



Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	IO-550-A3B
ENGINE SERIAL NUMBER	1002749
AIRCRAFT MAKE & MODEL	Cessna 310R
AIRCRAFT SERIAL NUMBER	310R0164
AIRCRAFT REGISTRATION	N5044J
FILE NUMBER	18-286

NAME	SIGNATURE	DATE
Nicole L. Charnon		04/01/2019

ENGINE EXAMINATION REPORT

FILE NUMBER:	18-286	ENGINE S/N:	1002749	PAGE 2 of 32
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GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	03/19/2019	NTSB ACCIDENT #	ERA19FA039
FACILITY	Anglin Aircraft Recovery & Storage	NTSB INVESTIGATOR	Adam Gerhardt
ADDRESS	4901 Holletts Corner Road Clayton, DE 19938	FAA INVESTIGATOR	Scott Gillson
		ACCIDENT DATE	11/09/2018
		ACCIDENT LOCATION	Walton, New York

ENGINE INFORMATION

ENGINE POSITION	Right Engine
TOTAL TIME	659.1 hours at last Annual Inspection 08/21/2018
TIME SOH	N/A
TYPE & TIME SLI	Unknown. Annual Inspection 08/21/2018
BUILD DATE	07/26/2010
IN SERVICE DATE	08/18/2010

Significant logbook information:

The aircraft maintenance records were kept in the accident airplane and portions were found by the on-site investigative group. Copies of the last annual inspection were provided by the maintenance outfit that conducted the inspection. According to that paperwork the last annual inspection took place on August 21, 2018 at an engine total time of 659.1 hours. During the annual inspection the #6 cylinder and #6 intake hydraulic lifter were replaced, the right magneto was re-timed, and the oil filter was changed. The old oil filter was cut open for inspection with no anomalies noted. The engine total time at the time of the accident is unknown.

Report Summary:

Search Code(s):

15-12-68

The engine sustained significant impact-related damage that precluded the functional testing of many of the components. However, examination of the engine and engine-related systems did not reveal any pre-accident anomalies that would have precluded its ability to produce full, rated power.

Disposition of engine following exam:

The engine and its related components were stored at the aircraft recovery facility pending final release by the NTSB investigator-in-charge (IIC).

ENGINE EXAMINATION REPORT**FILE NUMBER:**

18-286

ENGINE S/N:

1002749

PAGE 3 of 32**INSPECTION WITNESSES**

NAME	Nicole Charnon	NAME	Adam Gerhardt
ADDRESS	Washington, DC	ADDRESS	Ashburn, VA
ORGANIZATION	Continental Motors	ORGANIZATION	NTSB – Eastern Region
PHONE		PHONE	
NAME	Peter Wentz	NAME	Jennifer Barclay
ADDRESS	Ashburn, VA	ADDRESS	Wichita, KS
ORGANIZATION	NTSB – Easter Region	ORGANIZATION	Textron Aviation
PHONE		PHONE	
NAME	Nancy McAtee	NAME	Adam Huray
ADDRESS	Washington, DC	ADDRESS	Washington, DC
ORGANIZATION	NTSB	ORGANIZATION	NTSB
PHONE		PHONE	

EXTERNAL ENGINE CONDITION

The engine was separated from the aircraft and was lying on the floor of the aircraft recovery facility in a bag. The engine was upside down, the alternator and propeller were separated, the oil sump was torn and displaced, the accessory end of the engine was fractured and all of the accessories were separated. The induction system was separated from the engine with the exception of the deformed balance tube. Only two exhaust risers remained attached to the engine (the #2 and #4). All of the cylinder heads were fractured with the #5 cylinder head separated from the barrel. The magneto mounting pads were separated from the engine and the magnetos were separated. Though the engine sustained significant impact-related damage, there was no sign of operational discoloration or pre-accident operational distress.

ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 4 of 32



ENGINE EXAMINATION REPORT

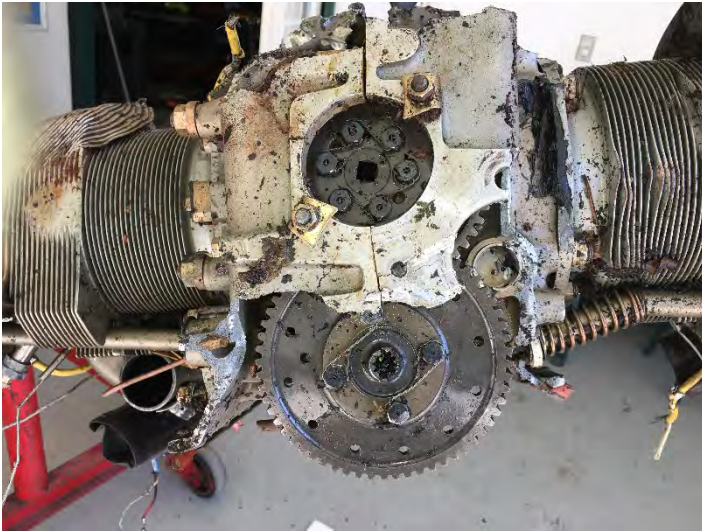
FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 5 of 32



ENGINE EXAMINATION REPORT**FILE NUMBER:**

18-286

ENGINE S/N:

1002749

PAGE 6 of 32**ENGINE EXAMINATION SUMMARY**

The impact-related damage precluded the functional testing of the engine and the engine-related systems; however, there were no pre-accident anomalies noted on the observed components. The deformation damage sustained by the crankcase, #5 cylinder, and camshaft gear precluded the manual rotation of the crankshaft. The camshaft was visible through its entirety and no pre-accident anomalies were noted with the camshaft lobes, cam gear, and bevel gear (the camshaft gear was bent and fractured on the bottom side). The crankshaft, connecting rods, and counterweights were observed using a lighted borescope with no signs of discoloration of lubrication distress. All of the components were intact with no internal pre-accident anomalies noted.

The cylinders remained attached to the crankcase. All of the cylinder heads sustained impact-related fracture damage with the right side sustaining the most damage. The #5 cylinder head was fractured and separated from the barrel, and the barrel was torn in one area and bent over the piston. The #3 cylinder head was fractured and the rockers were separated. The top sparkplugs were removed from their respective cylinders and a borescope was used to examine/document the internal components. No pre-accident anomalies were noted with any of the pistons, barrels, cylinder heads, valves or valve seats.

The intake shroud and filter remained intact and no obstructions were noted with the intake filter. The throttle body was intact with the throttle lever and cable rod end attached. The throttle body remained attached to the filter assembly.

The fuel injection system was separated from the engine with the exception of the fuel manifold valve, which was separated from its mount but remained attached to the engine via two of its fuel injection lines (the #4 and #6). The engine-driven fuel pump was separated from the backside of the engine and its drive coupling was missing. The fittings were fractured and the pump sustained impact-related damage to the mounting flange, the bellows housing, and the low pressure relief valve cap. A screwdriver was used to check pump shaft rotation which was obtained with no binding noted. Disassembly of the pump revealed that the pump vanes were intact and there were no pre-accident anomalies noted with the internal components. The altitude compensating bellow was deformed and its shaft was fractured, but the fracture surfaces contained shear lips consistent with a side load and impact damage sustained by the bellows housing.

The throttle body/fuel metering unit remained attached to the intake filter housing. The throttle and mixture control rod ends remained attached to their respective throttle and mixture control levers on the throttle body/fuel metering unit. The interconnect between the throttle shaft and the throttle cam was bent and fractured. Manual manipulation of the metering cams revealed no internal binding. The inlet fuel screen was removed and found to be clear.

The fuel manifold valve cap was removed and residual fuel was found in the housing. The screen was clear and the plunger remained attached to the diaphragm. No pre-accident anomalies were noted.

The magnetos were separated from their mounts and the mounting area was separated from the engine. Remnants of the ignition leads remained attached to the engine. The top sparkplugs and bottom #1 and #5 bottom sparkplugs were fractured. The #2, #3, #4, and #6 bottom sparkplugs remained intact. The fractured portions of the top sparkplugs were removed to facilitate borescope

ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 7 of 32

examination of the cylinders. There was no sign of carbon or lead fouling with any of the sparkplug electrodes. Both magnetos were located within the debris. The left magneto housing was fractured. The drive shaft was bent, the windings remained attached to the housing, and the distributor gear remained intact with no pre-accident anomalies noted with the gear teeth (some impact-related deformation damage was noted on a few teeth, but no abnormal wear). The right magneto remained intact but sustained significant impact-related damage that fractured the housing and prevented rotation of the drive shaft. The points were intact, and no pre-accident anomalies were noted through the vent hole for the distributor gear teeth.

The propeller was separated from the crankshaft and the stripped propeller bolts remained with the crankshaft flange. Two of the three propeller blades were cut by aircraft recovery personnel. The propeller piston was separated from the hub and the blade pitch change links blades were separated.

ENGINE COMPONENT EXAMINATION

EXHAUST SYSTEM

NOTE: It was not clear to which engine the separated exhaust components belonged.



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 8 of 32

INDUCTION SYSTEM

NOTE: It was not clear to which engine the separated intake tubes belonged.



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 9 of 32

IGNITION SYSTEM

LEFT MAGNETO



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 10 of 32

RIGHT MAGNETO



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 11 of 32

IGNITION HARNESS



SPARK PLUGS	
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1T



1B

Sparkplug Destroyed
3T



3B

Not Observed
5T

Not Observed
5B

ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 13 of 32



2T



2B



4T



4B



6T



6B

ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 14 of 32

FUEL SYSTEM

FUEL PUMP



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 15 of 32



THROTTLE
BODY
METERING UNIT



ENGINE EXAMINATION REPORT

FILE NUMBER:

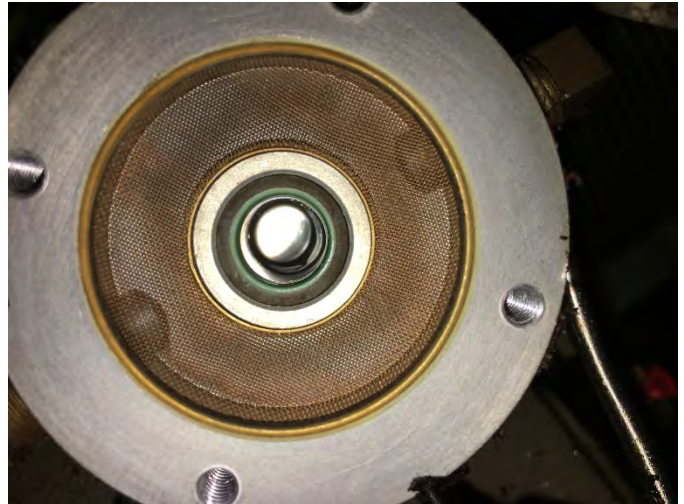
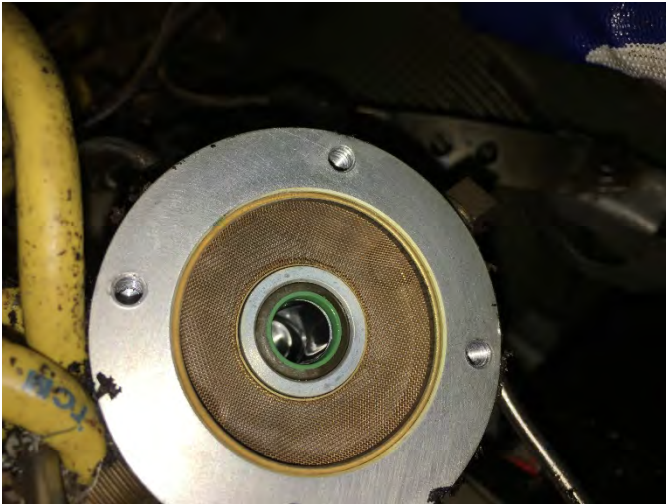
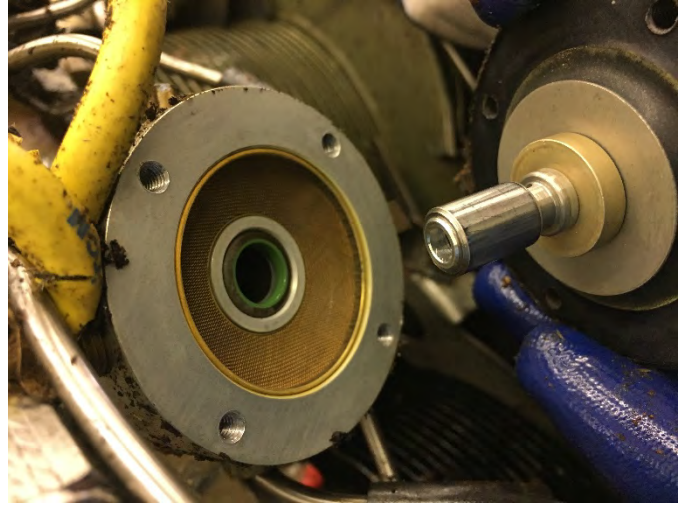
18-286

ENGINE S/N:

1002749

PAGE 16 of 32

FUEL MANIFOLD VALVE



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 17 of 32

LUBRICATION SYSTEM

OIL SUMP



ENGINE EXAMINATION REPORT

FILE NUMBER:

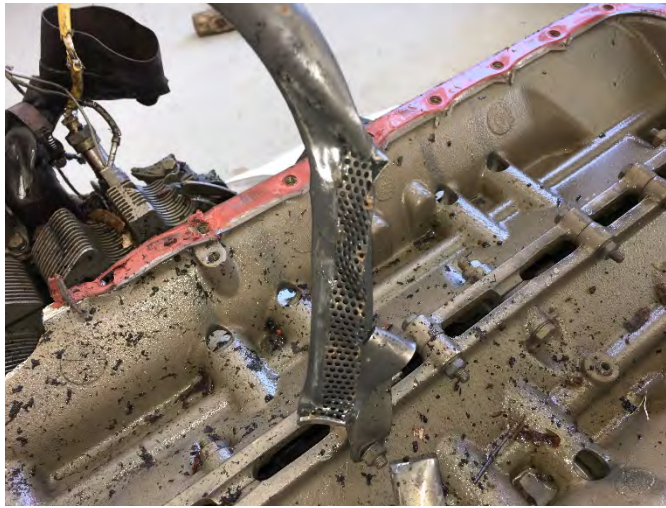
18-286

ENGINE S/N:

1002749

PAGE 18 of 32

OIL PICK-UP
TUBE &
SCREEN



OIL PUMP

Not Observed

OIL FILTER



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 19 of 32



OIL COOLER

NOTE: It was not clear to which engine the separated oil coolers belonged.



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 20 of 32

CYLINDERS

CYLINDER #1



CYLINDER #3



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 21 of 32



CYLINDER #5



Cylinder Head Not Observed

CYLINDER #2



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 22 of 32



CYLINDER #4



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 23 of 32

CYLINDER #6



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

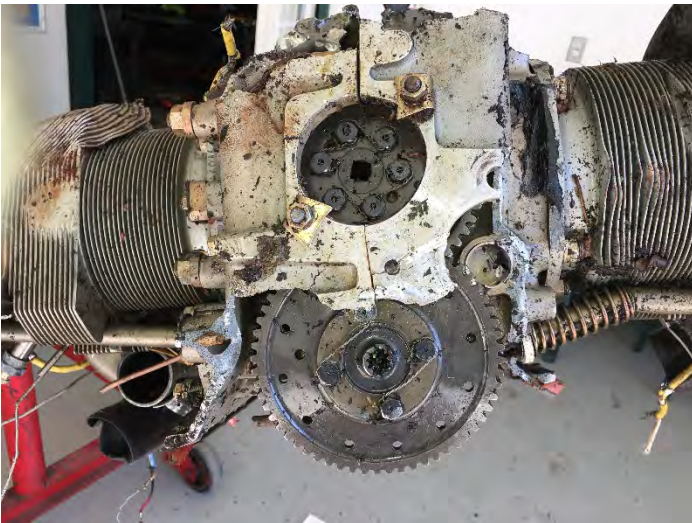
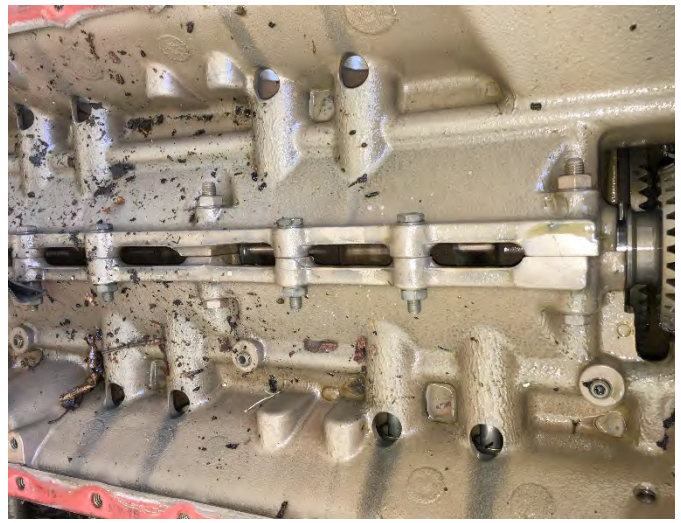
ENGINE S/N:

1002749

PAGE 24 of 32

CRANKCASE ASSEMBLY

CRANKCASE



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 25 of 32

CRANKSHAFT ASSEMBLY

CRANKSHAFT



ENGINE EXAMINATION REPORT

FILE NUMBER:

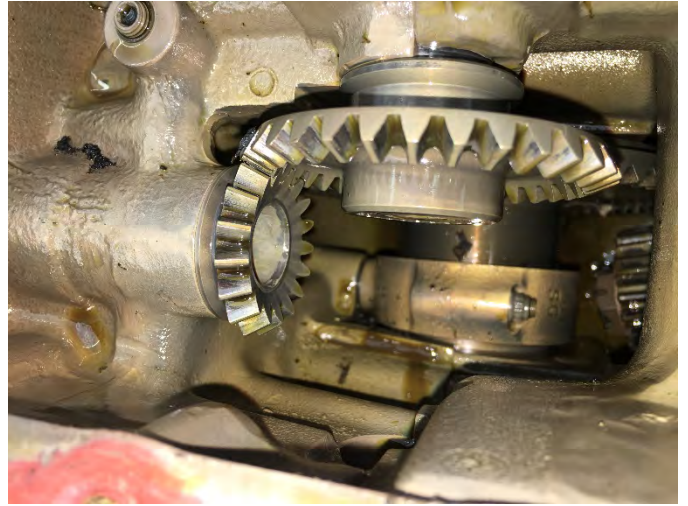
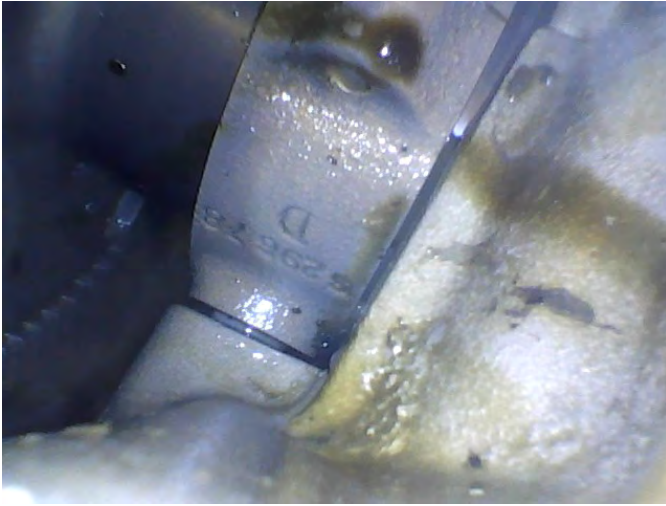
18-286

ENGINE S/N:

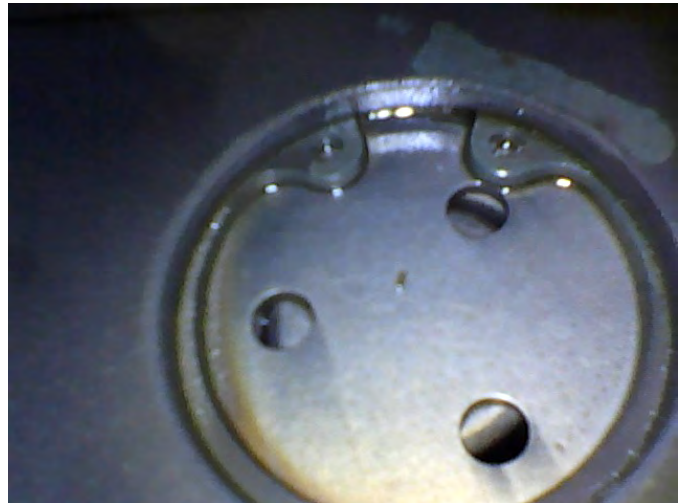
1002749

PAGE 26 of 32

TRANSFER COLLAR



COUNTER WEIGHTS



ENGINE EXAMINATION REPORT

FILE NUMBER:

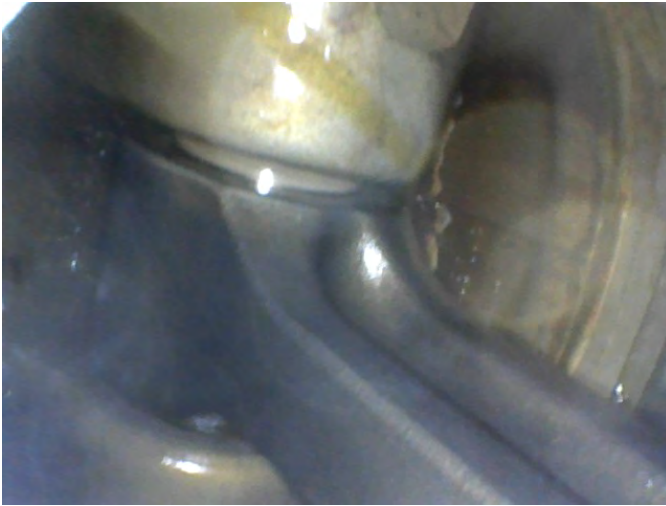
18-286

ENGINE S/N:

1002749

PAGE 27 of 32

CONNECTING RODS



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

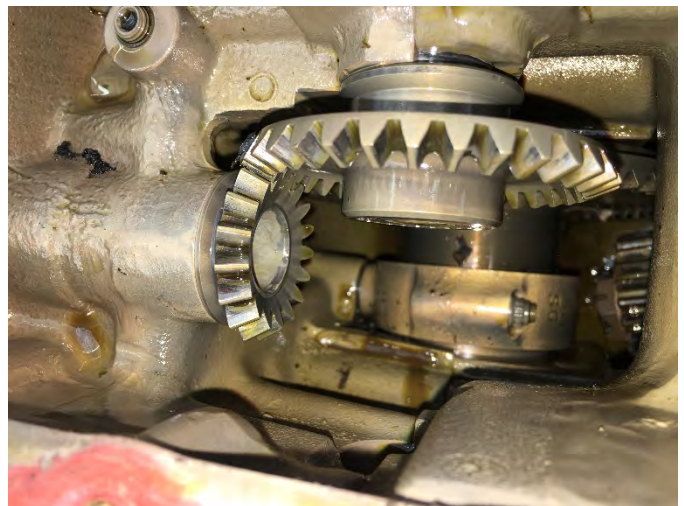
ENGINE S/N:

1002749

PAGE 28 of 32

CAMSHAFT

CAMSHAFT



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 29 of 32

ACCESSORIES

STARTER



STARTER ADAPTER



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 30 of 32

ALT/GEN #1



VACUUM
PUMP

NOTE: It was not clear to which engine the separated vacuum pump belonged.



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 31 of 32

PROPELLER

PROPELLER GOVERNOR

NOTE: It was not clear to which engine the separated propeller governors belonged.



PROPELLER



ENGINE EXAMINATION REPORT

FILE NUMBER:

18-286

ENGINE S/N:

1002749

PAGE 32 of 32

