



Continental Motors

ENGINE FIELD INSPECTION REPORT

ENGINE MODEL	IO520B (6B)
ENGINE SERIAL NUMBER	234760-R
AIRCRAFT MAKE & MODEL	North American Navion
AIRCRAFT SERIAL NUMBER	NAV-4-31
AIRCRAFT REGISTRATION	N91137
CMI FILE NUMBER	15-676

NAME	SIGNATURE	DATE
Mike Council		

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EXAMINATION		ACCIDENT DATA	
DATE	7-6-2016	NTSB ACCIDENT #	CEN16LA234
FACILITY	Air Transport	NTSB INVESTIGATOR	Josh Lindberg
ADDRESS	Phoenix, AZ	FAA INVESTIGATOR	Geary Monckton, ABQ FSDO
		ACCIDENT DATE	6-24-2016
		ACCIDENT LOCATION	Alamogordo, NM

ENGINE INFORMATION

ENGINE POSITION	Single		
TOTAL TIME	*1099	*according to the owner/pilot NTSB Form 6120	
TIME SFRB	*1099		
TYPE & TIME SLI	*20		
BUILD DATE	11-13-1986		
IN SERVICE DATE	9-17-1987 according to engine logbook entry		

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Last maintenance performed:

The engine remained at Air Transport, Phoenix, AZ until released by the NTSB IIC.

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NAME	Mike Council	NAME	Albert Nixon
ADDRESS	2039 South Broad Street, Mobile, Alabama 36615	ADDRESS	NTSB Central Region, Phoenix, AZ
ORGANIZATION	Continental Motors	ORGANIZATION	NTSB
PHONE	██████████	PHONE	██████████
NAME	Greg Collins, Intern	NAME	
ADDRESS	Western Pacific	ADDRESS	
ORGANIZATION	NTSB	ORGANIZATION	
PHONE		PHONE	

EXTERNAL INSPECTION OF ENGINE

The engine remained attached to the damaged airframe. The upper engine cowling was removed to gain access to the engine. The rocker cover for cylinder # 5 had been previously removed by unknown persons. This rocker box cover was located in the engine compartment and contained an inner exhaust valve spring, an outer exhaust valve spring, a damaged valve guide, portions of a rotocoil assembly, damaged valve spring keys and six machine screws and lock washers used to secure the rocker cover. The rocker cover exhibited a hole which was located directly outboard of the exhaust valve and spring assembly. The remainder of the engine appeared to be undamaged.



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NOTE: THE RED ARROW POINTS TO THE OIL FILTER SAFETY WIRE INCORRECTLY ATTACHED TO AN ENGINE DRIVEN FUEL PUMP FITTING.

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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition:

The exhaust collectors were undamaged. The mufflers and tailpipes received minor impact damage where they exit the lower cowling.



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INDUCTION SYSTEM

Condition: The induction system did not receive damage. Red arrows point to the right (1-3-5) induction tube elbows.



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IGNITION SYSTEM

LEFT MAGNETO	Manufacturer: Bendix-Overhauled by Quality Aircraft Accessories, Inc.	P/N: 10-349220-5	S/N: 308718-FR
Condition:	No damage was noted		



RIGHT MAGNETO	Manufacturer: Bendix-Overhauled by Quality Aircraft Accessories, Inc.	P/N: 10-349260-6	S/N: 309606FR
Condition:	No damage was noted		



IGNITION HARNESS	Manufacturer: (Mixed) Skytronics	P/N: Undetermined	S/N: Undetermined
Condition:	No damage was noted.		

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SPARK PLUGS

Manufacturer: Champion

P/N: RHB32E

Condition:

When compared to images on a Champion Check A Plug chart, the wear patterns best match *normal to worn out normal*. The top sparkplug from cylinder # 5 displayed mechanical damage and metal contamination was present.



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FUEL SYSTEM

FUEL PUMP

Manufacturer: TCM

P/N: Undetermined

S/N: Undetermined

Condition:

No damage was noted. Note that oil filter security wire is incorrectly attached to the fuel pump hose fitting. See red arrow below.

**THROTTLE
BODY
METERING UNIT**Manufacturer:
Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

No damage was noted.



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FUEL MANIFOLD VALVE

Manufacturer: TCM

P/N: Undetermined

S/N: Undetermined

Condition: No damage was noted. Data plate unintelligible



FUEL NOZZLES AND LINES

Manufacturer: TCM

Position	#1	#3	#5	#2	#4	#6
Size	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined

Condition: All six fuel injectors were open. No damage or contamination was noted.



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LUBRICATION SYSTEM

OIL SUMP

Condition: The exterior of the oil sump did not display any damage. The interior of the sump was contaminated with damaged engine components and metal debris.



OIL FILTER

Manufacturer: Champion

P/N: CH48109-1

Condition: When opened for inspection, the filter was contaminated with metal.



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OIL COOLER

Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

No damage was determined.



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CYLINDERS

CYLINDER #1	P/N: Undetermined	S/N: Undetermined	Head Date: Undetermined
Work Orders:	Undetermined		
Condition:	No damage was noted.		



CYLINDER #3	P/N: Undetermined	S/N: Undetermined	Head Date: Undetermined
Work Orders:	Undetermined		
Condition:	No damage was noted.		



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CYLINDER #5

P/N: 538288

S/N: Undetermined

Head Date:
Undetermined

Work Orders:

Undetermined

Condition:

Rocker cover exhibited damage directly over the exhaust valve and valve spring assembly. Exhaust valve separated. Inner and outer valve springs, damaged valve spring keys, exhaust valve guide, valve spring retainers and rocker box screws were found in the previously removed rocker box cover. The intake push rod was bent. The cylinder was removed. The piston separated leaving only the piston pin and damaged connecting rod. The damaged piston and rings were found in the oil sump. The exhaust valve head was located in the oil sump with approximately 1/2" of valve stem protruding.



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CYLINDER #2

P/N: Undetermined

S/N: Undetermined

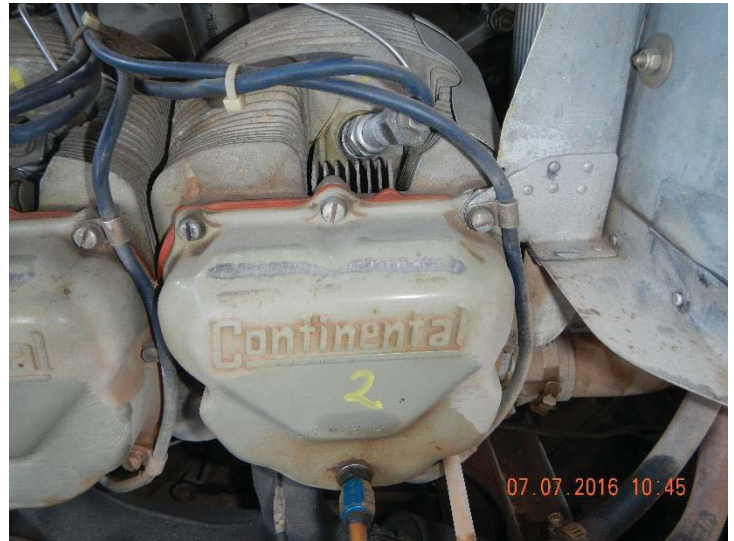
Head Date:
Undetermined

Work Orders:

Undetermined

Condition:

No damage was noted.



CYLINDER #4

P/N: Undetermined

S/N: Undetermined

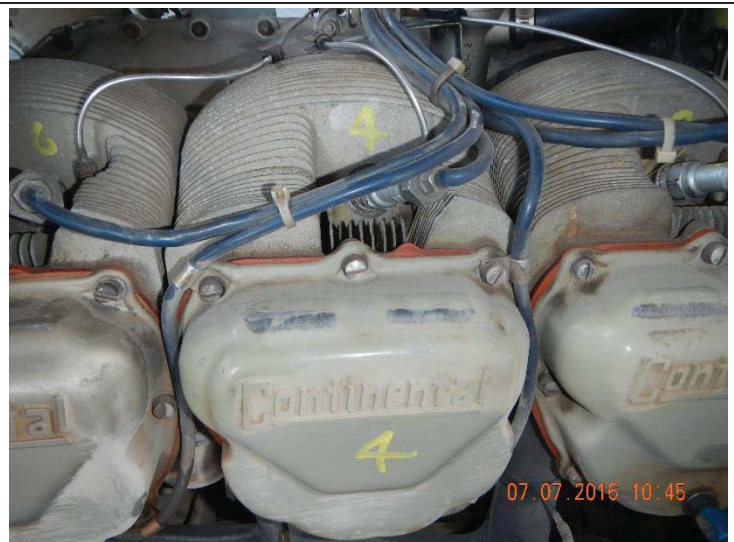
Head Date:
Undetermined

Work Orders:

Undetermined

Condition:

No damage was noted.



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CYLINDER #6

P/N: Undetermined

S/N: Undetermined

Head Date:
Undetermined

Work Orders:

Undetermined

Condition:

No damage was noted.



VALVES AND GUIDES

Condition:

Cylinder # 5 exhaust guide separated and was among the metal debris recovered from the removed oil sump. The red arrows point to the damaged # 5 exhaust guide. All other guides appeared undamaged.



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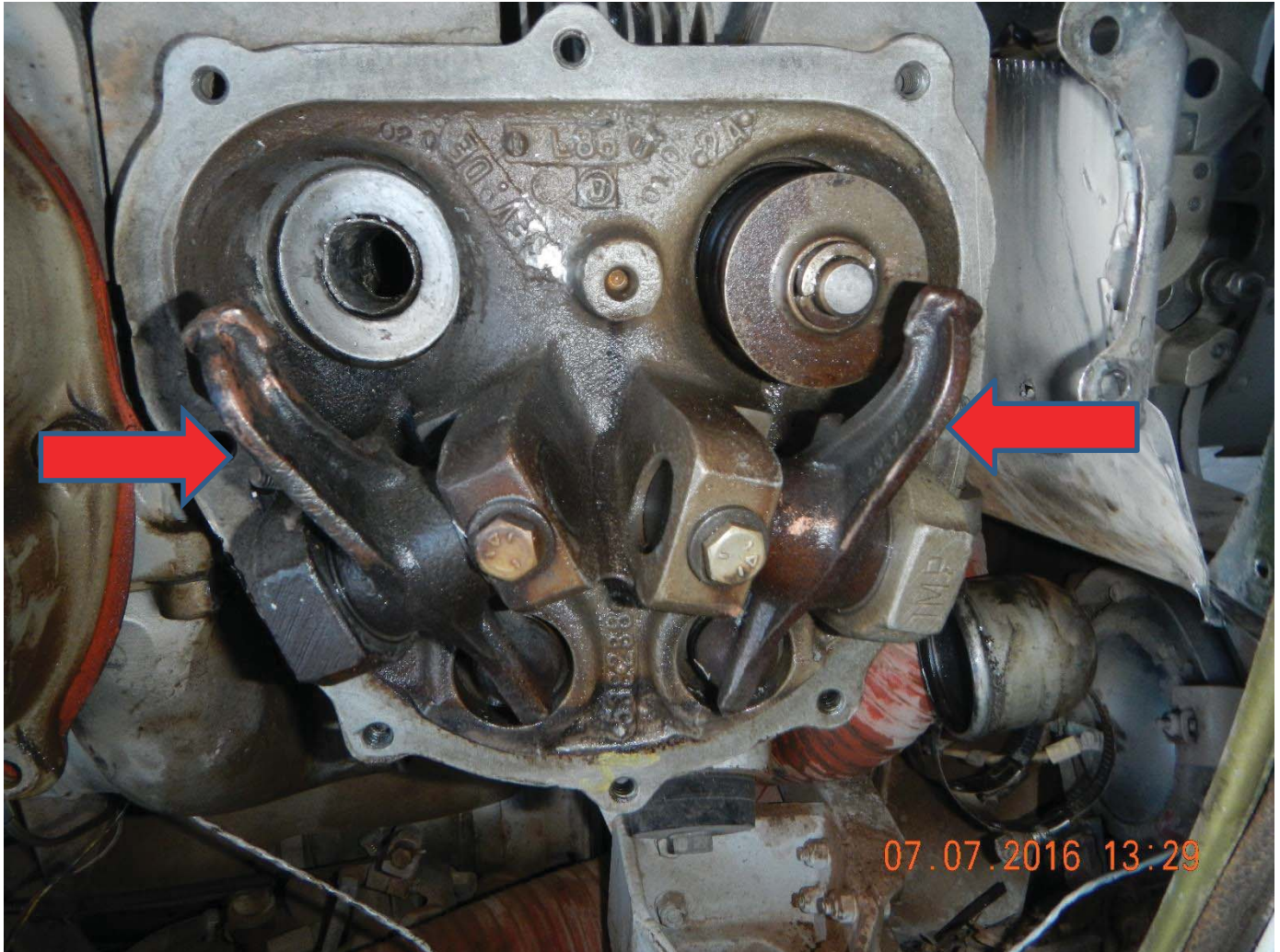
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CYL # 5 ROCKER ARMS AND SHAFTS

Condition:

No damage was noted. Red arrows indicate intake and exhaust rocker arms.



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#5 PISTON, RINGS AND PIN

Piston P/N: Undetermined

Condition:

The piston and rings separated and were recovered from the engine oil sump. Red arrows indicate piston material.



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CRANKCASE ASSEMBLY

CRANKCASE

1-3-5:

2-4-6:

S/N: Undetermined

Condition:

The right (1-3-5) crankcase half was damaged beginning at the base of cylinder # 5 resulting in a crack which extended approximately two inches toward the center parting line.



#5 CONNECTING ROD

P/N: 655910

Forging or Serial Number: Undetermined

Condition:

The connecting rod was twisted and the piston pin was mushroomed on both ends.



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#5 CONNECTING ROD BEARING

P/N: Undetermined

Condition:

The bearing exhibited normal wear patterns.



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ACCESSORIES

STARTER

Manufacturer: Sky-Tec

M/N: C12ST3

S/N: 2C3-471001

Condition:

No damage was noted



STARTER ADAPTER

P/N: Undetermined

Condition:

No damage was noted



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ALTERNATOR	Manufacturer: Hartzell	P/N: ALX-9524R	S/N: H-L052321
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Condition:	No damage was noted. Logbook entry indicates a recent replacement of the alternator drive coupling for undisclosed reasons.
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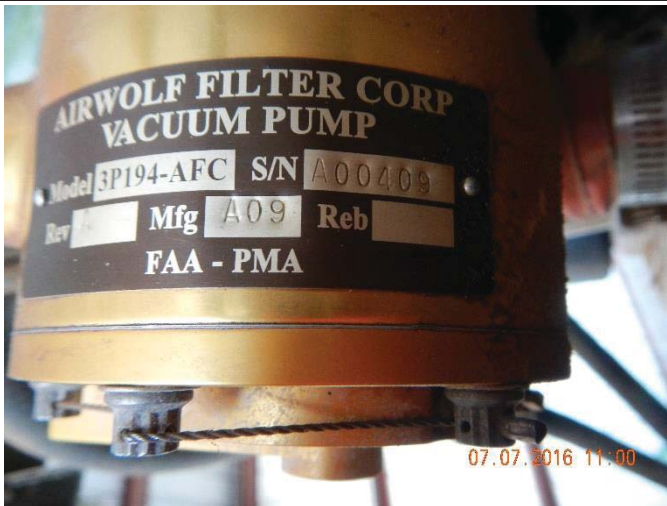
VACUUM PUMP

Manufacturer: Airwolf

P/N: 3P194-AFC

S/N: A00409

Condition:	No damage was noted.
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PROPELLER GOVERNOR

Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

The propeller governor did not display any damage.

