



ENGINE EXAMINATION REPORT

ENGINE MODEL	IO520A (35)
ENGINE SERIAL NUMBER	112818
AIRCRAFT MAKE & MODEL	Cessna 210D
AIRCRAFT SERIAL NUMBER	21058495
AIRCRAFT REGISTRATION	N3995Y
FILE NUMBER	18-307

NAME	SIGNATURE	DATE
Phillip Grice		09/05/2019
Mike Council		09/05/2019

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GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	5-29-2019	NTSB ACCIDENT #	ERA19FA
FACILITY	Continental Motors Analytical Lab	NTSB INVESTIGATOR	Ralph Hicks, IIC
ADDRESS	Mobile, Alabama	FAA INVESTIGATOR	Scott Olson, Tampa FSDO-Not Attending
		ACCIDENT DATE	11-30-2018
		ACCIDENT LOCATION	Apalachicola, FL

ENGINE INFORMATION

ENGINE POSITION	Single-Front
TOTAL TIME	895.8 at last annual inspection dated 11-8-2018-shop order #18-8992.
TIME SOH	Undetermined
TYPE & TIME SLI	7.01 hours. Tach time at recovery exam 3185.81
BUILD DATE	12-20-1997
IN SERVICE DATE	Undetermined-Engine logs were not recovered, only the last annual inspection work order was furnished by the NTSB IIC.

Significant logbook information: From recovered logbook

The IA did not record the cylinder compressions in his description of items accomplished at the last annual inspection.

Sold To: LCM ENGINEERING, PLLC

FORT MYERS, FL 33907 United States

General Comments:

GROSS WEIGHT OVER 2000 LBS.

Aircraft Number:		N3995Y		Type:210D		S/N: 21058495	
Total Time:		4,076.8		Hobbs Time:		Tach Time: 3,178.8 LG Cycles:	
Eng#	Type	S/N	Time	Cycles	Prop Type	Prop S/N	Prop Time
1	IO-520A(35B)	112818-R	895.8		D2A34C58-110	731070	

Discrepancy: 1

Problem:

C/W ANNUAL INSPECTION

Action Taken:

CHECKED CYLINDER COMPRESSIONS. CHANGED OIL AND FILTER. CLEANED AND GAPPED, AND ROTATED PLUGS. CHECKED MAG TIMING AND IGNITION HARNESS. DRESSED PROP BLADES AND INSPECTED AND LUBED HUB. REPLACED AIR FILTER ELEMENT. CLEANED FUEL INJECTOR NOZZLES AND SCREEN. CLEANED FUEL SCREENS. INSPECTED EXHAUST SYSTEM. SERVICED BATTERY. CHECKED LIGHT OPERATION. REPACKED WHEEL BEARINGS AND INSPECTED BRAKES. LUBED AIRFRAME AND GEAR. CHECKED GEAR RETRACTION AND EMERGENCY EXTENSION. INSPECTED FUSELAGE AND WINGS. CHECKED CABLES AND PULLEYS. INSPECTED VACUUM SYSTEM FILTERS. INSPECTED ELT BATTERY AND OPERATIONAL CHECKED PER FAR 91.207(d). WASHED ENGINE, GROUND RUN AND OPERATIONAL AND LEAK CHECKED. RESEARCHED AIRCRAFT RECORDS AND CHECKED AD COMPLIANCE THRU BW18-21

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Search Code(s):

15-12-68

The inspection of this engine did not reveal any pre-impact anomalies that would have prevented its ability to produce rated horsepower.

Disposition of engine following exam: The engine was returned to Florida Air Recover at the direction of the NTSB IIC per shipper # AD01159 dated 5-31-2019.

INSPECTION WITNESSES

NAME	Phillip Grice	NAME	Randy Bryant
ADDRESS	Mobile, Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Lisa Jersild	NAME	Mike Council
ADDRESS	Mobile, Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Aerospace Technologies
PHONE		PHONE	
NAME	Andrew Hall	NAME	Ralph Hicks
ADDRESS	Wichita, KS	ADDRESS	Eastern Region
ORGANIZATION	Textron Aviation	ORGANIZATION	NTSB
PHONE		PHONE	

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EXTERNAL INSPECTION OF ENGINE



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AIRFRAME COMPONENTS RETURNED WITH ENGINE

Airframe cooling baffles
Induction ducting and filter assembly
Exhaust collectors
Propeller spinner backing plate
Crankcase vent tube

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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition:

The exhaust components were impact damaged.



INDUCTION SYSTEM

Condition:

The forward balance tube was crushed. The induction elbows and connectors were impact damaged.



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IGNITION SYSTEM

MAGNETO-TO-ENGINE TIMING	Specification: 22 ° BTDC	L/H Magneto: °	R/H Magneto: °
Magneto points were open as received and ignition timing could not be determined. Points were cleaned after magnetos were removed and magnetos operated normally.			
LEFT MAGNETO	Manufacturer: Slick Aircraft Products	M/N: 6310	S/N: 97110435
Condition:	Magneto points were contaminated due to water immersion. Points were cleaned and the magneto produced spark at all ignition leads when bench tested. The impulse coupling released normally,		



RIGHT MAGNETO	Manufacturer: Slick Aircraft Products	M/N: 6310	S/N: 97110438
Condition:	Magneto points were contaminated due to water immersion. Points were cleaned and the magneto produced spark at all ignition leads when bench tested. The impulse coupling released normally,		



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IGNITION HARNESS

Manufacturer: Slick

P/N: Undetermined

S/N: Undetermined

Condition: The ignition harness hardware exhibited corrosion due to salt water immersion.



SPARK PLUGS

Manufacturer: Autolite

P/N: URHB32E

Condition: All sparkplugs were contaminated with undetermined debris/sediment and corrosion due to salt water immersion.



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FUEL SYSTEM

FUEL PUMP

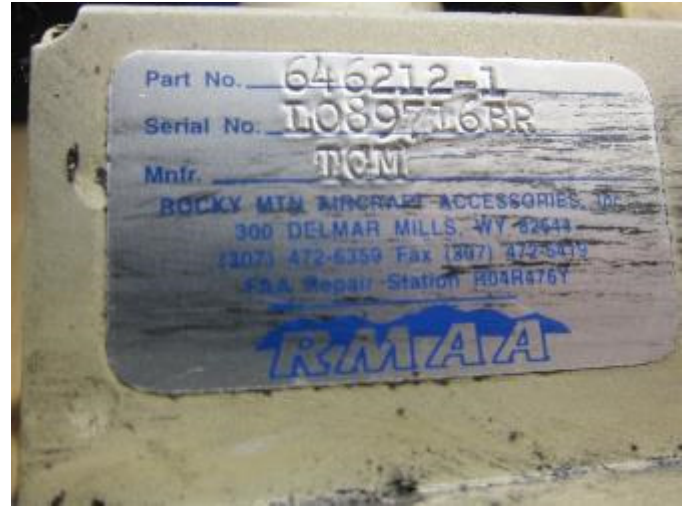
Manufacturer: Continental
Overhauled by Rocky
Mountain Aircraft
Accessories

P/N: 646212-1

S/N: IO89716BR

Condition:

The drive gear and coupling were intact. The pump exhibited corrosion from salt water immersion and would not turn manually. Impeller blades were intact. Fuel fittings were impact separated.



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THROTTLE BODY METERING UNIT

Manufacturer: CMI

P/N: 629703-2

S/N: 2059715AR

Condition: Control arms were secured, and the fuel screen was clean.



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FUEL MANIFOLD VALVE

Manufacturer: CMI

P/N: 31351-17A2

S/N: 2089715CR

Condition:

Assembly screws were properly secured, and a lead seal was present. The spring, diaphragm and fuel screen were intact. A small amount of contamination was found in the valve body.



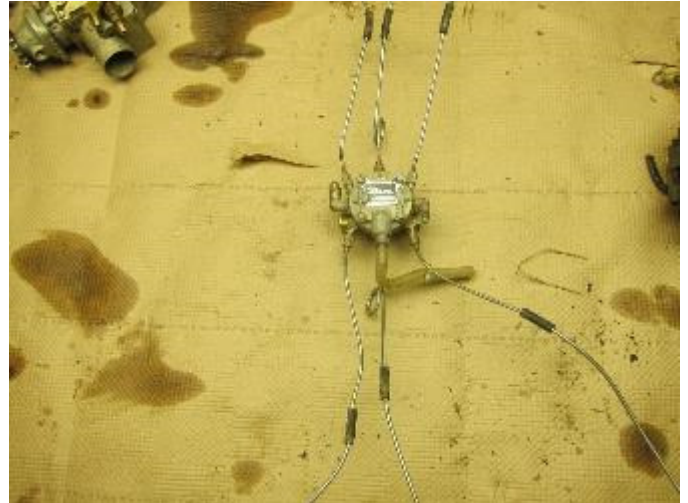
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FUEL NOZZLES AND LINES

Manufacturer: CMI

Position	#1	#3	#5	#2	#4	#6
Size	D-13A	D-13A	D-13A	D-13A	D-13A	D-13A
Condition:	All fuel injectors were open. All fuel injection lines were open and undamaged.					



LUBRICATION SYSTEM

OIL SUMP

Condition: The oil sump was impact damaged and the quick drain was partially separated.



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OIL PICK-UP TUBE & SCREEN

Condition:

The pick-up screen was clean, but the mounting brace was impact damaged.



OIL PUMP

Condition:

The oil pump exhibited normal wear with no evidence of hard particle passage. Pump gears, relief valve and spring were intact.



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OIL SCREEN

Manufacturer: CMI

P/N: Undetermined

Condition:

The oil screen was clean with no metal contamination. A small amount of undetermined contamination was present due to salt water immersion.



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OIL COOLER

Manufacturer: Niagara

P/N: 20618A

S/N: 52584

Condition: The oil cooler coils were contaminated with mud, but no impact damage was noted.



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CYLINDERS

CYLINDER #1	P/N: ECI-AEC631397	S/N: NA	Head Date: NA
Work Orders:	NA		
Condition:	Other than debris in the cooling fins and corrosion damage to cylinder wall surfaces, the cylinder was unremarkable.		



CYLINDER #3	P/N: ECI-AEC631397	S/N: NA	Head Date: NA
Work Orders:	NA		
Condition:	Other than debris in the cooling fins and corrosion damage to cylinder wall surfaces, the cylinder was unremarkable.		



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CYLINDER #5

P/N: ECI-AEC631397

S/N: NA

Head Date: NA

Work Orders:

NA

Condition:

Other than debris in the cooling fins and corrosion damage to cylinder wall surfaces, the cylinder was unremarkable.



CYLINDER #2

P/N: ECI-AEC631397

S/N: NA

Head Date: NA

Work Orders:

NA

Condition:

Other than debris in the cooling fins and corrosion damage to cylinder wall surfaces, the cylinder was unremarkable.



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CYLINDER #4	P/N: ECI-AEC631397	S/N: NA	Head Date: NA
Work Orders:	NA		
Condition:	Other than debris in the cooling fins and corrosion damage to cylinder wall surfaces, the cylinder was unremarkable.		



CYLINDER #6	P/N: ECI-AEC631397	S/N: NA	Head Date: NA
Work Orders:	NA		
Condition:	Other than debris in the cooling fins and corrosion damage to cylinder wall surfaces, the cylinder was unremarkable.		



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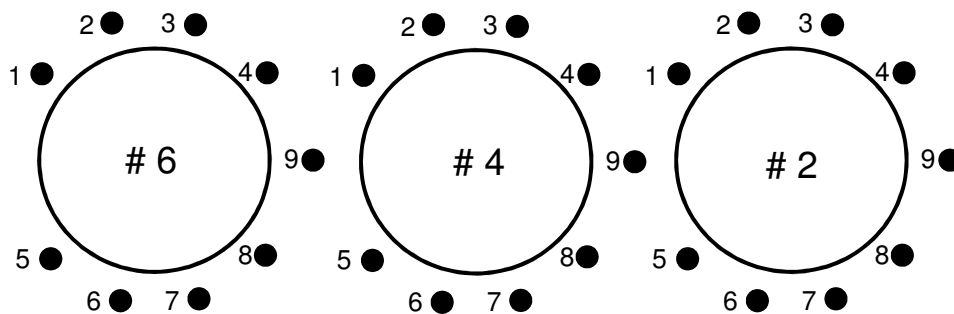
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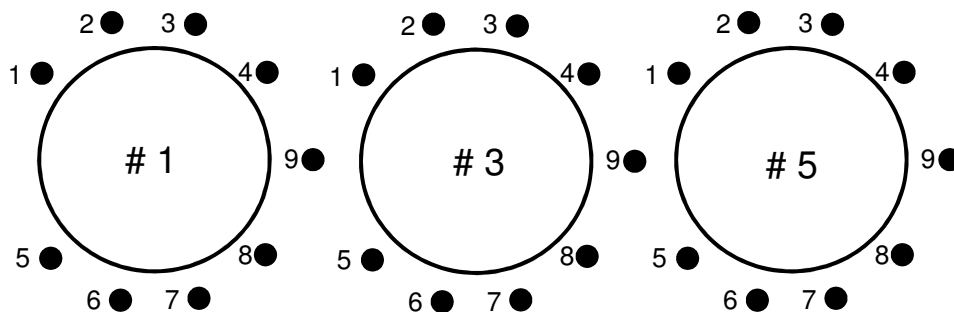
Cylinder Through-Bolt and Deck Stud Break-Away (Tightening/Loosening) Torque Measurements (in-lbs.)

(NOTE: Position numbers 1 and 5 are through-bolts)

	Bolt 1	Stud 2	Stud 3	Stud 4	Bolt 5	Stud 6	Stud 7	Stud 8	Stud 9
	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose
Cylinder #2	867 / 719	618 / 334	643 / 533	630 / 510	819 / 649	656 / 452	701 / 631	654 / 539	685 / 524
Cylinder #4	864 / 718	765 / 632	829 / 680	698 / 582	888 / 626	709 / 583	668 / 529	616 / 534	838 / 645
Cylinder #6	845 / 695	692 / 578	674 / 548	629 / 503	949 / 806	873 / 704	696 / 546	689 / 557	921 / 747



	Bolt 1	Stud 2	Stud 3	Stud 4	Bolt 5	Stud 6	Stud 7	Stud 8	Stud 9
	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose	Tight / Loose
Cylinder # 1	875 / 641	635 / 520	607 / 525	649 / 549	874 / 720	676 / 515	657 / 568	679 / 641	654 / 559
Cylinder # 3	762 / 632	608 / 513	628 / 550	652 / 438	898 / 742	762 / 624	697 / 580	612 / 535	652 / 505
Cylinder # 5	853 / 671	635 / 509	682 / 576	655 / 559	953 / 730	729 / 605	750 / 657	737 / 633	627 / 523



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VALVES AND GUIDES

Condition:

All valves were intact and exhibited normal combustion deposits



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ROCKER ARMS AND SHAFTS

Condition:

All rocker arms, shafts, valves springs and retainers were intact.



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#1 PISTON, RINGS AND PIN

Piston P/N: 654850

Condition:	The piston exhibited normal combustion deposits. Rings exhibited corrosion due to salt water immersion.
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#3 PISTON, RINGS AND PIN

Piston P/N: 654850

Condition:	The piston exhibited normal combustion deposits. Rings exhibited corrosion due to salt water immersion.
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#5 PISTON, RINGS AND PIN

Piston P/N: 654850

Condition:

The piston exhibited normal combustion deposits. Rings exhibited corrosion due to salt water immersion.



#2 PISTON, RINGS AND PIN

Piston P/N: 654850

Condition:

The piston exhibited normal combustion deposits. Rings exhibited corrosion due to salt water immersion.



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#4 PISTON, RINGS AND PIN

Piston P/N: 654850

Condition:

The piston exhibited normal combustion deposits. Rings exhibited corrosion due to salt water immersion.



#6 PISTON, RINGS AND PIN

Piston P/N: 654850

Condition:

The piston exhibited normal combustion deposits. Rings exhibited corrosion due to salt water immersion.

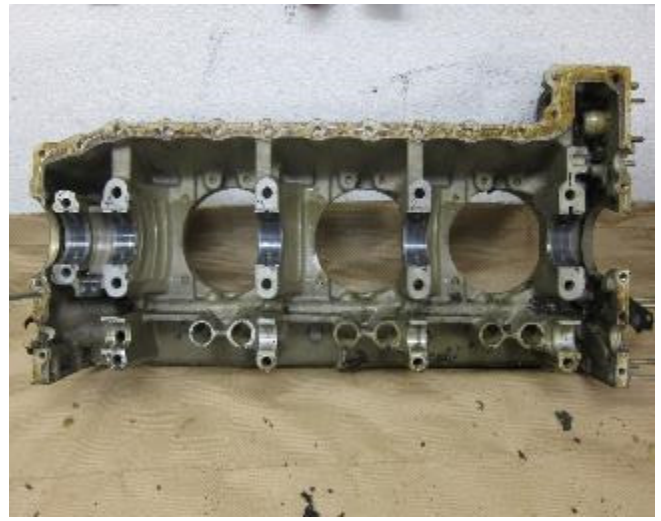


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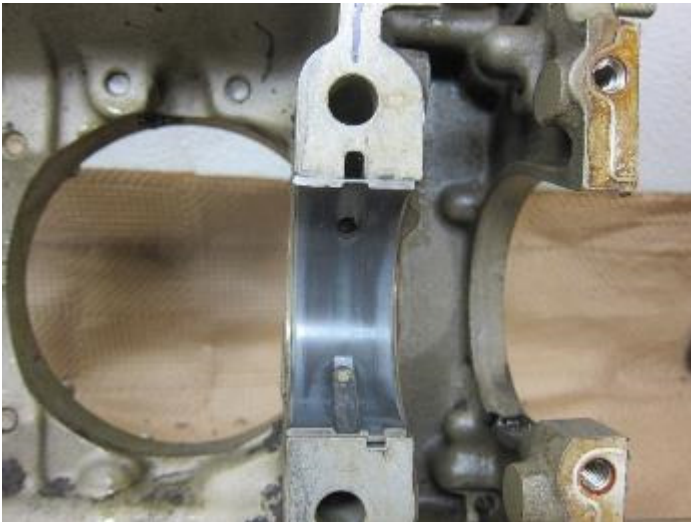
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CRANKCASE ASSEMBLY

CRANKCASE	Casting Number:	1-3-5: K219712R	2-4-6: K219712R	S/N: Undetermined
Condition:	The crankcase assembly was unremarkable.			



#1 MAIN BEARINGS	P/N: 653547	Date Code: 9/97
Condition:	The bearing exhibited normal wear patterns.	



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#2 MAIN BEARINGS

P/N: 653547

Date Code: 9/97

Condition: The bearing exhibited normal wear patterns.



#3 MAIN BEARINGS

P/N: 653547

Date Code: 9/97

Condition: The bearing exhibited normal wear patterns.



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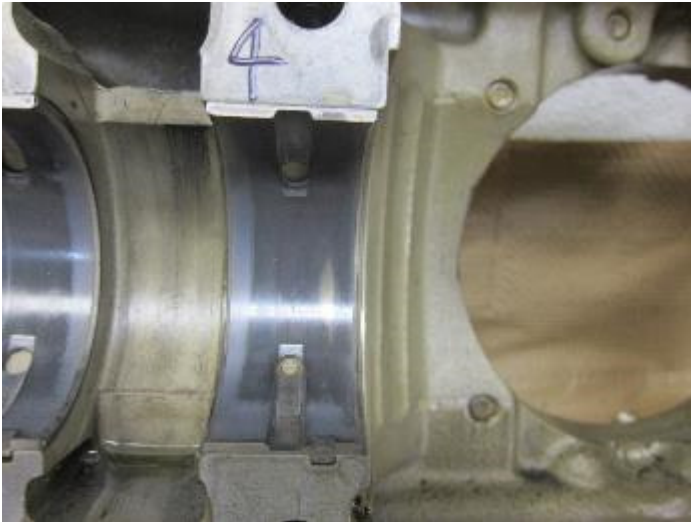
#4 MAIN BEARINGS

P/N: 653547

Date Code: 9/97

Condition:

The bearing exhibited normal wear patterns.



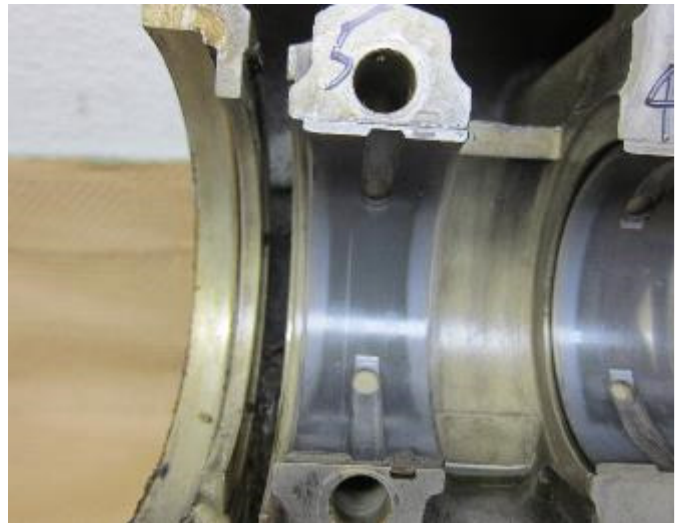
#5 MAIN BEARINGS

P/N: 653547

Date Code: 9/97

Condition:

The bearing exhibited normal wear patterns.



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CRANKSHAFT ASSEMBLY

CRANKSHAFT

Forging Number: 649130

S/N: J219501N

Heat code: NA

Condition:

The crankshaft exhibited normal wear on bearing surfaces with a small amount of corrosion damage due to salt water immersion.

**TRANSFER COLLAR****Condition:**

Unremarkable. The bearing surfaces were normal.



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COUNTER WEIGHTS

Condition:

The counter weights were intact and moved freely on pins. All clips and plates were intact and unremarkable.



CONNECTING RODS

P/N:656126-R

Forging or Serial Number: NA

Condition:

All connecting rods, bolts and nuts were intact and unremarkable.



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#1 CONNECTING ROD BEARING

P/N: 630826 Date code: 11/97

Condition:

The rod bearings exhibited normal wear patterns.



#3 CONNECTING ROD BEARING

P/N: 630826 Date code: 11/97

Condition:

The rod bearings exhibited normal wear patterns.



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#5 CONNECTING ROD BEARING

P/N: 630826 Date code: 11/97

Condition:

The rod bearings exhibited normal wear patterns.



#2 CONNECTING ROD BEARING

P/N: 630826 Date code: 11/97

Condition:

The rod bearings exhibited normal wear patterns.



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#4 CONNECTING ROD BEARING

P/N: 630826 Date code: 11/97

Condition:

The rod bearings exhibited normal wear patterns.

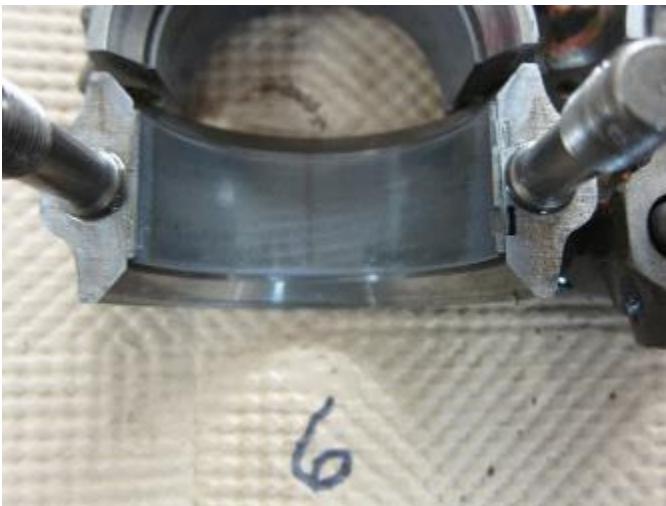


#6 CONNECTING ROD BEARING

P/N: 630826 Date code: 11/97

Condition:

The rod bearings exhibited normal wear patterns.



CAMSHAFT

CAMSHAFT	P/N: 653052	S/N: 970142
Condition:	The lobe bearing surfaces exhibited pitting from corrosion.	



LIFTERS	#1	#3	#5	#2	#4	#6
INTAKE						
EXHAUST						
Condition:	Lifter faces exhibited a slight amount of surface pitting. Intake Lifter Part Number: SA628488 Exhaust Lifter Part Number: SA646277					



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ACCESSORY GEARS	
Condition:	Accessory gears were unremarkable.



ACCESSORIES

STARTER	Manufacturer: CMI Energizer	P/N: 646238-2	S/N: J-179782
Condition:	The starter motor would not rotate manually due to salt water immersion.		



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STARTER ADAPTER

P/N: 643259A19

Condition: Unremarkable



ALT #1

Manufacturer: Ford Motor Co.

P/N: C611501-0101

S/N: Undetermined

Condition: Unremarkable



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VACUUM PUMP

Manufacturer: Airborne

P/N: 216CW

S/N: 52584

Condition: The vacuum pump rotated manually, and shear drive couplings were intact. The carbon rotor and individual vanes were intact.



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PROPELLER GOVERNOR	Manufacturer: Woodward	P/N: C210680	S/N: 2120413AA
Condition:	Unremarkable.		

