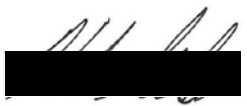




Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	IO-550-N
ENGINE SERIAL NUMBER	917311
AIRCRAFT MAKE & MODEL	Cirrus SR22
AIRCRAFT SERIAL NUMBER	0471
AIRCRAFT REGISTRATION	N1116C
FILE NUMBER	15-136

NAME	SIGNATURE	DATE
Kurt Gibson		11/15/2016

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GENERAL INFORMATION

EXAMINATION

DATE 10/27/2015

FACILITY Continental Motors Inc.

ADDRESS 2039 S Broad St
Mobile, AL 36615

ACCIDENT DATA

NTSB ACCIDENT # ERA15FA330

NTSB INVESTIGATOR Heidi Kemner

FAA INVESTIGATOR Clay Perkins

ACCIDENT DATE 08/27/2015

ACCIDENT LOCATION Alabaster, AL

ENGINE INFORMATION

ENGINE POSITION Single Engine

TOTAL TIME 2121.4 (Time at last annual inspection)

TIME SOH 599.3 (Time at last annual inspection)

TIME SLI Unknown

BUILD DATE 06/21/2004

IN SERVICE DATE Unknown

Significant logbook information:

The last annual inspection was performed on 04/10/2015 at an hour meter time of 2289.9. On 12/16/2011 the engine was disassembled for a propeller strike inspection at an hour meter time of 2145.5.

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:

At the time of this report's writing the engine remained in bonded storage at the Continental Motors Inc. factory in Mobile, Alabama.

ENGINE EXAMINATION REPORT**FILE NUMBER:**

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PAGE 3 of 37**INSPECTION WITNESSES**

NAME	Kurt Gibson	NAME	Jack Clark
ADDRESS	Mobile, Alabama	ADDRESS	Birmingham, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	FAA
PHONE		PHONE	
NAME	Phillip Grice	NAME	Brad Miller
ADDRESS	Mobile, Alabama	ADDRESS	Duluth, Minnesota
ORGANIZATION	Continental Motors Inc.	ORGANIZATION	Cirrus
PHONE		PHONE	
NAME	Greg Eastburn	NAME	Lisa Jersild
ADDRESS	Mobile, Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors Inc.	ORGANIZATION	Continental Motors Inc.
PHONE	N/A	PHONE	N/A

EXTERNAL INSPECTION OF ENGINE

The engine displayed impact and thermal damage signatures; the thermal damage signatures were concentrated to the rear of the engine. The crankcase was fractured at the lower forward portion of the crankcase and portions of the internal components were exposed. The propeller flange had fractured from the rest of the crankshaft which was consistent with impact damage. All six cylinders remained attached to their cylinder bays and displayed varying amount of impact and thermal damage signatures.

The fuel pump remained attached to its installation point and displayed thermal damage signatures and some impact damage signatures. The throttle and fuel metering assembly remained attached to its installation point and was undamaged. The fuel manifold valve remained attached to its installation point and was undamaged. All of the fuel nozzles remained secured in their cylinders and the #1 fuel injector displayed impact damage signatures.

Both of the magnetos remained attached to their installation points and displayed some thermal damage signatures. The ignition harness remained attached to both of the magnetos and to each of the spark plugs. The ignition harness displayed thermal damage signatures. All of the spark plugs remained installed in their cylinders and displayed varying degrees of thermal damage.

The induction system displayed some impact and thermal damage signatures. The majority of the exhaust system had been cut off from the engine by the recovery personnel. There were no anomalies noted with the small portions of exhaust returned with the engine.

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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition: The majority of the exhaust system had been cut from the engine by the recovery personnel and had not been sent with the rest of the engine. The small portions of the exhaust that remained attached to the engine displayed normal operating signatures.

INDUCTION SYSTEM

Condition: The induction system displayed impact and thermal damage signatures concentrated to the rear portions of the induction system. There were no signs of induction leaks or any other anomalies noted with the induction system.



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IGNITION SYSTEM

LEFT MAGNETO

Manufacturer: CMI

P/N: 10-500556-1

S/N: D06GA155

Condition: The magneto remained attached to its installation point and displayed thermal damage signatures. The magneto was removed from the engine and it was noted that the drive shaft was capable of normal rotation. The magneto was placed on a test bench and was tested throughout its operating speeds; the magneto was capable of producing a spark on all six posts in the correct order.



RIGHT MAGNETO

Manufacturer: CMI

P/N: 10-500556-1

S/N: D06GA205

Condition: The magneto remained attached to its installation point and displayed thermal damage signatures. The magneto was removed from the engine and it was noted that the drive shaft was capable of normal rotation. The magneto was placed on a test bench and was tested throughout its operating speeds; the magneto was capable of producing a spark on all six posts in the correct order.



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IGNITION HARNESS

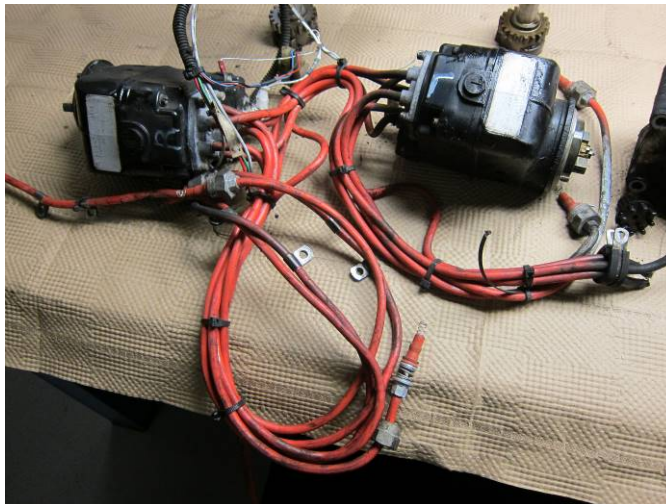
Manufacturer: Slick

P/N: Not recorded

S/N: Not recorded

Condition:

The ignition harness remained attached to both of the magnetos and to each of the spark plugs. The ignition harness displayed thermal damage to several of the ignition leads. There were no anomalies noted with the ignition harness.



SPARK PLUGS

Manufacture: Tempest

P/N: URHB32S

Condition:

All of the spark plugs remained installed in their cylinders and displayed varying degrees of thermal damage. The spark plugs were removed and the electrodes were visually inspected. The electrodes displayed normal operating and wear signatures.



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FUEL SYSTEM

FUEL PUMP

Manufacturer: CMI

P/N: 655921-3A1

S/N: B04CA091

Condition:

The fuel pump remained attached to its installation point and displayed thermal and impact damage signatures. The fuel pump was removed and it was noted that the fuel pump drive coupling remained intact. It was noted that the fuel pump drive was not capable of rotation by hand. The fuel pump was disassembled and the internal components were visually inspected. All of the internal components displayed thermal damage signatures and normal operating signatures. There were no anomalies noted.



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THROTTLE BODY METERING UNIT

Manufacturer: CMI

P/N: 653353-1

S/N: A04FA009

Condition:

The throttle and fuel metering assembly remained attached to its installation point and was undamaged. The fuel metering portion of the assembly was disassembled and the internal components were visually inspected. There were no anomalies noted with the throttle and fuel metering assembly.



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FUEL MANIFOLD VALVE

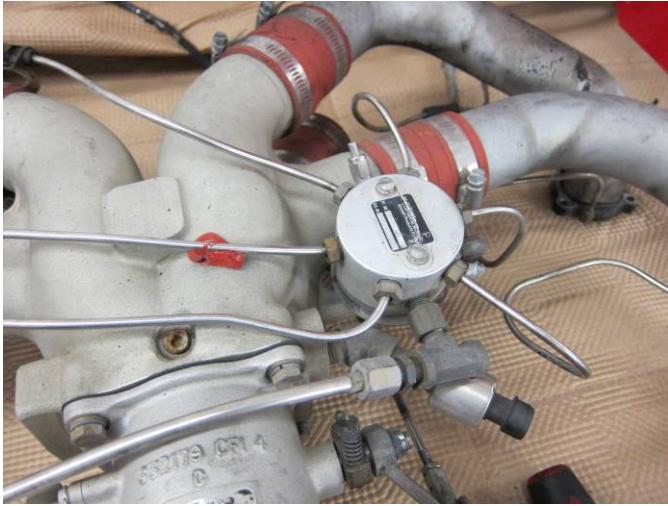
Manufacturer: CMI

P/N: 646433-3

S/N: C04FA010

Condition:

The fuel manifold valve remained attached to its installation point and was undamaged. There were no signs of fuel leaks noted around the manifold valve. The manifold valve was disassembled and the internal components were visually inspected. The fuel screen was noted to have fibrous material in the screen; however, the screen was not blocked and there were no signs of the fibrous material on the filtered side of the manifold valve. The remaining components displayed normal operating signatures.



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FUEL NOZZLES AND LINES

Manufacturer: CMI

Position	#1	#3	#5	#2	#4	#6
Size	12E	12E	12E	12E	12E	12E
Condition:	All of the fuel nozzles remained installed in their cylinders and the #1 fuel nozzle displayed impact damage signatures; the #1 nozzle was broken approximately in half. The nozzles were removed and visually inspected. There were no anomalies noted with the nozzles.					



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LUBRICATION SYSTEM

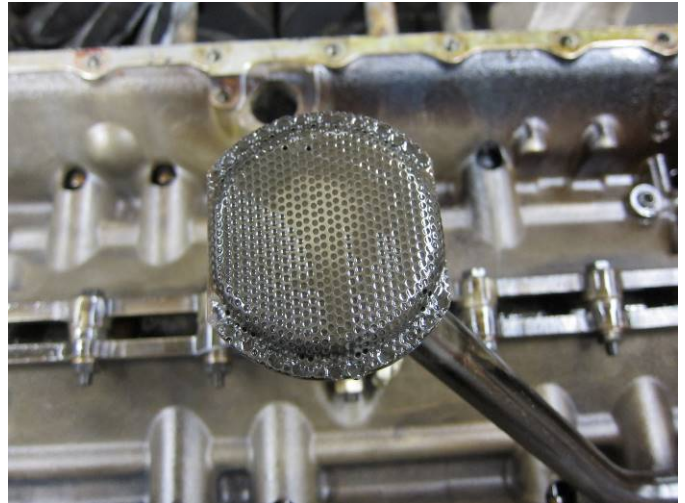
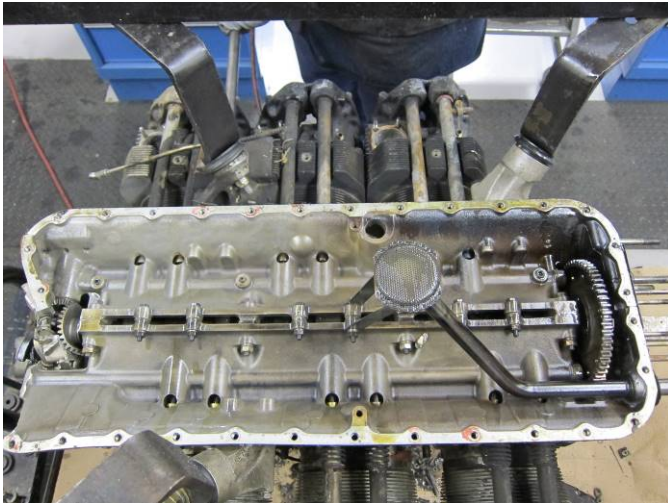
OIL SUMP

Condition: The oil sump displayed impact and thermal damage signatures; the oil sump was breached towards the rear of the oil sump. There were no pre-impact anomalies noted with the oil sump.



OIL PICK-UP TUBE & SCREEN

Condition: The oil pick-up tube and screen were intact and undamaged. The oil pick-up screen was clear of any contaminants. There were no anomalies noted.



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OIL PUMP

Condition: The oil pump displayed thermal damage signatures and remained intact. The oil pump was disassembled and the internal components were visually inspected. The oil pump housing displayed scoring consistent with hard particle passage. The oil pump gears and pressure relief valve displayed normal operating signatures.



OIL FILTER

Manufacturer: Unknown

P/N: Unknown

Condition: The oil filter had broken free from the oil filter adapter and was not sent to Continental Motors Inc. with the engine.

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OIL COOLER

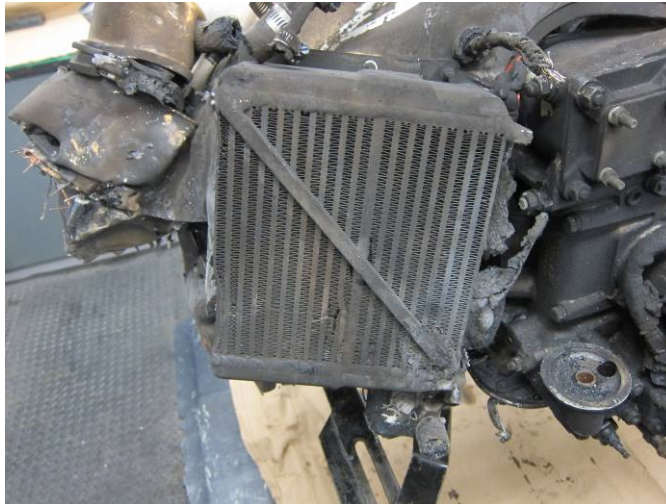
Manufacturer: Illegible

P/N: Illegible

S/N: Illegible

Condition:

The oil cooler remained partially attached to the engine and displayed impact and thermal damage signatures. There were no pre-impact anomalies noted with the oil cooler.



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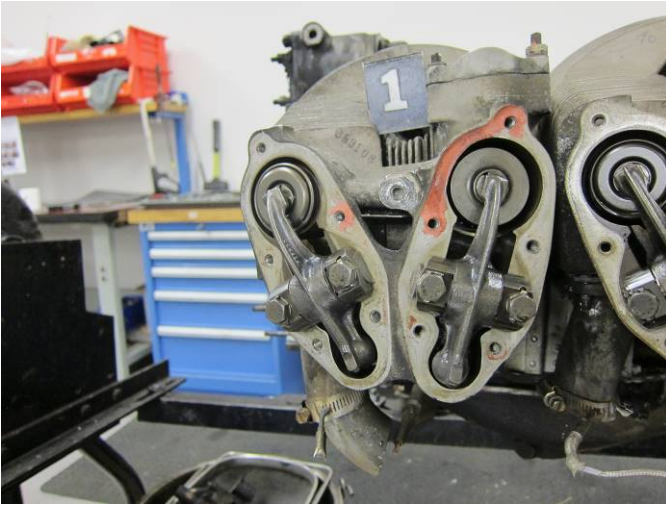
CYLINDERS

CYLINDER #1

P/N: 655465

S/N: AC08HB261

Condition: The cylinder remained attached to its cylinder bay and displayed some impact and thermal damage signatures. The cylinder was removed from the engine and visually inspected. The cylinder bore displayed normal operating signatures. The valve heads displayed normal operating and combustion signatures. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures.



CYLINDER #3

P/N: 655465

S/N: AC08HB269

Condition: The cylinder remained attached to its cylinder bay and displayed some impact and thermal damage signatures. The cylinder was removed from the engine and visually inspected. The cylinder bore displayed normal operating signatures. The valve heads displayed normal operating and combustion signatures. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures.



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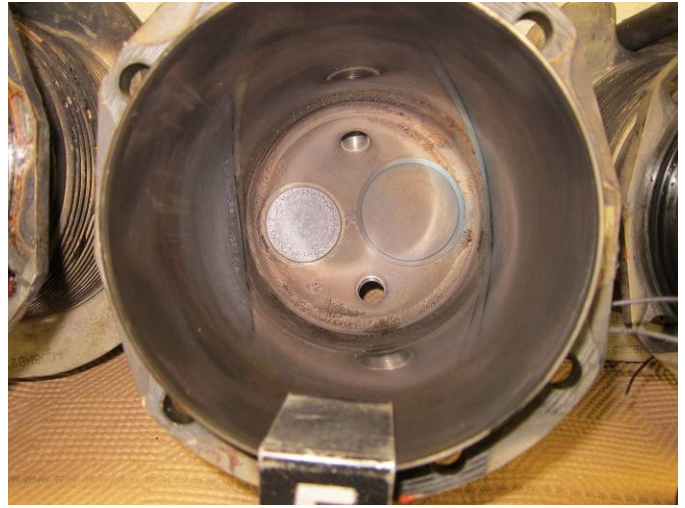
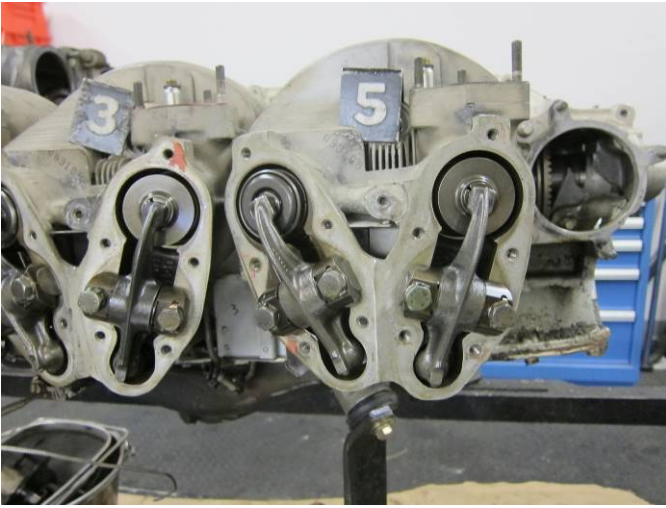
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CYLINDER #5

P/N: 655465

S/N: AC08HA318

Condition: The cylinder remained attached to its cylinder bay and displayed some impact and thermal damage signatures. The cylinder was removed from the engine and visually inspected. The cylinder bore displayed normal operating signatures. The valve heads displayed normal operating and combustion signatures. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures.



CYLINDER #2

P/N: 655465

S/N: AC08HA331

Condition: The cylinder remained attached to its cylinder bay and displayed some impact and thermal damage signatures. The cylinder was removed from the engine and visually inspected. The cylinder bore displayed normal operating signatures. The valve heads displayed normal operating and combustion signatures. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures.



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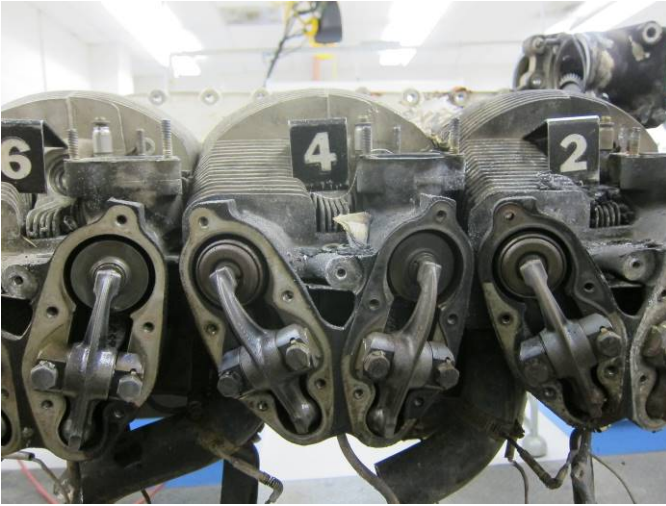
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CYLINDER #4

P/N: 655465

S/N: AC08HB271

Condition: The cylinder remained attached to its cylinder bay and displayed some impact and thermal damage signatures. The cylinder was removed from the engine and visually inspected. The cylinder bore displayed normal operating signatures. The valve heads displayed normal operating and combustion signatures. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures.

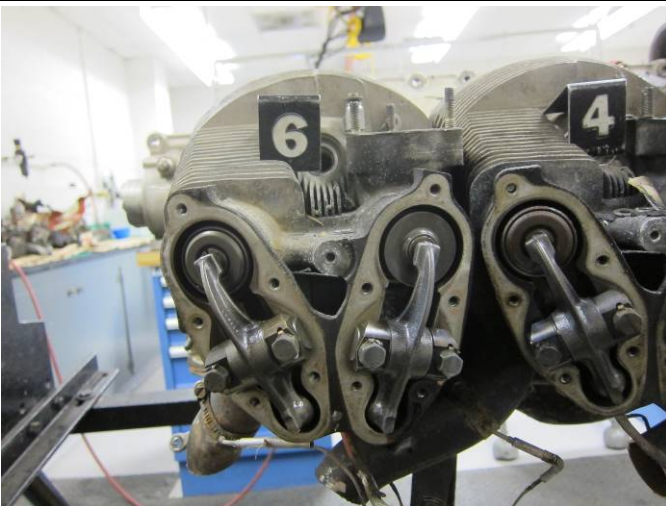


CYLINDER #6

P/N: 655465

S/N: AC08HB265

Condition: The cylinder remained attached to its cylinder bay and displayed some impact and thermal damage signatures. The cylinder was removed from the engine and visually inspected. The cylinder bore displayed normal operating signatures. The valve heads displayed normal operating and combustion signatures. The overhead components (valves, springs, and rocker arms) displayed normal operating and lubrication signatures.



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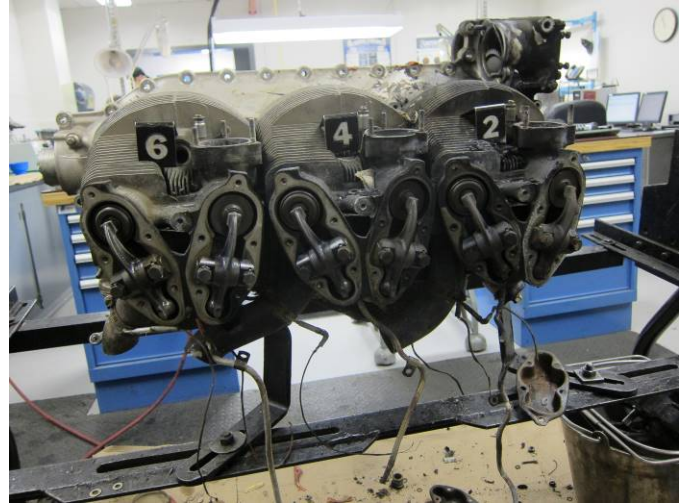
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VALVES AND GUIDES

Condition: All of the valve heads displayed normal operating and combustion signatures. The valve stems displayed normal operating signatures. There were no anomalies noted.

ROCKER ARMS AND SHAFTS

Condition: All of the rocker arms displayed normal operating and lubrication signatures. There were no anomalies noted with the rocker arms.



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PISTONS

Piston P/N: 654857C

Condition: The pistons remained intact and were undamaged. The piston faces displayed normal operating and combustion signatures. The piston rings were capable of normal movement in their grooves. There were no anomalies noted with the pistons.



#1 Piston



#3 Piston

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#5 Piston



#2 Piston



#4 Piston

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#6 Piston

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CRANKCASE ASSEMBLY

CRANKCASE

Casting
Number:

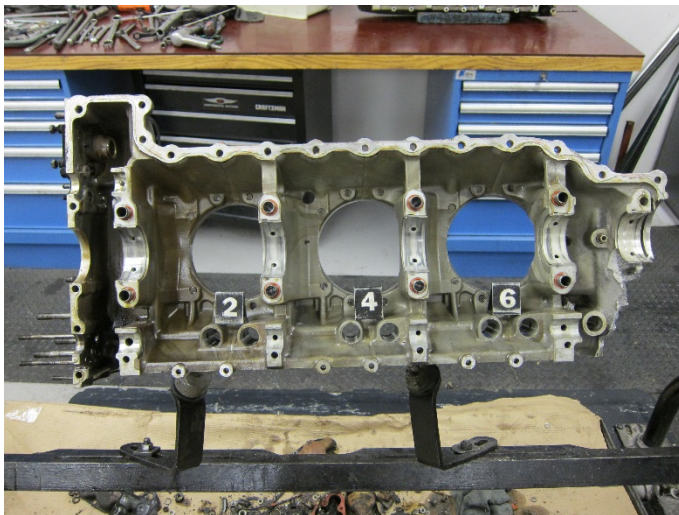
1-3-5: 655435

2-4-6: 655434

S/N: ?4EB346

Condition:

The crankcase displayed a significant amount of impact damage to the bottom forward portion of the crankcase. The crankcase halves were split and the crankcase was visually inspected. There were no signs of lock tab elongation or fretting on the crankcase halves. There were no anomalies noted with the crankcase.



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#1 MAIN BEARINGS

P/N: 634503

Date Code: 8-10

Condition:

The bearings remained in place and were undamaged. The bearings displayed normal operating and lubrication signatures. There were no signs of bearing shift or lubrication distress. There were no anomalies noted.



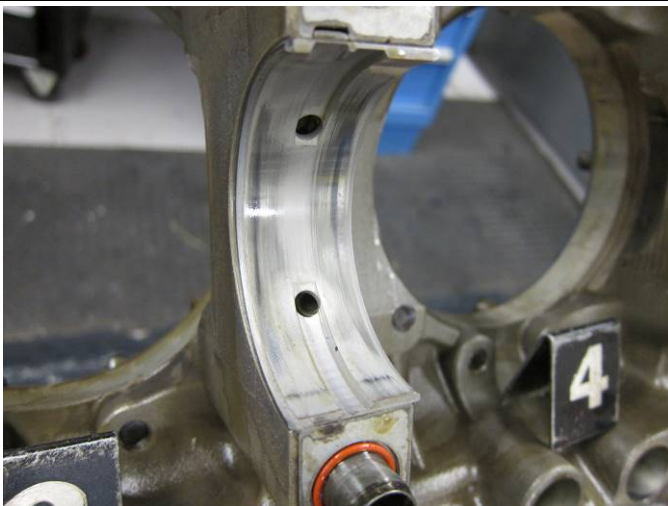
#2 MAIN BEARINGS

P/N: 634503

Date Code: 8-10

Condition:

The bearings remained in place and were undamaged. The bearings displayed normal operating and lubrication signatures. There were no signs of bearing shift or lubrication distress. There were no anomalies noted.



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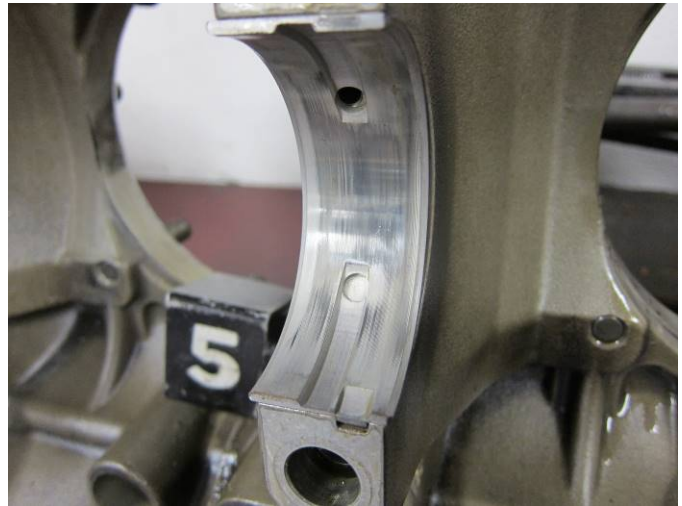
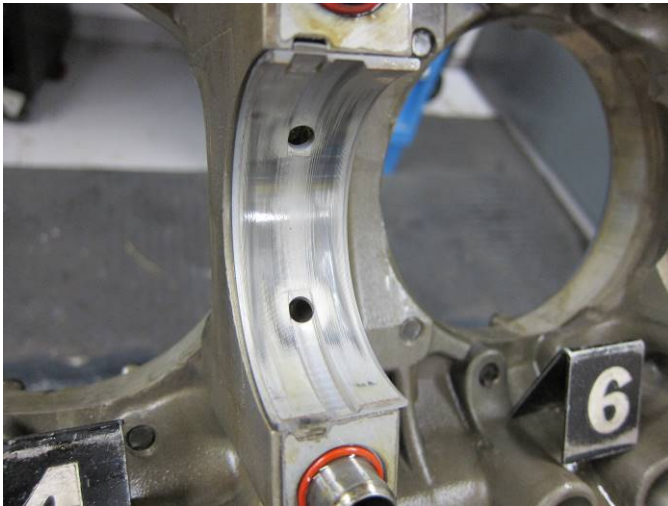
#3 MAIN BEARINGS

P/N: 634503

Date Code: 8-10

Condition:

The bearings remained in place and were undamaged. The bearings displayed normal operating and lubrication signatures. There were no signs of bearing shift or lubrication distress. There were no anomalies noted.



#4 MAIN BEARINGS

P/N: 653547

Date Code: 3-10

Condition:

The bearings remained in place and were undamaged. The bearings displayed normal operating and lubrication signatures. There were no signs of bearing shift or lubrication distress. There were no anomalies noted.



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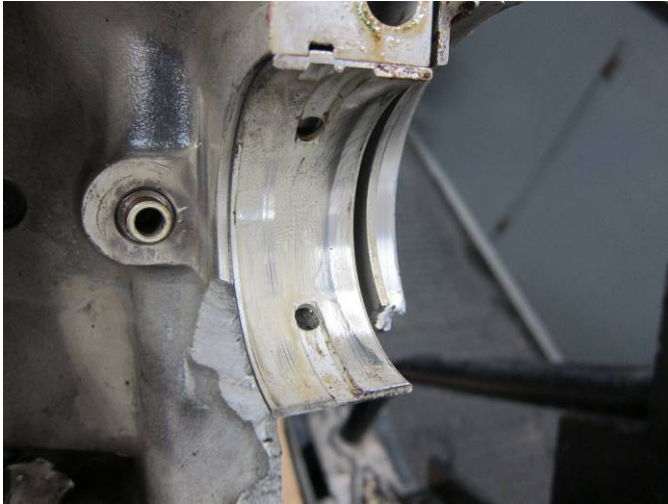
#5 MAIN BEARINGS

P/N: 653547

Date Code: 3-10

Condition:

Due to the impact damage to the forward portion of the crankcase both of the bearings were displaced. The bearings displayed normal operating and lubrication signatures. There were no signs of bearing shift or lubrication distress. There were no anomalies noted.



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CRANKSHAFT ASSEMBLY

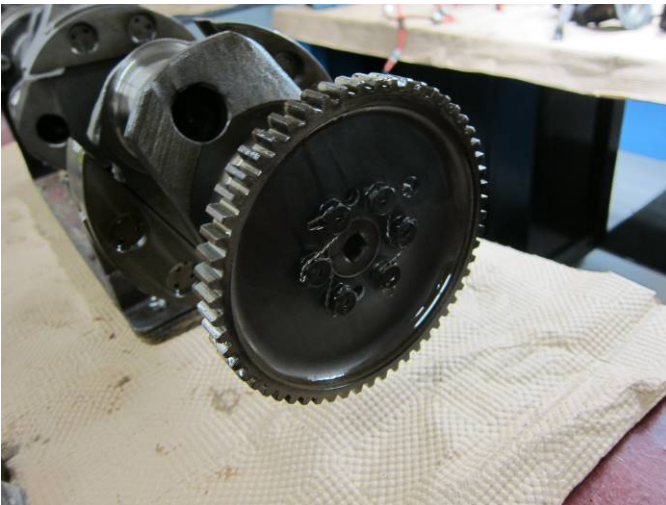
CRANKSHAFT

Forging Number: 649878

S/N: Propeller flange
not sent with engine.

Heat code: RFA

Condition: The propeller flange had broken free from the rest of the crankshaft and was not shipped with the rest of the engine. The fracture was consistent with impact damage and there were several cracks at a 45-degree angle noted near the fracture point. The rest of the crankshaft remained intact and the crankshaft gear remained secured to the crankshaft. All of the main bearing journals and connecting rod journals displayed normal operating and lubrication signatures.



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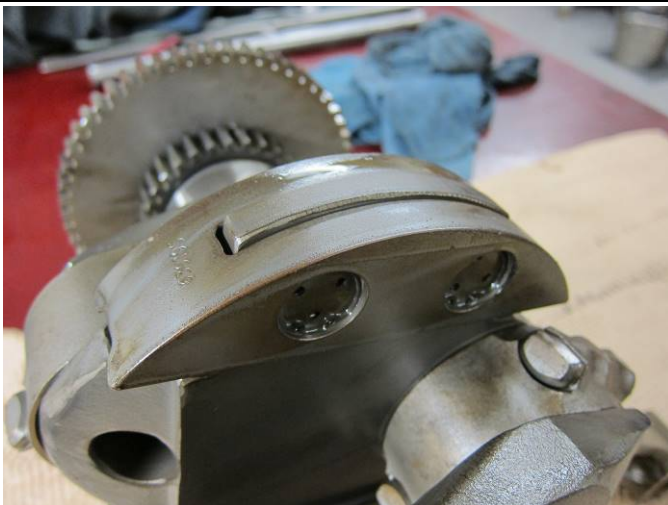
TRANSFER COLLAR

Condition: The transfer collar was fractured into several pieces which was consistent with impact damage. There were no pre-impact anomalies noted with the transfer collar



COUNTER WEIGHTS

Condition: All of the counterweights remained attached to their hangers and were undamaged. The counterweights were capable of normal movement on their hangers. There were no anomalies noted.



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INTERNAL TIMING

Condition: The internal timing was verified to be correct.



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#1 CONNECTING ROD

P/N: Illegible

Forging: 646126

Condition:

The connecting rod remained intact and undamaged. The connecting rod displayed normal operating signatures. There were no anomalies noted.

#1 CONNECTING ROD BEARING

P/N: 642398

Date Code: 03-09

Condition:

The connecting rod bearing displayed normal operating signatures and normal lubrication signatures. There were no signs of lubrication distress. There were no anomalies noted.



#3 CONNECTING ROD

P/N: Illegible

Forging: 646126

Condition:

The connecting rod remained intact and undamaged. The connecting rod displayed normal operating signatures. There were no anomalies noted.

#3 CONNECTING ROD BEARING

P/N: 642398

Date Code: 03-09

Condition:

The connecting rod bearing displayed normal operating signatures and normal lubrication signatures. There were no signs of lubrication distress. There were no anomalies noted.



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#5 CONNECTING ROD

P/N: Illegible

Forging: 646126

Condition:

The connecting rod remained intact and undamaged. The connecting rod displayed normal operating signatures. There were no anomalies noted.

#5 CONNECTING ROD BEARING

P/N: 642398

Date Code: 03-09

Condition:

The connecting rod bearing displayed normal operating signatures and normal lubrication signatures. There were no signs of lubrication distress. There were no anomalies noted.



#2 CONNECTING ROD

P/N: Illegible

Forging: 646126

Condition:

The connecting rod remained intact and undamaged. The connecting rod displayed normal operating signatures. There were no anomalies noted.

#2 CONNECTING ROD BEARING

P/N: 642398

Date Code: 03-09

Condition:

The connecting rod bearing displayed normal operating signatures and normal lubrication signatures. There were no signs of lubrication distress. There were no anomalies noted.



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#4 CONNECTING ROD

P/N: Illegible

Forging: 646126

Condition:

The connecting rod remained intact and undamaged. The connecting rod displayed normal operating signatures. There were no anomalies noted.

#4 CONNECTING ROD BEARING

P/N: 642398

Date Code: 03-09

Condition:

The connecting rod bearing displayed normal operating signatures and normal lubrication signatures. There were no signs of lubrication distress. There were no anomalies noted.



#6 CONNECTING ROD

P/N: Illegible

Forging: 646126

Condition:

The connecting rod remained intact and undamaged. The connecting rod displayed normal operating signatures. There were no anomalies noted.

#6 CONNECTING ROD BEARING

P/N: 642398

Date Code: 03-09

Condition:

The connecting rod bearing displayed normal operating signatures and normal lubrication signatures. There were no signs of lubrication distress. There were no anomalies noted.



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CAMSHAFT

CAMSHAFT

P/N: 654084

S/N: N/A

Condition: The camshaft remained intact and displayed impact damage signatures to the forward camshaft gear. The camshaft lobes and journals displayed normal operating and lubrication signatures. The camshaft gear was undamaged and remained secured to the camshaft. There were no anomalies noted with the camshaft.



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LIFTERS	#1	#3	#5	#2	#4	#6
INTAKE	653888	653888	653888	653888	653888	653888
EXHAUST	653877	653877	653877	653877	653877	653877
Condition:	All of the lifters were undamaged and displayed normal operating and lubrication signatures. There were no anomalies noted.					



#1 Lifters



#3 Lifters



#5 Lifters



#2 Lifters



#4 Lifters



#6 Lifters

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ACCESSORY GEARS

Condition: The accessory gears were undamaged and displayed normal operating signatures. There were no anomalies noted.



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ACCESSORIES

STARTER

Manufacturer: Illegible

P/N: ES646275-1

S/N: D013226

Condition:

The starter displayed impact and thermal damage signatures. There were no anomalies noted with the starter.



STARTER ADAPTER

P/N: Illegible

Condition:

The starter adapter remained attached to its installation point and displayed impact and thermal damage signatures. A large portion of the starter adapter housing had broken free from the rest of the adapter and some of the internal components were visible. There were no pre-impact anomalies noted with the starter adapter.



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ALT/GEN #1

Manufacturer: CMI

P/N: 646843

S/N: 005GA438

Condition:

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



ALT/GEN #2

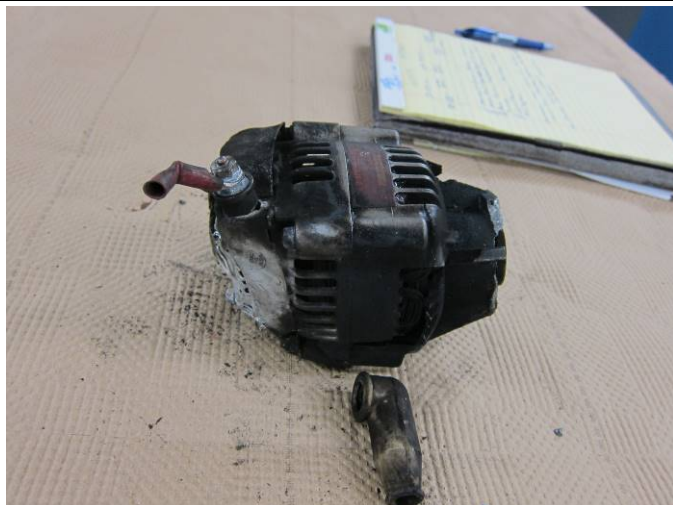
Manufacturer: B&C Specialty

P/N: BC410-1

S/N: 0765091X

Condition:

The alternator had broken free from its installation point and displayed impact and thermal damage signatures. There were no pre-impact anomalies noted with the alternator.



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PROPELLER GOVERNOR

Manufacturer: Ontic

P/N: D210760

S/N: 00306

Condition:

The propeller governor remained attached to its installation point and was undamaged. The governor was removed and it was noted that the gasket screen was clear of any contaminants. The propeller governor drive was capable of rotation and residual oil was pumped out of the governor. There were no anomalies noted with the governor.

