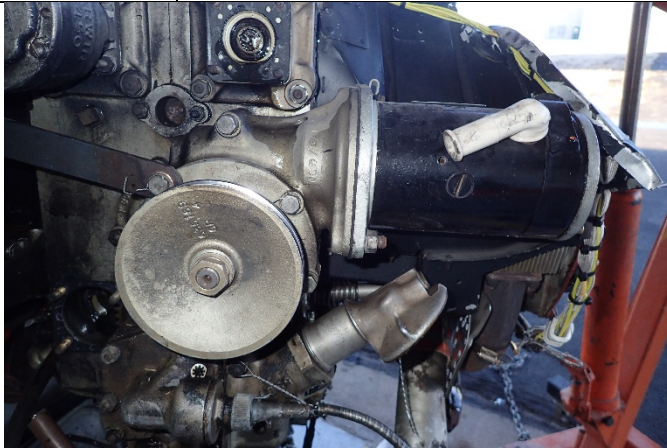
The starter remained attached to its installation point and displayed minor impact damage signatures. There were no anomalies noted.

**STARTER ADAPTER**

P/N: Illegible

Condition:

The starter adapter remained attached to its installation point and was undamaged. There were no anomalies noted with the starter adapter.



ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 26 of 27**ALTERNATOR**

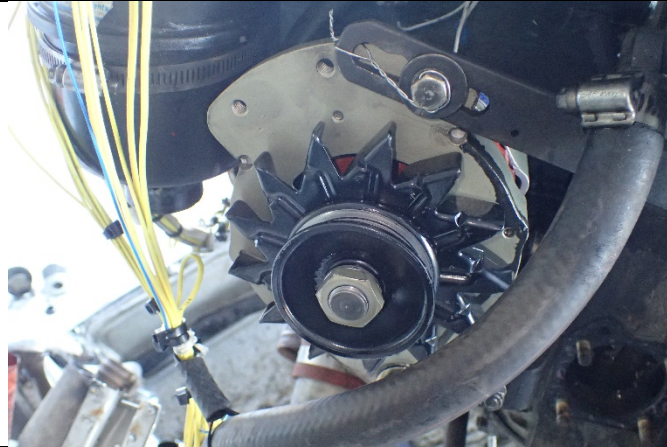
Manufacturer: Motorola

P/N: 015-01237

S/N: A-7689

Condition:

The alternator remained attached to its installation point and was undamaged. There were no anomalies noted with the alternator.

**VACUUM PUMP**

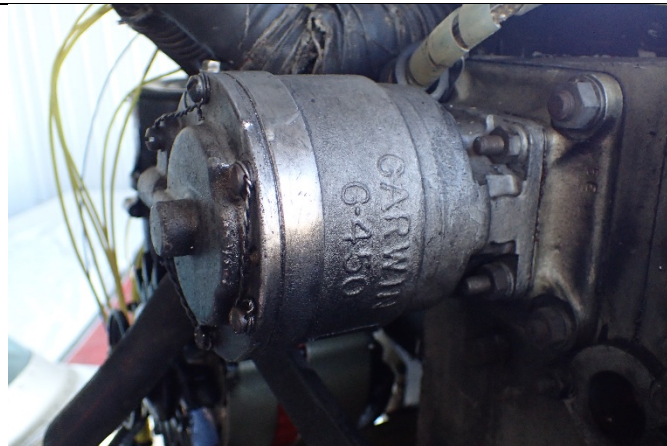
Manufacturer: Garwin

P/N: G-450

S/N: Not observed

Condition:

The vacuum pump remained attached to its installation point and was undamaged. There were no anomalies noted with the vacuum pump.



ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

17-377

ENGINE S/N:

71706-9-C

PAGE 27 of 27**PROPELLER****PROPELLER GOVERNOR**

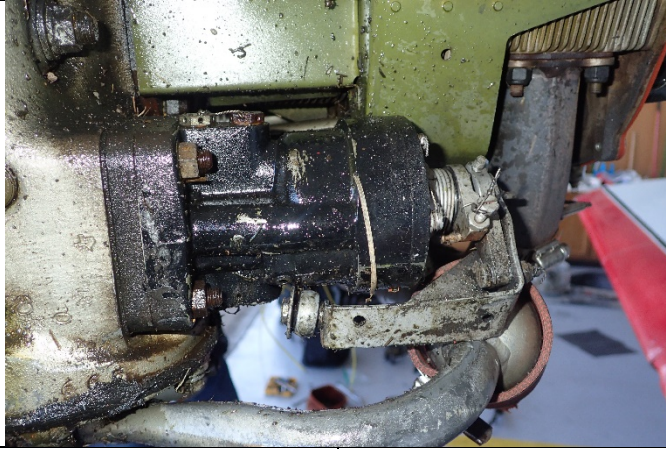
Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

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

**PROPELLER**

Manufacturer: Beechcraft

P/N: Not observed

S/N: Not observed

Condition:

The propeller remained attached to the propeller flange; however, the propeller flange had broken free from the rest of the crankshaft consistent with impact damage. Both of the propeller blades remained within the propeller hub and displayed minor impact damage. One propeller blade was bent slightly aft and displayed minor scratches at the blade tip. The other propeller blade displayed minor scratches at the blade tip. There were no anomalies noted with the propeller.

