




Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	GTSIO-520-L
ENGINE SERIAL NUMBER	276375
AIRCRAFT MAKE & MODEL	Cessna 421C
AIRCRAFT SERIAL NUMBER	421-C0601
AIRCRAFT REGISTRATION	N421TK
FILE NUMBER	16-570

NAME	SIGNATURE	DATE
John T. Kent		12/01/2017

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GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	10/31/2017	NTSB ACCIDENT #	CEN17FA167
FACILITY	Analytical Department	NTSB INVESTIGATOR	John Brannen
ADDRESS	2039 South Broad Street, Mobile, Alabama 36615	FAA INVESTIGATOR	Unknown
		ACCIDENT DATE	04/25/2017
		ACCIDENT LOCATION	Huntsville, Texas

ENGINE INFORMATION

ENGINE POSITION	Left
TOTAL TIME	3,342.1 As of 04/24/2017
TIME SOH	132.0 As of 04/24/2017
TYPE & TIME SLI	Unknown
BUILD DATE	12/09/1993
IN SERVICE DATE	Unknown

Significant logbook information: The engine was overhauled by Ram Aircraft in Waco, Texas on 05/08/2014. The last annual inspection was performed on 04/24/2017 by Mr. Wes Wright AP-2994045IA. During the annual inspection the propeller governor and the waste gate actuator were removed, repaired and reinstalled.

Report Summary:

Search Code(s):

The number two connecting rod was separated from the rod journal, and the number two rod journal had heavy heat damage. Rod journals one, three and four were heat discolored, but the connecting rods remained attached. The number two connecting rod bearing was partly melted and heat damaged. The main bearings were not heat discolored.

Disposition of engine following exam: The engine was released to the insurance company.

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NAME	John T. Kent	NAME	Henry Soderlund
ADDRESS	2039 South Broad Street, Mobile, Alabama 36615	ADDRESS	Wichita, Kansas
ORGANIZATION	Continental Motors	ORGANIZATION	Textron Aircraft
PHONE	██████████	PHONE	██████████
NAME	John Brannen	NAME	Lisa Jersild
ADDRESS	Chicago, Illinois	ADDRESS	Mobile, Alabama
ORGANIZATION	NTSB	ORGANIZATION	Continental Motors
PHONE	██████████	PHONE	██████████
NAME	Rick Roper	NAME	Greg Eastburn
ADDRESS	Waco, Texas	ADDRESS	Mobile, Alabama
ORGANIZATION	Ram Aircraft	ORGANIZATION	Continental Motors
PHONE	██████████	PHONE	██████████

EXTERNAL INSPECTION OF ENGINE

The engine was intact with crushing damage on the top and bottom. All of the intake and exhaust pipes were impact damaged. All of the accessories were attached except for the oil filter. The rocker covers and ignition harness had impact damage. The oil sump was partly crushed, and most of the oil lines on the engine were separated.



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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition: The exhaust system was crushed and partly missing.



INDUCTION SYSTEM

Condition: The intake system is attached and impact damaged.



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IGNITION SYSTEM

LEFT MAGNETO	Manufacturer: Continental Motors S6LN-1201	P/N: BL-349220-4	S/N:F14AA231R
Condition:	The magneto was in place and not damaged. The drive shaft was free to rotate.		



RIGHT MAGNETO	Manufacturer: Continental Motors S6LN-1205	P/N: BL-349260-7	S/N: Damaged
Condition:	The magneto was broken away from the mount and had heavy impact damage on the top. The drive shaft was free to rotate.		



IGNITION HARNESS	Manufacturer: Champion	P/N: Unknown	S/N:Unknown
Condition:	The ignition harness was mostly intact with some impact damage.		

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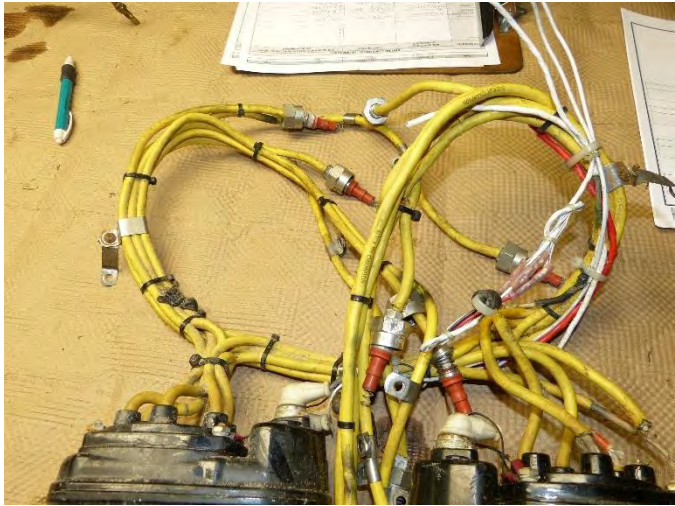
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SPARK PLUGS

Manufacturer: Champion

P/N: RHB-32E

Condition:

The spark plugs had normal wear when compared to the Champion Check-A-Plug comparison card. They had rust and corrosion in the electrode areas.



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FUEL SYSTEM

FUEL PUMP

Manufacturer: Continental Motors

P/N: 646210-3

S/N:E079906BR

Condition:

The fuel pump was in place with some impact damage. The drive coupling was intact, and the drive shaft was free to rotate.



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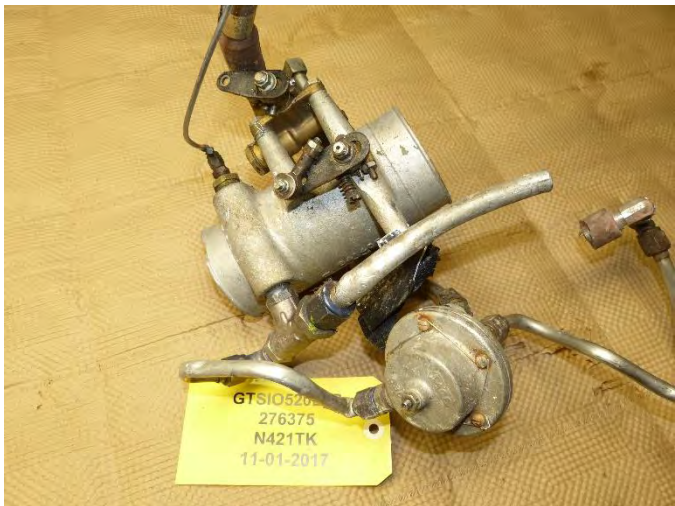
THROTTLE BODY METERING UNIT

Manufacturer: Continental Motors

P/N: 633573-9

S/N: E78026A

Condition: The unit had impact damage, but was mostly intact. The throttle and mixture controls were impact damaged. The main fuel screen was clean and clear.



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FUEL MANIFOLD VALVE

Manufacturer: Continental Motors

P/N: 641032-1A6

S/N: B039901CR

Condition: The fuel manifold was in place and the safety wire was intact. The unit was opened and the fuel screen was clear. The spring and diaphragm were not damaged. The nut was tight on the plunger.



FUEL NOZZLES AND LINES

Manufacturer: Continental Motors

Position	#1	#3	#5	#2	#4	#6
Size	19A	19A	19A	19A	19A	19A

Condition: The fuel nozzles were in place and not damaged.

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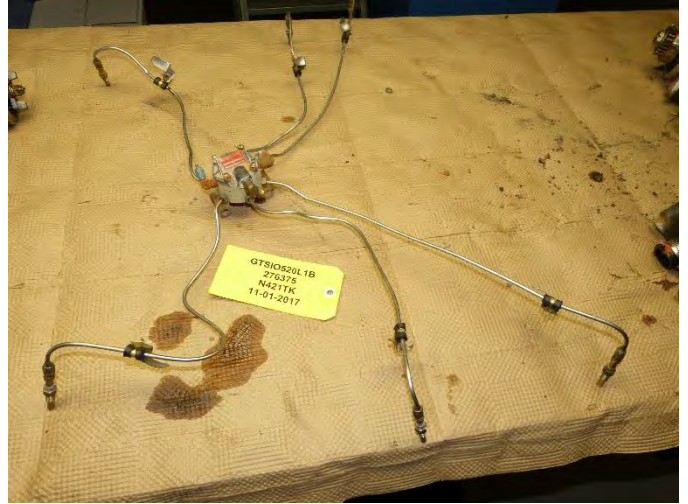
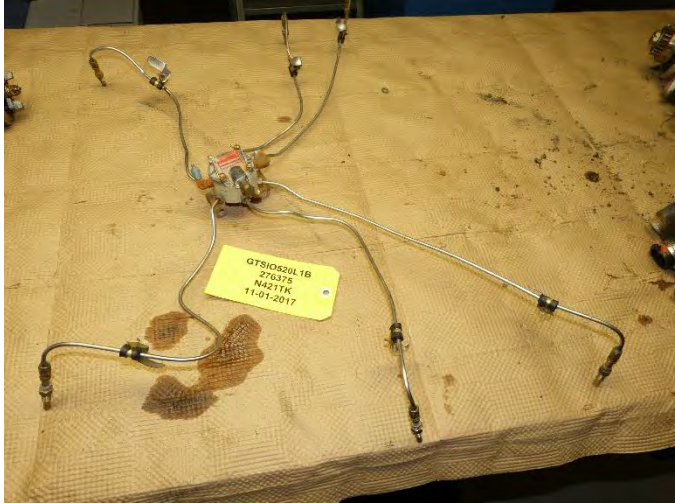
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LUBRICATION SYSTEM

OIL SUMP

Condition: The oil sump had heavy impact damage on the bottom, and part of a connecting rod was observed in the sump.



OIL PICK-UP TUBE & SCREEN

Condition: The oil pickup tube was partly crushed.

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OIL PUMP

Condition: The oil pump was intact and the gears were coated with oil.



OIL FILTER

Manufacturer:

P/N

Condition: The oil filter was missing.

OIL COOLER

Manufacturer: Aero Classics

P/N: 80000464

S/N: 3859514

Condition: The oil cooler had impact damage and contained some oil.

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CYLINDERS

CYLINDER #1	P/N: 658130	S/N: AC14AA956	Head Date: NA
Work Orders:	NA		
Condition:	The cylinder was not impact damaged. It has some corrosion in the barrel and the valves were in place.		



CYLINDER #3	P/N: 658130	S/N: AC14AA881	Head Date: NA
Work Orders:	NA		
Condition:	The cylinder had some corrosion in the barrel and the valves were in place.		

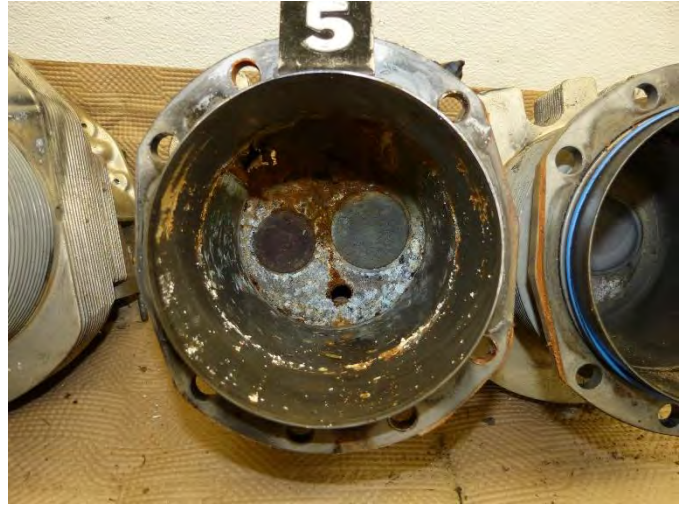
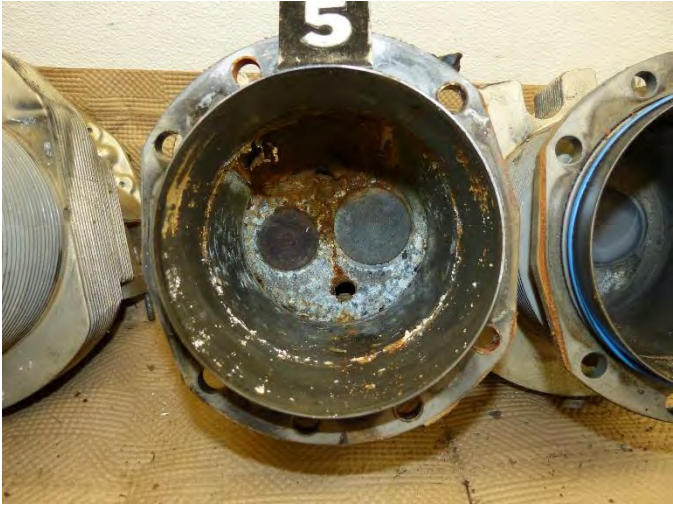


CYLINDER #5	P/N: 658130	S/N: AC14AA953	Head Date: NA
Work Orders:	NA		

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Condition: The cylinder has some rust and corrosion in the barrel and the valves were in place.



CYLINDER #2	P/N: 658130	S/N: AC14AA098	Head Date: NA
Work Orders:	NA		
Condition:	The piston was stuck in the barrel, and the valves were in place.		



CYLINDER #4	P/N:658130	S/N: AC14AA970	Head Date: NA
Work Orders:	NA		
Condition:	The cylinder had no combustion deposits in the dome, and the valves were in place.		

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CYLINDER #6	P/N:658130	S/N: AC14AA873	Head Date: NA
Work Orders:	NA		
Condition:	The cylinder had no combustion deposits in the dome, and the valves were in place.		



VALVES AND GUIDES	
Condition:	The valves were not removed and examined.

ROCKER ARMS AND SHAFTS	
Condition:	The rocker shafts were not removed and examined.

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**1 PISTON,
RINGS AND PIN**

Piston P/N: 654847

Condition:

The piston was covered with corrosion, and all of the rings were in place.



**#3 PISTON,
RINGS AND PIN**

Piston P/N: 654847

Condition:

Piston three had combustion deposits and the rings were in place.



**#5 PISTON,
RINGS AND PIN**

Piston P/N: 654847

Condition:

Piston number five had heavy corrosion and some rust. The rings were in place.

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**#2 PISTON,
RINGS AND PIN**

Piston P/N: 654847

Condition:

Piston number two was stuck in the cylinder.



**#4 PISTON,
RINGS AND PIN**

Piston P/N: 654847

Condition:

Piston number four had light combustion deposits and the rings were in place.

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**#6 PISTON,
RINGS AND PIN**

Piston P/N: 654847

Condition:

Piston number six had very light combustion deposits and the rings were in place.



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CRANKCASE ASSEMBLY

CRANKCASE	Casting Number:	1-3-5:	2-4-6:	S/N: R13GA525
Condition:	The crankcase halves were intact with some impact damage.			



MAIN BEARINGS	P/N: Propeller Shaft- 530386M010 Propeller Reduction Shaft- 630571 Mains-634503-M010	Date Code: 5/13 for main bearings
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Condition:	The main bearings had some heat discoloration and were lightly coated with oil.
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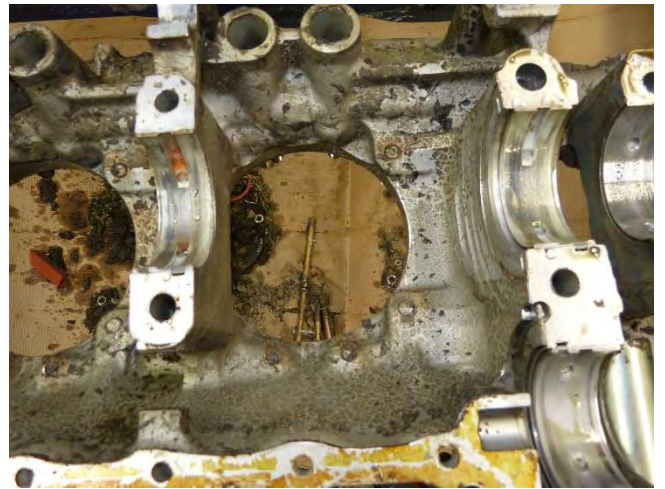
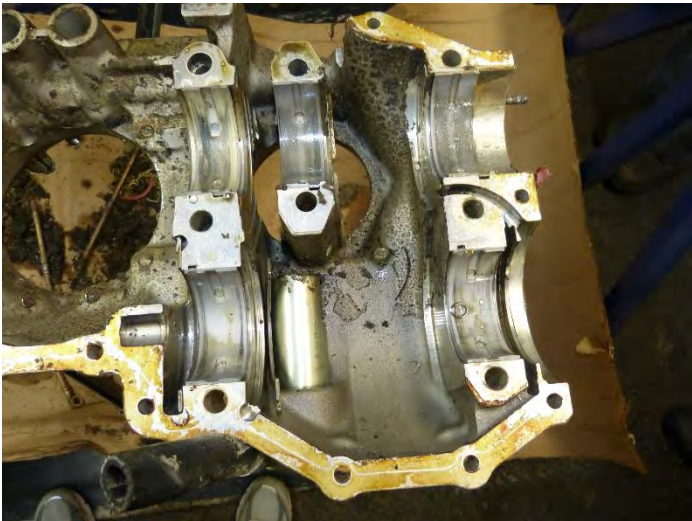
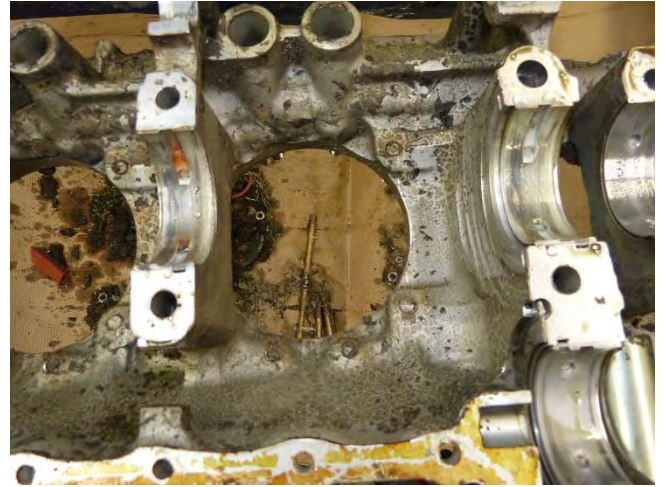
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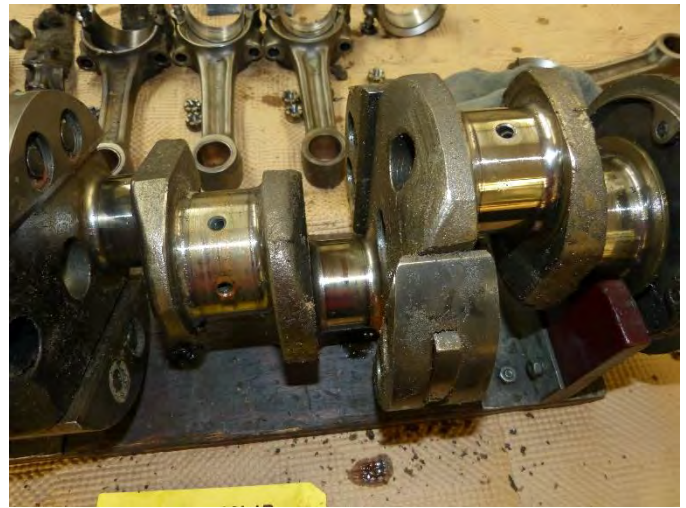
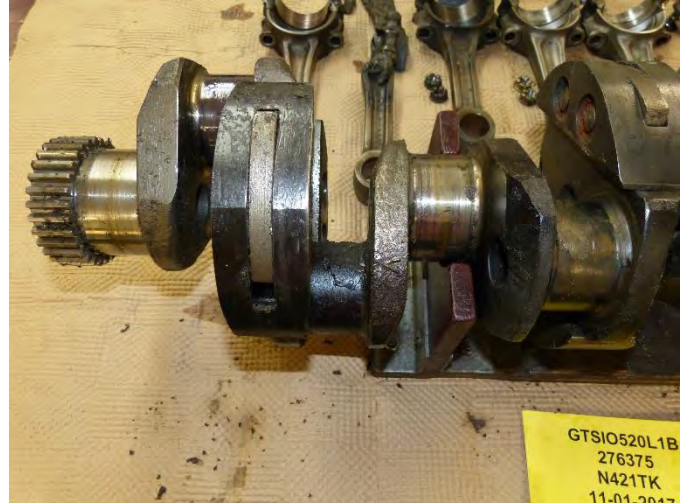
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CRANKSHAFT ASSEMBLY

CRANKSHAFT	Forging Number:	S/N: B601	Heat code:
Condition:	The crankshaft was not damaged, but the main journals were slightly heat discolored. The number 2 rod journal had heat and impact damage, and the rest of the rod journals were heat discolored.		



COUNTER WEIGHTS	
Condition:	The counter weights were in place and free to move.

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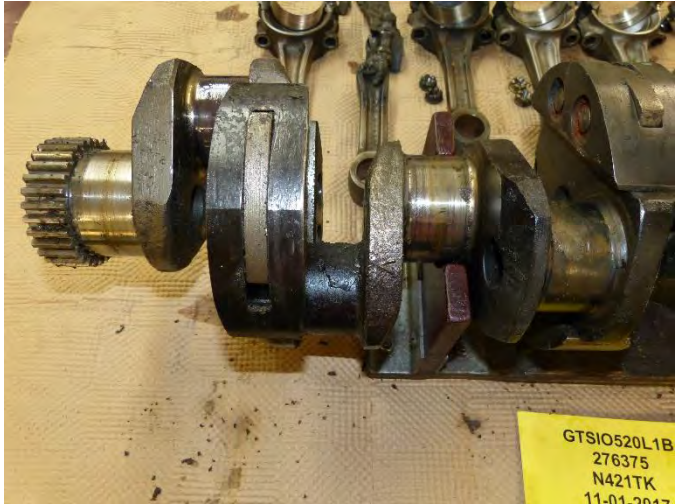
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INTERNAL TIMING

Condition: Internal timing was confirmed.



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CONNECTING RODS and BEARINGS

P/N: 632041F MS
Rod Bearings:
SA630826M010

Forging or Serial Number: NA

Condition:

The number 2 connecting rod was separated from the rod journal and remained attached to the piston. The number 2 rod cap bearing was mostly melted. All of the other rods remained attached to the rod journals. Rod bearings 1, 3, and 4 were heat discolored and very dry. Rod bearings 5 and 6 were intact and coated with oil.

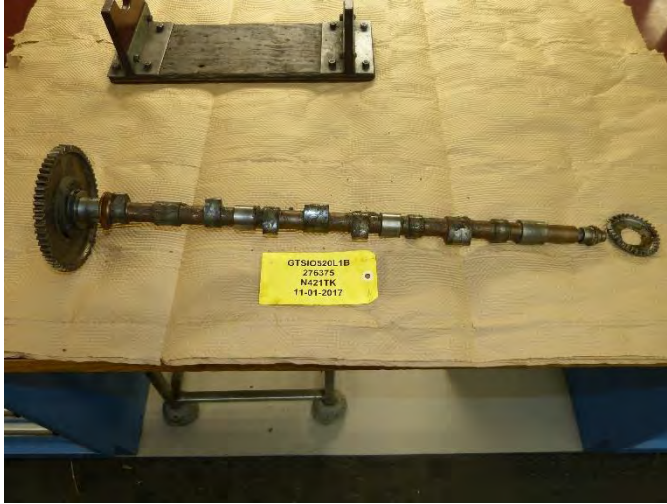


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CAMSHAFT

CAMSHAFT	P/N: AGF13003	S/N: Unknown
Condition:	The camshaft was intact with light impact damage. The lobes were mostly dry.	



LIFTERS	#1	#3	#5	#2	#4	#6
INTAKE	658088LK	658088LK	658088LK	658088LK	658088LK	658088LK
EXHAUST	658077LK	658077LK	658077LK	658077LK	658077LK	658077LK
Condition:	The number two cylinder lifters could not be removed from the crankcase halves. The remainder of the lifters were intact and not damaged.					

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ACCESSORY GEARS

Condition:

The accessory gears were in place and not damaged.



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ACCESSORIES

STARTER

Manufacturer: Hartzell

P/N: MHJ-4003SR

S/N: H-0031310

Condition:

The starter was in place and not damaged. The drive shaft was free to rotate.



STARTER ADAPTER

P/N: 643259A43

Condition:

The starter adapter was in place and not damaged. The drive shaft was free to rotate.



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ALT/GEN #1

Manufacturer: Hartzell

P/N: ALV-9610

S/N: H0020523 24V

Condition:

The alternator was in place and not damaged. The drive shaft was free to rotate.



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ALT/GEN #2	Manufacturer: NA	P/N:	S/N:
Condition:			

VACUUM PUMP	Manufacturer: Rapco	P/N:441CC	S/N:170365
Condition:	The vacuum pump was not damaged.		



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TURBO

Manufacturer: Hartzell

P/N:465930-9003

S/N: H-RCR00092

Condition: The turbocharger had been removed and shipped with the engine. The drive shaft was free to rotate.



TURBO CONTROLLER

Manufacturer: Air Research

P/N:470886-9003

S/N: LIRO146

Condition: The controller was intact and not damaged.

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WASTEGATE

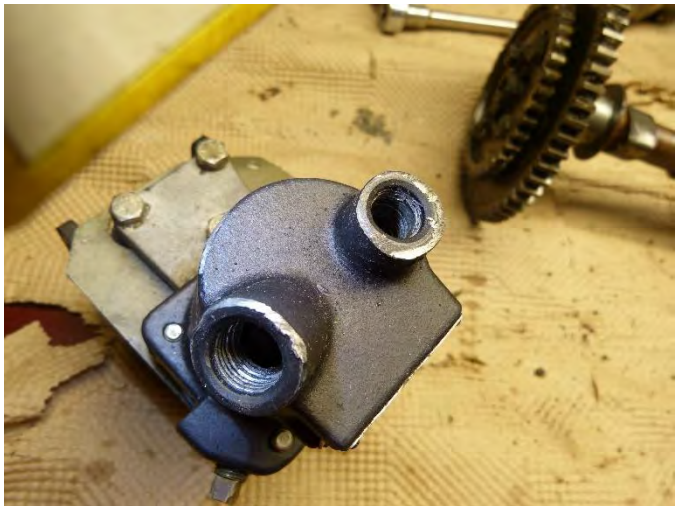
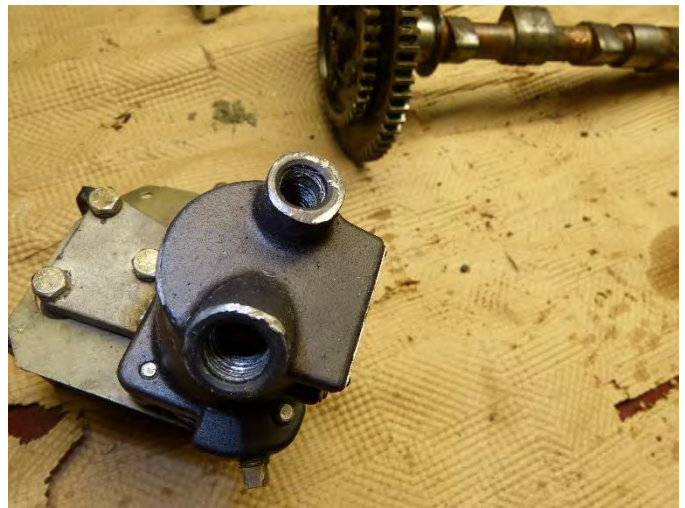
Manufacturer: Air Research

P/N:481064-9001

S/N:OCR0107

Condition:

The waste gate controller was in place, but the oil lines had separated, and the oil hose attachment threads were damaged.



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**OVERBOOST
VALVE**

Manufacturer: Ram

P/N:1020-1

S/N: DJ010894

Condition:

The overboost valve was not damaged.

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PROPELLER

PROPELLER GOVERNOR	Manufacturer: McCauley	P/N: DCF5290D9C-T6	S/N: 990007
Condition:	The propeller governor was in place and was not damaged. The drive shaft was free to rotate.		



PROPELLER	Manufacturer: McCauley	P/N: 3FF32C501-C	S/N: 881738
Blade 1 S/N:	Unknown		
Blade 2 S/N:	Unknown		
Blade 3 S/N:	Unknown		
Blade 4 S/N:	NA		
Condition:	Two blades were in the feather position and the third blade was bent toward the non-cambered side.		

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