

AAIPU# A08-23936



AIR ACCIDENT INVESTIGATION AND PREVENTION UNIT CIVIL AVIATION DEPARTMENT

NASSAU, N. P., BAHAMAS

AIRCRAFT ACCIDENT REPORT

CATASTROPHIC ENGINE FAILURE

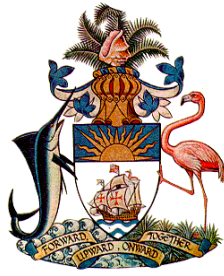
CESSNA T210H

N2219R

MCLEANS TOWN, GRAND BAHAMA, BAHAMAS

JULY 3, 2007





**Bahamas Department of Civil Aviation
Air Accident Investigation and Prevention Unit
P. O. Box AP-59244
Lynden Pindling International Airport
Nassau N. P., Bahamas**

AIRCRAFT ACCIDENT REPORT

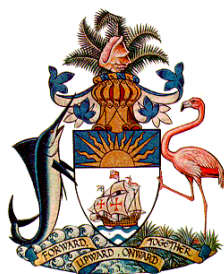
**CESSNA T210H
N2219R**

**CATASTROPHIC ENGINE FAILURE
MCCLEANS TOWN, GRAND BAHAMA, BAHAMAS
JULY 3, 2007**

**AAIPU# A08-23936
Adopted April 30, 2010**

Abstract: This report presents the circumstances surrounding the catastrophic engine failure, loss of control and crash of N2219R, a Cessna T210H aircraft while the aircraft was enroute from Treasure Cay Int'l Airport, Treasure Cay, Abaco, Bahamas to Amelia Island, via Fort Pierce, Florida, USA.





Bahamas Department of Civil Aviation Air Accident Investigation and Prevention Unit

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Letter to Director

April 15, 2008

Mr. Cyril Saunders
Director
Civil Aviation Department
Seaban House
Crawford Street, Oakes Field
P.O. Box N-975
Nassau, N.P.,
Bahamas

Sir

The attached report summarizes the investigation into the circumstances of the accident involving Cessna T210H United States Registration N2219R, registered to Tropical Aviation II, Pompano Beach, Florida. This accident occurred near McLean's Town, Grand Bahama on July 3, 2007.

This report is submitted pursuant to Part XII, Regulation 80, and Schedule 19 of the Bahamas Civil Aviation (Safety) Regulation (CASR 2001) and in accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO).

In accordance with Annex 13 to the Convention on International Civil Aviation (ICAO), and Schedule 19 of the Bahamas Civil Aviation (Safety) Regulations (CASR April 17, 2001), the fundamental purpose of such investigations is to determine the circumstances and causes of these events, with a view to the preservation of life and the avoidance of similar occurrences in the future. It is not the purpose of such investigations to apportion blame or liability.

This information is published to inform the aviation industry and the public of the circumstances surrounding this accident. The contents of this Report may be subjected to alterations or corrections if additional information becomes available.

Delvin R. Major
Investigator in Charge
Flight Standards Inspectorate
Department of Civil Aviation (Bahamas)



PARTICIPANTS IN THE INVESTIGATION

Delvin R. Major	Flight Standards Inspectorate	IIC
Philip C. Romer	Flight Standards Inspectorate	Airworthiness
Dion Q. Demeritte	Flight Standards Inspectorate	Airworthiness
Timothy Monville	National Transportation Safety Board	Senior Air Safety Investigator
Josh Cawthra	Teledyne Continental Motors	
Mike Koonce	Cessna Aircraft Company	
Wellington Moultrie - Freeport Airport Company Freeport, Bahamas ATC		





FLIGHT STANDARDS INSPECTORATE
BAHAMAS CIVIL AVIATION DEPARTMENT

TITLE

Registered Owner: Tropical Aviation II
Manufacturer: Cessna Aircraft
Model: T210H
Place of Accident: McCleans Town, Grand Bahama
Nationality: United States of America
Registration: N2219R
Date of Accident: July 3, 2007

SYNOPSIS

Notification: DCA, FSI, NTSB, FAA,
Investigating Authority: Civil Aviation Department
Air Accident Investigation and Prevention Unit
Investigator in Charge: Delvin R. Major
Accredited Representative: Mr. William Standing - FAA
Mr. Jose Obregon – NTSB
Teledyne Continental Motors
Cessna Aircraft Company
Releasing Authority: Civil Aviation Department



ABBREVIATIONS and TERMINOLOGY

ADDS	Aviation Digital Data Service - Report by Meteorological Department
AIS	Automatic Information Services
ATS	Air Traffic Services
BDCA	Bahamas Department of Civil Aviation
CASR	Bahamas Civil Aviation (Safety) Regulations (April 17, 2001)
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CG	Center of Gravity
CVR	Cockpit Voice Recorder
DCA	Director of Civil Aviation
DFDR	Digital Flight Data Recorder
CAD	Civil Aviation Department
EST	Eastern Standard Time (-5 hours (-4DT) to convert from UTC)
FAA	Federal Aviation Administration
FSI	Flight Standards Inspectorate
FSS	Flight Service Station
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Condition
MALSF	Medium-intensity Approach Lighting System (with sequenced flashers)
MCM	Maintenance Control Manual
MET	Meteorological Office / Department
METAR	Weather Report furnished by Meteorological Department
MIRL	Medium Intensity Runway Lights
MYGF	ICAO Airport Designation – Freeport, Grand Bahama, Bahamas
NDB	Non-directional Beacon
NM or nm	Nautical Miles
NTSB	National Transportation Safety Board
PAPI	Precision Approach Path Indicator
SEP	Survival and Emergency Procedures Training
USA	United States of America
VFR	Visual Flight Rules
VOR	(Very High Frequency) Omni-directional Range Station
VMC	Visual Meteorological Conditions
UTC	Universal Coordinated Time
Z	Zulu time



DEFINITIONS

When the following terms are used in the Standards and Recommended Practices for Aircraft Accident and Incident Investigation, they have the following meaning:

Accident. An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

a) a person is fatally or seriously injured as a result of:

- being in the aircraft, or
- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
- direct exposure to jet blast, except when the injuries are from natural causes, self inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and
- would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or

c) the aircraft is missing or is completely inaccessible.

Note 1.— For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.

Note 2.— An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Accredited representative. A person designated by a State, on the basis of his or her qualifications, for the purpose of participating in an investigation conducted by another State.

Adviser. A person appointed by a State, on the basis of his or her qualifications, for the purpose of assisting its accredited representative in an investigation.

Aircraft. Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Causes. Actions, omissions, events, conditions, or a combination thereof, which led to the accident or incident.

Fatal injury. - means any injury which results in death within 30 days of the accident.

Flight recorder. Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

Incident. An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Note.— The types of incidents which are of main interest to the International Civil Aviation Organization for accident prevention studies are listed in the Accident/Incident Reporting Manual (Doc 9156).

Investigation. A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

Investigator-in-charge. A person charged, on the basis of his or her qualifications, with the responsibility for the organization, conduct and control of an investigation.

Note.— Nothing in the above definition is intended to preclude the functions of an investigator-in-charge being assigned to a commission or other body.

Maximum mass. Maximum certificated take-off mass.



Operator. A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Preliminary Report. The communication used for the prompt dissemination of data obtained during the early stages of the investigation.

Safety recommendation. A proposal of the accident investigation authority of the State conducting the investigation, based on information derived from the investigation, made with the intention of preventing accidents or incidents.

Serious incident. An incident involving circumstances indicating that an accident nearly occurred.

Note 1.— The difference between an accident and a serious incident lies only in the result.

Note 2.— Examples of serious incidents can be found in Attachment C of Annex 13 and in the Accident/Incident Reporting Manual (Doc 9156).

Serious injury. An injury which is sustained by a person in an accident and which:

- a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; or
- b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
- c) involves lacerations which cause severe hemorrhage, nerve, muscle or tendon damage; or
- d) involves injury to any internal organ; or
- e) involves second or third degree burns, or any burns affecting more than 5 per cent of the body surface; or
- f) involves verified exposure to infectious substances or injurious radiation.

State of Design. The State having jurisdiction over the organization responsible for the type design.

State of Manufacture. The State having jurisdiction over the organization responsible for the final assembly of the aircraft.

State of Occurrence. The State in the territory of which an accident or incident occurs.

State of the Operator. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

State of Registry. The State on whose register the aircraft is entered.

Note.— In the case of the registration of aircraft of an international operating agency on other than a national basis, the States constituting the agency are jointly and severally bound to assume the obligations which, under the Chicago Convention, attach to a State of Registry. See, in this regard, the Council Resolution of 14 December 1967 on Nationality and Registration of Aircraft Operated by International Operating Agencies which can be found in Policy and Guidance Material on the Economic Regulation of International

“State of Design” - The State having jurisdiction over the organization responsible for the type design

“State of Manufacture” - The State having jurisdiction over the organization responsible for the final assembly of the aircraft.

“Substantial damage” - means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent failings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage" for the purpose of this Report.



OVERVIEW

On July 3, 2007, the NTSB Miami Field Office informed the Flight Standards Inspectorate at Lynden Pindling International Airport that Miami Center reported that aircraft N2219R, a Cessna 210 aircraft, was down. This information was later confirmed by the Grand Bahama Airport Company Limited Air Traffic Control (ATC) Freeport, Grand Bahama.

ATC reported that aircraft N2219R declared a mayday on frequency 126.50 at 1254Z and stated that he will try and land on a road that he saw. At 1304Z the pilot reported that he was unsure of his exact location. A pilot in the area estimated the aircraft position as approximately 38 DME East of Freeport Int'l Airport. Between 1304Z and 1306Z communication was lost with the aircraft. Bahamasair Flight 311 reported at 1306Z that at 2,000 feet AGL, a strong ELT signal was picked up at a location approximately 23 DME on the 093 degree radial of the Freeport VOR.

At 1308Z Bahamasair Flight BHS 311 relayed information from Western Air Flight 704, that they had “spotted the wreckage, saw billows of smoke and that the aircraft appeared to have crashed nose first in the pine forest.” FLT 704 further reported that “the tail of the aircraft was sticking up in the air and that the aircraft was approximately 3 miles inland, in the pine forest between McLean’s Town and Pelican Point.”

Crash and rescue services were dispatched to the area and upon reaching the site found no occupants. It was later learnt that the pilot had made his way thru the forest to the main road where he was picked up by a passing vehicle and taken to the Rand Memorial Hospital.

Information gathered later revealed that the pilot (the sole occupant) was on a VFR flight plan from Treasure Cay, Abaco, Bahamas to Amelia Island via a stop in Ft. Pierce, Florida to clear US Authorities. The weather in the area of the crash site, around the time of the accident, was

reported as Visual Meteorological Conditions (VMC). The aircraft hit several trees prior to contact with the ground. It caught fire and exploded several seconds later. It was destroyed by post impact fire. The wreckage is located at coordinates N26° 40’735” and W 078°00’565”. The aircraft came to rest on a Magnetic heading of 265°.



The FAA NTSB, Engine and Aircraft Manufacturers were notified.

1.0 FACTUAL INFORMATION:

1.1 HISTORY OF THE FLIGHT

Cessna T210H, United States Registration N2219R, was a private flight which originated from Treasure Cay, Abaco, Bahamas direct to Amelia Island via Ft. Pierce, Florida.

Enroute to Amelia Island the pilot who declared a mayday on 126.5 indicated that he had lost an engine and was going down. The wreckage was located near McLean’s Town, Grand Bahama approximately 3 miles off the main road, in the pine forest.

The pilot in an interview after the accident stated that while level at 8,500 ft enroute to Amelia Island, Florida the aircraft engine started sputtering. The pilot further stated that he observed his engine instruments and everything looked normal and within limitations.



Shortly thereafter, a loud boom was heard and the windshield was covered with oil. The pilot stated that he got the checklist, followed it and proceeded to look for a place to land thru the part of the windshield that was not totally covered in oil. There was no smoke or fire present at this time.

The aircraft was prepared and configured for a landing without power. A service road was spotted and the pilot made attempts to configure the airplane to land on the service road.



The aircraft hit several trees while attempting to land on the service road. The pilot exited the aircraft and it exploded several seconds later and was burnt extensively.

The accident occurred during daylight. Communication was lost with the aircraft between 1304Z and 1306Z (9:04 and 9:06am local). The Cessna aircraft engine was recovered from the wreckage. It was later transported to Teledyne Continental Motors for analysis. (*Analytical report attached as Appendix 1*)

1.2 INJURIES TO PERSONS

The pilot received second degree burns, cuts and scratches about the face and upper body. He was hospitalized at the Rand Memorial Hospital in Freeport, Grand Bahama and subsequently airlifted to Florida for further treatment.

1.3 DAMAGE TO AIRCRAFT

Approximately 80% of the aircraft was completely destroyed by the crash and post impact fire. The empennage was the only part not destroyed by the crash and post impact fire. Below photo shows the exit point of engine parts which contributed to the catastrophic engine failure.



1.4 OTHER DAMAGE

Major damage was confined to the aircraft. The surrounding trees and shrubbery in the immediate area of the crash were destroyed by the post impact fire.

1.5 PERSONNEL INFORMATION

The aircraft was piloted by Mr. John Mathew Zakryk. Mr. Zakryk, age 67 holds a United States Private Pilot License. Mr. Zakryk holds a Third Class Medical Certificate with no limitations, which was issued on 07/2005.

1.6 AIRCRAFT INFORMATION – GENERAL

Cessna T210H serial number T210-0369 was manufactured in 1969 by Cessna Aircraft. It was registered in the United States and bore the registration number N2219R.

Tropical Aviation II is the registered owner of N2219R. The Aircraft was issued a valid Certificate of Airworthiness on January 11, 1995. The Engine model TSIO-520 SER.



1.6.1 AIRWORTHINESS AND MAINTENANCE

According to the pilot the aircraft had undergone an annual inspection approximately 1 month prior to the accident. Additionally, the aircraft engine had less than 200 hours total time.

1.7 METEOROLOGICAL INFORMATION

The weather in the area of the crash site, around the time of the accident, was reported as Visual Meteorological Conditions (VMC).

1.8 AIDS TO NAVIGATION

Navigational aids were not a factor in this accident. The aircraft had available to it the VOR of Freeport Int'l Airport.

1.9 COMMUNICATIONS

N2219R was in contact with Freeport ATC up until the time of the crash. He had relayed a mayday and advised Freeport ATC that he would not make the field and would try to land on a service road he saw below.

1.10 AERODROME INFORMATION

The aircraft did not land at the aerodrome at Freeport Int'l Airport.

1.11 FLIGHT RECORDERS

This aircraft did not have an installed flight voice recorder as one was not required by regulations for this type of aircraft.

1.12 WRECKAGE AND IMPACT INFORMATION

The aircraft wreckage was examined at the crash site on July 3, 2007 by Aviation Safety Inspectors of the Flight Standards Inspectorate.

The aircraft came to rest on a Magnetic heading of approximately 265 degrees. The wreckage was located at coordinates N26° 40'735' and W 078° 00'565''.



The aircraft hit several tall pine trees prior to making contact with the ground. It caught fire and exploded several seconds later. The aircraft was almost completely destroyed in the post impact fire.



The engine sustained damaged due to the impact and was removed in joint participation with the Flight Standards Inspectorate and Teledyne Continental Motors. The engine was brought back to Grand Bahama International Airport to a secure storage area and later shipped for further evaluation to the experts of Teledyne Continental Motors.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

Not a factor in this investigation



1.14 FIRE

A fire erupted after the aircraft made impact with the ground. The post impact fire completely engulfed and destroyed the aircraft except the empennage (tail section - elevator, rudder, horizontal and vertical stabilizer). The immediate area containing brush and other small shrubbery was also destroyed by the post impact fire.



1.15 SURVIVAL ASPECTS

Crash and Fire rescue services were dispatched to the area and upon locating the site discovered that no occupants could be located. It was later learnt that the pilot had made his way thru the forest to the main road where he was picked up by a passing vehicle and taken to the rand Memorial Hospital.

1.16 TESTS AND RESEARCH

1.16.1 Engine Inspection – Teledyne Continental Motors

The engine was inspected at the Crash site located in McLean's Town, Grand Bahama by Investigators from Teledyne Continental Motors. Report is attached as *Appendix 1-*.

1.16.2 Engine Inspection – Teledyne Continental Motors

The engine was later shipped to and further analyzed by Teledyne Continental Motors Lab in Mobley, Alabama. Full Report is attached as *Appendix 1*.

1.17 ADDITIONAL INFORMATION Not applicable.



2.0 ANALYSIS:

2.1 GENERAL

- Crew qualifications – Private Pilot License in Airplane Single Engine Land
- Weather – Visual Meteorological Condition existed at the time and was not a factor in this accident.
- ATC – Air Traffic Control reported that aircraft N2219R declared a mayday on frequency 126.50 at 1254Z.
- Aids to Navigation – Aids to navigation was not a factor in the accident.

2.2 AIRCRAFT

- Aircraft maintenance – Aircraft had recently undergone an annual inspection. Aircraft engine had less than 200 hours total time.
- Aircraft performance – aircraft performance was not a factor in the accident.
- Mass and balance – aircraft was within mass and balance limitations .
- Aircraft Navigational Instrumentation – not a factor and had no bearing on the accident.
- Human factors – There was no evidence that incapacitation or physiological factors affected the pilot's performance.
- Psychological and physiological factors affecting personnel involved. - There was no evidence that the pilot suffered any sudden illness or incapacitation which might have affected their ability to control the aircraft.

3.0 CONCLUSIONS:

3.1 FINDINGS

1. The pilot was properly certified and qualified for the flight.
2. The airplane was properly certificated in accordance with existing regulations.

3.2 PROBABLE CAUSE

The probable cause of this accident has been determined to be catastrophic engine failure.

3.3 CONTRIBUTING FACTORS

Not applicable

4.0 SAFETY RECOMMENDATION

The AAIPU as a result of this accident makes no recommendations.

Engine examination revealed no abnormalities that would have prevented normal operation and production of rated horsepower.





Teledyne Continental Motors, Inc.
A Teledyne Technologies Company

5.0 ENGINE ANALYSIS REPORT – APPENDIX 1

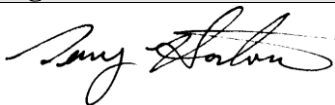
ENGINE MODEL: TSIO-520-M

ENGINE SERIAL: 825533

AIRCRAFT MODEL: Cessna T210H

SERIAL NUMBER: T210-0369

REGISTRATION: N2219R

Examiner	Signature	Date
Terry L Horton		November 2, 2007



GENERAL INFORMATION**EXAMINATION**

Date	October 2, 2007
Facility	Teledyne Continental Motors
Address	2039 Broad Street
City	Mobile
State and Zip	Alabama 36615

ENGINE RECEIVED

Date	September 4, 2007
RGA #	0707-825533
FROM	The Grand Bahamas Airport Company
NTSB/FAA Tagged	NTSB
Box Sealed	Yes

ENGINE INFORMATION

Make	Teledyne Continental Motors
Model	TSIO-520-M
Serial No.	825533
Engine Position	Front
Total Time	Not reported
Time SOH	Not reported
Build Date	March 8, 2002
In Service Date	Not reported
Removal Date	Not reported

AIRCRAFT / ACCIDENT INFORMATION

Aircraft Make	Cessna
Aircraft Model	T210H
Aircraft Serial No.	T210-0369
Registration No.	N2219R
Accident Date	July 3, 2007
Accident Location	Freeport, Bahamas

Significant logbook information: There were no log books or maintenance information returned with the engine.

Report Summary:

Search Code:	
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The inspection of this engine did not reveal any abnormalities that would have prevented normal operation and production of rated horsepower.

Disposition of engine following exam: Awaiting disposition.



Inspection Witnesses

Inspector	Terry L Horton	Mechanic	Bill Ross
Address	2039 Broad Street, Mobile, Alabama, 36616	Address	2039 Broad Street, Mobile, Alabama, 36616
Organization	Teledyne Continental Motors	Organization	Teledyne Continental Motors
Phone No	251-436-8481	Phone No	251-436-8482
Witness	Josh Cawthra	Mechanic	Johnny Little
Address	2039 Broad Street, Mobile, Alabama, 36616	Address	2039 Broad Street, Mobile, Alabama, 36616
Organization	Teledyne Continental Motors	Organization	Teledyne Continental Motors
Phone No	251-436-8481	Phone No	251-436-8482
Witness	John Lovell		
Address	8405 NW 53 rd Street, Suite B- 103 Miami, FL 33166		
Organization	National Transportation Safety Board		
Phone No	(305) 597-4611, X20		



EXTERNAL INSPECTION OF ENGINE: The engine exhibited extensive thermal discoloration and damage. The following parts were shipped loose from the engine: the old feller housing a portion of the crankcase casting a piston pin a hose clamp and some fittings.

AIRFRAME PARTS RETURNED WITH ENGINE: Cooling baffles, oil filter adapter, hydraulic pump, propeller de-ice brush block assembly, propeller governor, vacuum pump, fuel primer valve, induction port drain valve and hoses, fuel flow transducer and portions of wiring harnesses, hoses, tubing and control cables.

ENGINE COMPONENT EXAMINATION

Exhaust System Condition: The exhaust system exhibited thermal discoloration and mechanical damage.

Starter Manufacturer: TCM Energizer Part Number: 646???-2 Serial #: A-210221
Condition: The starter rotated by hand and exhibited thermal damage.

Starter Adapter Part Number: Illegible. Date Code: Illegible.
Condition: The starter adapter could not be rotated by hand and exhibited thermal discoloration and damage. The clutch spring and shaft gear exhibited corrosion, but were intact.

Crankshaft to Camshaft Timing The crankshaft to camshaft timing was verified by the alignment of the gear's timing marks.

Ignition Harness Manufacturer: Illegible Model/Part Number: Illegible Serial #: Illegible
Condition: All leads exhibited thermal discoloration and damage.

L/H Magneto Manufacturer: TCM Model/Part Number: Illegible Serial #: Illegible
Condition: The left-hand magneto could not be turned freely by hand. The magneto exhibited extensive thermal damage.

R/H Magneto Manufacturer: TCM Model/Part Number: Illegible Serial #: Illegible
Condition: The right-hand magneto could not be turned freely by hand. The magneto exhibited extensive thermal damage, thermally destroying the majority of the internal components.

Oil Cooler Manufacturer: Niagara NDM Model/Part Number: 20617A / 654595 Serial #: B02-188-410

Condition: The oil cooler exhibited thermal discoloration.



Oil Pump

Condition: The oil pump drive was intact. The oil pump assembly exhibited thermal damage and corrosion. The oil pump assembly required extensive mechanical force to allow access and examine the internal components. The oil pump cavity contained fine material and exhibited normal operating signatures. The oil pump gear teeth exhibited normal operating signatures. The oil pressure relief valve and seat contained no obstructions and exhibited signatures of proper seating. The oil scavenge pump components exhibited thermal damage and corrosion. The scavenge pump gears were intact. The scavenge pump gear cavity was intact.

Oil Filter

Manufacturer: Illegible

Part number: Illegible

Condition: The oil filter exhibited thermal discoloration and damage. The oil filter housing was cut open using the Champion cutting tool and the filter element was cut from the canister to allow examination. The oil filter element was examined and contained abundance of flakes and slivers from the damaged internal engine components.

** - Fuel System Component Flow/Pressure Test: The "Observed" fuel flows and/or pressures are recorded without adjustment (unless noted) of the fuel system component. The additional values in each table are engineering specifications for the original calibration of the component to insure desired performance within the full range of operation. These tests and adjustments are carried out in an environment of controlled fuel supply pressures and calibrated test equipment. When engines are installed in aircraft, they are subjected to a different induction system, fuel supply system and operating environment and may require further adjustments to compensate for these differences. It is these differences that may be present in the following test bench recorded values and TCM flow/pressure specifications. These tests are conducted to confirm that the fuel system components will function adequately within its' designed limitations.*

Throttle and Fuel Control Assembly

Manufacturer: TCM

Part Number: Illegible

Serial #: Illegible

Condition: The throttle and control assembly exhibited thermal discoloration and damage. Only the throttle valve and lever assembly remained from the throttle body. The link rod and levers were intact. Finger screen removed and no material was present.

Fuel Pump

Manufacturer: TCM

Part Number: 646768-1A1

Serial #: B02BA363R

Condition: The fuel pump exhibited thermal and mechanical damage. The fuel pump could not be turned freely by hand. The fuel pump drive gear was seized in the pump drive housing. The fuel inlet fitting was fractured at vapor separator housing. The fuel pump was disassembled for internal examination.

Fuel Manifold Valve

Manufacturer: TCM

Part Number: 634326-12A2M

Serial #: C02BA321R

Condition: The fuel manifold valve exhibited thermal discoloration. The manifold valve assembly was disassembled for internal examination. The diaphragm was thermally deteriorated. The plunger components exhibited thermal damage.



Fuel Nozzles and Lines

Manufacturer: TCM

Size: 6 each – 14B

Condition: The fuel nozzles were unrestricted and exhibited normal operating signatures.

Spark Plugs

Manufacturer: Champion

Part number: RHB32E

Condition: The spark plugs exhibited worn out signatures in accordance with the Champion aviation check-a-plug comparison chart.

Alternator

Manufacturer: Illegible

Part Number: Illegible

Serial #: Illegible

Condition: The alternator exhibited extensive thermal damage.

Oil Sump

Condition: The oil sump quick drain was secure and closed. The oil sump was thermally breached.

Oil Pick-up Tube & Screen

Condition: The oil pick-up tube was undamaged. The oil suction screen was unrestricted.

Induction System

Condition: The induction risers and balance tube were undamaged and exhibited normal operating signatures.

Aftercooler

Part number:

Serial Number:

Condition: The aftercooler was intact and undamaged. The cooling fins were undamaged and unrestricted. The internal passages were undamaged and unrestricted.

Cylinder #1

Part Number:

Head Date:

Barrel Surface: Steel Chrome

Serial #:

**Work Order
Numbers: None**

Condition: The spot putty was not evident on the cylinder hold-down nuts. The cylinder combustion chamber had a normal amount of combustion deposits and the bore condition was free of scoring and undamaged. The cylinder skirt was intact and undamaged and there were no hone marks visible in the cylinder bore ring travel area. The intake and exhaust valve heads exhibited normal deposits and operating signatures. The rocker box area had an oil residue indicating lubrication to the overhead. The cylinder overhead components (valves, rocker arms, guides, springs, retainers and shafts) were lubricated and undamaged.

Cylinder #2

Part Number:

Head Date:

Barrel Surface: Steel Chrome

Serial #:

**Work Order
Numbers: None**

Condition: The spot putty was not evident on the cylinder hold-down nuts. The cylinder combustion chamber had a normal amount of combustion deposits and the bore condition was free of scoring and undamaged. The cylinder skirt was intact and undamaged and there were no hone marks visible in the cylinder bore ring travel area. The intake and exhaust valve heads exhibited normal deposits and operating signatures. The rocker box area had an oil residue indicating lubrication to the overhead. The cylinder overhead components (valves, rocker arms, guides, springs, retainers and shafts) were lubricated and undamaged.



Cylinder #3

Serial #:

Part Number:

Work Order

Head Date:

None

Barrel Surface: Steel Chrome

Numbers:

Condition:

The spot putty was not evident on the cylinder hold-down nuts. The cylinder combustion chamber had a normal amount of combustion deposits and the bore condition was free of scoring and undamaged. The cylinder skirt was intact and undamaged and there were no hone marks visible in the cylinder bore ring travel area. The intake and exhaust valve heads exhibited normal deposits and operating signatures. The rocker box area had an oil residue indicating lubrication to the overhead. The cylinder overhead components (valves, rocker arms, guides, springs, retainers and shafts) were lubricated and undamaged.

Cylinder #4

Serial #:

Part Number:

Work Order

Head Date:

None

Barrel Surface: Steel Chrome

Numbers:

Condition:

The spot putty was not evident on the cylinder hold-down nuts. The cylinder combustion chamber had a normal amount of combustion deposits and the bore condition was free of scoring and undamaged. The cylinder skirt was intact and undamaged and there were no hone marks visible in the cylinder bore ring travel area. The intake and exhaust valve heads exhibited normal deposits and operating signatures. The rocker box area had an oil residue indicating lubrication to the overhead. The cylinder overhead components (valves, rocker arms, guides, springs, retainers and shafts) were lubricated and undamaged.

Cylinder #5

Serial #:

Part Number:

Work Order

Head Date:

None

Barrel Surface: Steel Chrome

Numbers:

Condition:

The spot putty was not evident on the cylinder hold-down nuts. The cylinder combustion chamber had a normal amount of combustion deposits and the bore condition was free of scoring and undamaged. The cylinder skirt was intact and undamaged and there were no hone marks visible in the cylinder bore ring travel area. The intake and exhaust valve heads exhibited normal deposits and operating signatures. The rocker box area had an oil residue indicating lubrication to the overhead. The cylinder overhead components (valves, rocker arms, guides, springs, retainers and shafts) were lubricated and undamaged.

Cylinder #6

Serial #:

Part Number:

Work Order

Head Date:

None

Barrel Surface: Steel Chrome

Numbers:

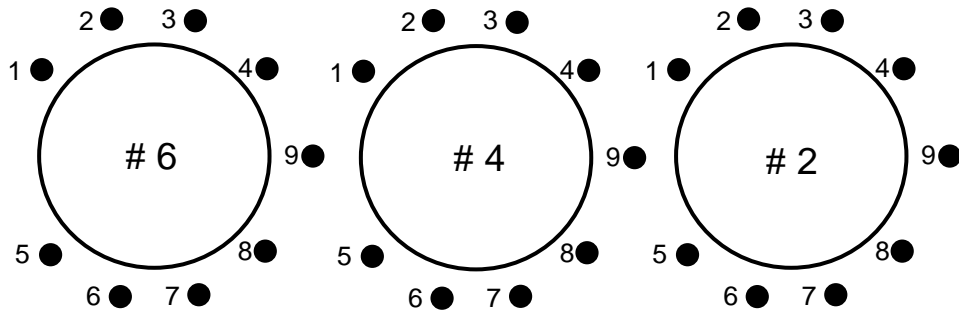
Condition:

The spot putty was not evident on the cylinder hold-down nuts. The cylinder combustion chamber had a normal amount of combustion deposits and the bore condition was free of scoring and undamaged. The cylinder skirt was intact and undamaged and there were no hone marks visible in the cylinder bore ring travel area. The intake and exhaust valve heads exhibited normal deposits and operating signatures. The rocker box area had an oil residue indicating lubrication to the overhead. The cylinder overhead components (valves, rocker arms, guides, springs, retainers and shafts) were lubricated and undamaged.

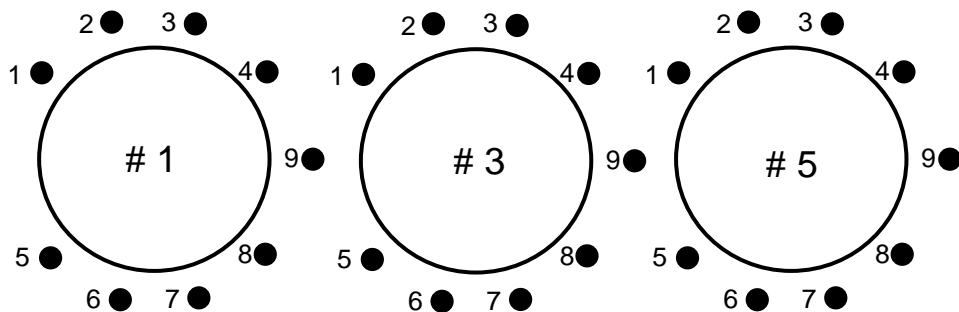


Cylinder Through-Bolt and Deck Stud Break-Away (Tightening / Loosening) Torque Measurements – Inch Pounds
(Position numbers 1 and 5 are through-bolts)

	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	/	/	/	/	/	/	/	/	/
Cylinder #4	/	/	/	/	/	/	/	/	/
Cylinder #6	/	/	/	/	/	/	/	/	/



	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	/	/	/	/	/	/	/	/	/
Cylinder # 3	/	/	/	/	/	/	/	/	/
Cylinder # 5	/	/	/	/	/	/	/	/	/



Valve and Guide

Condition: The intake and exhaust valve faces and seats exhibited full seat contact signatures and the intake and exhaust valve guides exhibited normal wear and operating signatures.



Rocker Arm and Shaft

Condition: The intake and exhaust rocker arms and shafts exhibited normal operating signatures.

#1 Piston, Rings and Pin

Piston Part Number:

Condition:

The piston head exhibited a normal amount of combustion deposits and the piston skirt was free of scoring and damage. The piston rings were intact, free in their grooves, exhibited normal wear and operating signatures. The piston pin and plug assembly was intact and undamaged.

#2 Piston, Rings and Pin

Piston Part Number:

Condition:

The piston head exhibited a normal amount of combustion deposits and the piston skirt was free of scoring and damage. The piston rings were intact, free in their grooves, exhibited normal wear and operating signatures. The piston pin and plug assembly was intact and undamaged.

#3 Piston, Rings and Pin

Piston Part Number:

Condition:

The piston head exhibited a normal amount of combustion deposits and the piston skirt was free of scoring and damage. The piston rings were intact, free in their grooves, exhibited normal wear and operating signatures. The piston pin and plug assembly was intact and undamaged.

#4 Piston, Rings and Pin

Piston Part Number:

Condition:

The piston head exhibited a normal amount of combustion deposits and the piston skirt was free of scoring and damage. The piston rings were intact, free in their grooves, exhibited normal wear and operating signatures. The piston pin and plug assembly was intact and undamaged.

#5 Piston, Rings and Pin

Piston Part Number:

Condition:

The piston head exhibited a normal amount of combustion deposits and the piston skirt was free of scoring and damage. The piston rings were intact, free in their grooves, exhibited normal wear and operating signatures. The piston pin and plug assembly was intact and undamaged.

#6 Piston, Rings and Pin

Piston Part Number:

Condition:

The piston head exhibited a normal amount of combustion deposits and the piston skirt was free of scoring and damage. The piston rings were intact, free in their grooves, exhibited normal wear and operating signatures. The piston pin and plug assembly was intact and undamaged.

Lifter	#1	#3	#5	#2	#4	#6
Intake						
Exhaust						



Condition: The lifter faces were undamaged and exhibited normal operating signatures. The lifter bodies were undamaged and exhibited normal operating signatures.

Crankshaft

Forging number: Serial number: Heat code:

Condition: *JournalConditionTransferTubesLubricationThrustSurfacesTransferCollarCounterweightPinsSnap ringsPlates* The crankshaft and counterweight assembly was undamaged and exhibited normal operating signatures. The connecting rod journals, main journals and thrust surfaces were undamaged and showed no signs of abnormal wear or lubrication distress. The crankshaft counterweight pins, plates and snap-rings were intact. The counterweights were undamaged and had free and unrestricted movement on the hanger blades. The crankshaft exhibited cracks on the shaft diameter, aft of the propeller flange. Multiple angled cracks of this nature indicate that there were torsional loads on the crankshaft at the time of fracture and therefore that the engine was making power at that time. The crankshaft and counterweight assembly exhibited lubrication distress, thermal damage, and mechanical damage concentrated at the number four, five and six connecting rod journals. The crankshaft cluster gear was intact and exhibited normal operating signatures. The gear bolts were tight and saftied and the gear teeth were undamaged. The crankshaft main bearing journals were intact, undamaged and exhibited normal operating signatures. The rear set of counterweight assemblies were intact and had free and unrestricted movement on the hanger blades. The number one, two and three connecting rod journals were intact, undamaged and did not exhibit any signs of lubrication distress. The forward set of counterweight assemblies exhibited mechanical damage and had free and unrestricted movement on the hanger blades. All of the counter weight pins, plates and snap-rings were intact. The number four connecting rod journal exhibited thermal distress and scoring from lack of sufficient lubrication. The number five connecting rod journal exhibited signs of lubrication distress, thermal discoloration and fracture, mechanical damage and displacement of the journal material. The number six connecting rod journal exhibited signs of lubrication distress, thermal discoloration, mechanical damage and displacement of the journal material. Excluding the displacement of journal material on number five and six, the oil transfer passages were open and unrestricted. Alternator drive face gear teeth were intact and undamaged. The oil transfer collar was intact and undamaged. The oil transfer plug was tight and in position.

Crankshaft Main Bearing Journal Dimensions		
Main Journal Number (Rear to Front)	Measured	Limits - New / M010
Number 1		– (new limits)
Number 2		– (new limits)
Number 3		– (new limits)
Number 4		– (new limits)
Number 5		– (new limits)

Main Bearing Part Number	Rear	Intermediate	Front
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Condition: The crankshaft main bearings exhibited normal operating and lubrication signatures. The crankshaft main bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress.

Crankshaft Connecting Rod Bearing Journal Dimensions		
Rod Journal Number (Rear to Front)	Measured	Limits - New / M010
Number 1		– (new limits)
Number 2		– (new limits)
Number 3		– (new limits)
Number 4		– (new limits)
Number 5		– (new limits)
Number 6		– (new limits)

#1 Connecting Rod

Part #:

Forging #:

Serial #:

Condition: The connecting rod exhibited extreme thermal and mechanical damage and was fractured through at the base of the I-beam, separating of both sections of bearing supports. Fragments of connecting rod cap exhibited thermal and mechanical damage. Fragments of connecting rod bolts and nuts were fractured through and exhibited mechanical damage and overload signatures. One section of bearing support was distorted and the bolt had fractured from tensile overload. The connecting rod cap was retained to the opposite bearing support section which was distorted by the opposite rod bolt and nut that exhibited bending and tensile overload necking. The connecting rod assembly was intact and exhibited thermal discoloration. The connecting rod nuts and bolts were intact. The connecting rod was intact and undamaged. The connecting rod bushing exhibited normal operating and lubrication signatures.

#1 Connecting Rod Bearings Part Number:

Condition: The connecting rod bearing exhibited normal operating and lubrication signatures. The connecting rod bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress. Only fragments and the connecting rod bearing remained in the bearing support. These fragments of the bearing steel backing only had welded to the support due to a lack of sufficient lubrication and subsequent thermal distress. Only fragments and the connecting rod bearing remained. These fragments of the bearing exhibited lubrication and thermal distress and were found in the oil sump. The connecting rod bearing exhibited lubrication distress and thermal smearing of the surface babbit, exposing the copper layer.

#2 Connecting Rod

Part #:

Forging #:

Serial #:

Condition: The connecting rod exhibited extreme thermal and mechanical damage and was fractured through at the base of the I-beam, separating of both sections of bearing supports. Fragments of connecting rod cap exhibited thermal and mechanical damage. Fragments of connecting rod bolts and nuts were fractured through and exhibited mechanical damage and overload signatures. One section of bearing support was distorted and the bolt had fractured from tensile overload. The connecting rod cap was retained to the opposite bearing support section which was distorted by the opposite rod bolt and nut that exhibited bending and tensile overload necking. The connecting rod assembly was intact and exhibited thermal discoloration. The connecting rod nuts and bolts were intact. The connecting rod was intact and undamaged. The connecting rod bushing exhibited normal operating and lubrication signatures.

#2 Connecting Rod Bearings Part Number:



Condition: The connecting rod bearing exhibited normal operating and lubrication signatures. The connecting rod bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress.
Only fragments and the connecting rod bearing remained in the bearing support. These fragments of the bearing steel backing only had welded to the support due to a lack of sufficient lubrication and subsequent thermal distress.
Only fragments and the connecting rod bearing remained. These fragments of the bearing exhibited lubrication and thermal distress and were found in the oil sump.
The connecting rod bearing exhibited lubrication distress and thermal smearing of the surface babbitt, exposing the copper layer.

#3 Connecting Rod

Part #:

Forging #:

Serial #:

Condition: The connecting rod exhibited extreme thermal and mechanical damage and was fractured through at the base of the I-beam, separating of both sections of bearing supports. Fragments of connecting rod cap exhibited thermal and mechanical damage. Fragments of connecting rod bolts and nuts were fractured through and exhibited mechanical damage and overload signatures. One section of bearing support was distorted and the bolt had fractured from tensile overload. The connecting rod cap was retained to the opposite bearing support section which was distorted by the opposite rod bolt and nut that exhibited bending and tensile overload necking.
The connecting rod assembly was intact and exhibited thermal discoloration. The connecting rod nuts and bolts were intact.
The connecting rod was intact and undamaged. The connecting rod bushing exhibited normal operating and lubrication signatures.

#3 Connecting Rod Bearings Part Number:

Condition: The connecting rod bearing exhibited normal operating and lubrication signatures. The connecting rod bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress.
Only fragments and the connecting rod bearing remained in the bearing support. These fragments of the bearing steel backing only had welded to the support due to a lack of sufficient lubrication and subsequent thermal distress.
Only fragments and the connecting rod bearing remained. These fragments of the bearing exhibited lubrication and thermal distress and were found in the oil sump.
The connecting rod bearing exhibited lubrication distress and thermal smearing of the surface babbitt, exposing the copper layer.

#4 Connecting Rod

Part #:

Forging #:

Serial #:

Condition: The connecting rod exhibited extreme thermal and mechanical damage and was fractured through at the base of the I-beam, separating of both sections of bearing supports. Fragments of connecting rod cap exhibited thermal and mechanical damage. Fragments of connecting rod bolts and nuts were fractured through and exhibited mechanical damage and overload signatures. One section of bearing support was distorted and the bolt had fractured from tensile overload. The connecting rod cap was retained to the opposite bearing support section which was distorted by the opposite rod bolt and nut that exhibited bending and tensile overload necking.
The connecting rod assembly was intact and exhibited thermal discoloration. The connecting rod nuts and bolts were intact.
The connecting rod was intact and undamaged. The connecting rod bushing exhibited normal operating and lubrication signatures.

#4 Connecting Rod Bearings Part Number:



Condition: The connecting rod bearing exhibited normal operating and lubrication signatures. The connecting rod bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress.
Only fragments and the connecting rod bearing remained in the bearing support. These fragments of the bearing steel backing only had welded to the support due to a lack of sufficient lubrication and subsequent thermal distress.
Only fragments and the connecting rod bearing remained. These fragments of the bearing exhibited lubrication and thermal distress and were found in the oil sump.
The connecting rod bearing exhibited lubrication distress and thermal smearing of the surface babbit, exposing the copper layer.

#5 Connecting Rod

Part #:

Forging #:

Serial #:

Condition: The connecting rod exhibited extreme thermal and mechanical damage and was fractured through at the base of the I-beam, separating of both sections of bearing supports. Fragments of connecting rod cap exhibited thermal and mechanical damage. Fragments of connecting rod bolts and nuts were fractured through and exhibited mechanical damage and overload signatures. One section of bearing support was distorted and the bolt had fractured from tensile overload. The connecting rod cap was retained to the opposite bearing support section which was distorted by the opposite rod bolt and nut that exhibited bending and tensile overload necking. The connecting rod assembly was intact and exhibited thermal discoloration. The connecting rod nuts and bolts were intact.
The connecting rod was intact and undamaged. The connecting rod bushing exhibited normal operating and lubrication signatures.

#5 Connecting Rod Bearings Part Number:

Condition: The connecting rod bearing exhibited normal operating and lubrication signatures. The connecting rod bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress.
Only fragments and the connecting rod bearing remained in the bearing support. These fragments of the bearing steel backing only had welded to the support due to a lack of sufficient lubrication and subsequent thermal distress.
Only fragments and the connecting rod bearing remained. These fragments of the bearing exhibited lubrication and thermal distress and were found in the oil sump.
The connecting rod bearing exhibited lubrication distress and thermal smearing of the surface babbit, exposing the copper layer.

#6 Connecting Rod

Part #:

Forging #:

Serial #:

Condition: The connecting rod exhibited extreme thermal and mechanical damage and was fractured through at the base of the I-beam, separating of both sections of bearing supports. Fragments of connecting rod cap exhibited thermal and mechanical damage. Fragments of connecting rod bolts and nuts were fractured through and exhibited mechanical damage and overload signatures. One section of bearing support was distorted and the bolt had fractured from tensile overload. The connecting rod cap was retained to the opposite bearing support section which was distorted by the opposite rod bolt and nut that exhibited bending and tensile overload necking. The connecting rod assembly was intact and exhibited thermal discoloration. The connecting rod nuts and bolts were intact.
The connecting rod was intact and undamaged. The connecting rod bushing exhibited normal operating and lubrication signatures.

#6 Connecting Rod Bearings Part Number:



Condition: The connecting rod bearing exhibited normal operating and lubrication signatures. The connecting rod bearings were intact and exhibited an insignificant amount of contamination and hard particle passage. There were no signs of lubrication distress.

Only fragments and the connecting rod bearing remained in the bearing support. These fragments of the bearing steel backing only had welded to the support due to a lack of sufficient lubrication and subsequent thermal distress.

Only fragments and the connecting rod bearing remained. These fragments of the bearing exhibited lubrication and thermal distress and were found in the oil sump.

The connecting rod bearing exhibited lubrication distress and thermal smearing of the surface babbit, exposing the copper layer.

Connecting Rod Nut Tightening / Break-Away Torque Values												
Position	#1 Upper	#1 Lower	#2 Upper	#2 Lower	#3 Upper	#3 Lower	#4 Upper	#4 Lower	#5 Upper	#5 Lower	#6 Upper	#6 Lower
Torque Ft/Lbs.	/	/	/	/	/	/	/	/	/	/	/	/
Bolt Length Tight	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Bolt Length Loose	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Bolt Length Retorque = in/lbs.	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Camshaft

Part number:

Serial Number: Z02BA331

Condition: *LobeConditionGovernorGearEndDamage* The camshaft lobes exhibited normal operating signatures.

Crankcase

Casting Number

1-3-5
Side:

2-4-6
Side:

Serial number: R02AA521

Work Order Numbers: None



Condition: The cylinder bays were intact and undamaged. The main bearing support mating surfaces were intact and exhibited no signs of fretting. The main bearing support diameters were intact and exhibited no signs of bearing movement or bearing tang lock-slot elongation. The number one cylinder bay was intact and undamaged exhibited mechanical damage on the forward side. The number three cylinder bay exhibited mechanical damage at the centerline of the cylinder bore that displaced the intake lifter bore from the crankcase casting. The number five cylinder bay exhibited mechanical damage at the ten to one o'clock and the six and eight o'clock positions of the cylinder bore. The number two cylinder bay exhibited mechanical damage at the intake lifter bore and penetration of the main oil galley. The number four cylinder bay exhibited mechanical damage on the aft side. The number six cylinder bay exhibited mechanical damage at the six to ten o'clock and at the six o'clock positions of the cylinder bore. The number ? main bearing support mating surfaces were intact and exhibited no signs of fretting or bearing tang lock-slot elongation. The number ? main bearing support diameter was intact and exhibited no signs of bearing movement or rotation. The number ? main bearing support mating surfaces exhibited rough surfaces from fretting. The number ? main bearing support diameter exhibited displaced material and mechanical damage from bearing displacement. The number ? main bearing support lock-slot was elongated, indicating bearing shift. The number ? main bearing support mating surfaces exhibited rough surfaces from fretting. The number ? main bearing support diameter exhibited displaced material and mechanical damage from bearing rotation and extrusion. The number ? main bearing support lock-slot was elongated, indicating bearing shift. The number ? main bearing support mating surfaces exhibited rough surfaces from fretting. The number ? main bearing support diameter exhibited displaced material, thermal damage and partial bearing rotation signatures. The number ? main bearing support lock-slot was elongated, indicating bearing shift. The number ? and ? main bearing supports mating surfaces exhibited rough surfaces from fretting. The number ? and ? main bearing support diameters exhibited displaced material, thermal damage and bearing rotation signatures. The number ? and ? main bearing support lock-slots were obliterated from bearing rotation. The oil galleys and passages in the left and right crankcase halves were intact, clear and unrestricted. The oil filler was shipped loose from the engine. The oil filler housing exhibited damage at the attached flange at the lower portion of the unit. There was no damage to the oil filler housing cap seating area on the oil filler housing neck. The oil filler cap was found unattached to the oil filler. It was discovered after the engine had been inverted and then rolled upright. It was found positioned in an area adjacent to the oil filler housing attach point on the crankcase.

Accessory Gears

Condition: The accessory gears had continuity. The teeth were undamaged and exhibited normal operating signatures.

Turbocharger

Part number: C295001-0101 / 406610-9005

Serial Number: XK016898

Condition: Garrett Allied Signal - The turbocharger could not be rotation by hand. The turbocharger exhibited thermal discoloration and damage.

Controller

Part number:

Serial Number:

Condition: The controller was connected to the TURBOCON Turbo Control Test Unit and a functional test was performed. During testing the assembly replicated consistent function through its full operational range.



Wastegate

Part number: C105006-0105 / 470908-11

Serial Number: DE0112

Condition: The wastegate (exhaust by-pass) valve was in the full open position. The wastegate and actuator assembly exhibited thermal discoloration and damage.

Propeller Governor

Part number: 0290D4-K/T2 McCauley

Serial Number: 751554

Condition: The propeller governor could be rotated by hand. The assembly exhibits thermal discoloration and damage and the control lever was fractured away. The gaskets screen was unobstructed.

Vacuum Pump

Part number: Illegible

Serial Number: Illegible

Condition: The vacuum pump could not be rotated by hand and exhibited thermal discoloration and damage.

Hydraulic Pump

Part number: Illegible

Serial Number: Illegible

Condition: The hydraulic pump could not be rotated by hand and exhibited thermal discoloration and damage.

