



ENGINE ANALYTICAL INSPECTION REPORT

ENGINE MODEL: IO360B1DA2

ENGINE SERIAL: 03207

AIRCRAFT MODEL: Vans

A/C SERIAL NUMBER: Not Reported

REGISTRATION: N800PB

Examiner	Signature	Date
William A. Ross		May 6, 2021

Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

GENERAL INFORMATION			
EXAMINATION		ENGINE RECEIVED	
Date	May 6, 2021	Date	March 23, 2021
Facility	Superior Air Parts	RGA #	
Address	621 South Royal Lane	FROM	
City	Coppell	NTSB/FAA Tagged	No
State and Zip	Texas 75019	Box Sealed	Yes

ENGINE INFORMATION	
Make	Superior Air Parts
Model	IO360B1DA2
Serial No.	03207
Engine Position	Front
Total Time	Not reported
Time SOH	Not reported
Build Date	07/30/2003 by America's Aircraft Engines
In Service Date	08/04/2004
Removal Date	Not reported

AIRCRAFT / ACCIDENT INFORMATION	
Aircraft Make	Vans
Aircraft Model	IO360B1DA2
Aircraft Serial No.	Not reported
Registration No.	N800PB
Accident Date	September 21, 2020
Accident Location	Hillard, FL

Significant logbook information: Superior Air Parts was provided an incomplete excerpt from the engine logbooks for review. The 1st entry in the engine log was 07/30/2003 by America's Aircraft Engines in which the engine was assembled and test run. The last entry in the engine log was 12/11/2007 in which the engine was removed and inspected for a propeller strike. The number 2 cylinder was removed on 08/07/2005 for low compression, repaired and reinstalled on 09/28/2005 at a total engine time of 101.2 hours.

Report Summary: The engine exhibited extensive mechanical damage to the crankcase above the number 2 cylinder. The number 2 connecting rod cap exhibited mechanical damage and was separated from the connecting rod. The connecting rod and cap remnants exhibited thermal discoloration consistent with lubrication distress. All of the connecting rod bearings exhibited oil starvation signatures consistent with a systemic loss of oil pressure. The engine oil sump contained only a residual amount of oil. The engine oil drain plugs was intact, torqued and safety wired. The engine oil filter was inspected and contained no metal particles. The engine oil pump exhibited normal operational signatures and no signs of hard particle passage.

Disposition of engine following exam: Awaiting disposition.

Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Inspection Witnesses			
Inspector	Bill Ross	Technician	Darrell Ingle
Organization	Superior Air Parts	Organization	Superior Air Parts
Witness	Joshua Lindberg	Technician	
Organization	NTSB	Organization	

Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

EXTERNAL INSPECTION OF ENGINE: The engine was received in a wooden crate and was not NTSB or FAA tagged. The box was undamaged. The engine was wrapped in plastic and secured to the engine crate.



AIRFRAME PARTS RETURNED WITH ENGINE: There were miscellaneous hoses and parts of the engine baffling returned with the engine.

Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

ENGINE COMPONENT EXAMINATION

Magneto to Engine Timing
Spec. - 25° BTDC

Left Magneto
Manufacturer:

Light Speed

Right Magneto
Manufacturer:

Slick

Exhaust System

The exhaust system was not returned with the engine.

Starter

Manufacturer:

Part Number: MZ 6222

Serial #: G120377

Condition: The starter was intact and exhibited damage from thermal exposure. The electrical cable remained attached to the starter motor.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Crankshaft to Camshaft Timing

The crankshaft to camshaft timing was verified correct by alignment of the gears and timing marks.



Ignition Harness

Manufacturer: Unknown

Model/Part Number: Unknown

Serial #: Unknown

Condition: Only partial portion of the ignition harness was returned with the engine. The portions returned exhibited damage from thermal exposure.

Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

L/H EI Controller

Manufacturer: Light Speed Model/Part Number: Illegible

Serial #: Illegible

Condition: The control unit was securely mounted to the mount flange and exhibited impact and thermal damage. The drive coupling was intact and exhibited normal operational signatures.



R/H Magneto

Manufacturer: Slick

Model/Part Number: 4371

Serial #: 03011412

Condition: The right hand magneto exhibited thermal damage. The right hand magneto rotated freely when turned by hand and the drive gear was undamaged and exhibited normal operational signatures. There was no spark noted when rotated by hand.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Oil Cooler Manufacturer: Unknown Model/Part Number: Unknown Serial #:Unknown

Condition: The oil cooler was not returned with the engine.

Oil Pump Condition: The oil pump was intact and exhibited normal operational signatures. The oil pump body had no scratches or abnormal wear signatures. There was no sign of hard particle passage or damage to the pump gears. The oil pump drive was intact and exhibited no damage.



Oil Filter Manufacturer: Tempest Part number: AA48110-2

Condition: The oil filter was intact and safety wired to the oil filter adapter pad. The oil filter was removed and cut open for examination. The oil filter exhibited no metal or foreign material in the pleats. The outside of the oil filter was marked 06-10-1?. It is difficult to determine the last digit noting the year. The number of hours at installation was not indicated on the oil filter.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Fuel Servo

Manufacturer:
Airflow
Performance

Part Number: FM200 Model Serial #: 20231122
5020007

Condition: The fuel injection servo exhibited damage and discoloration from thermal exposure. The link rod and throttle moved freely through its full range of travel.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Fuel Pump

Manufacturer: Illegible

Part Number: 154734802

Serial #: Illegible

Condition: The fuel pump was intact and the actuator arm moved freely by hand. The fuel pump exhibited damage and discoloration from thermal exposure.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Fuel Manifold Valve Manufacturer: Illegible Part Number: Illegible Serial #: Illegible

Condition: The manifold valve exhibited damage and discoloration from thermal exposure.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Spark Plugs

Manufacturer: Top – NGK
Bottom -Tempest

Part number: Top – BR8ECM Bottom – UREM40E

Condition: The top spark plugs were automotive type and the bottom plugs were aviation type. The spark plugs exhibited worn normal signatures as compared to the Champion Aviation Check A Plug comparison chart.



Alternator/Generator

Manufacturer: Plane Power

Part Number: #99-1012

Serial #: H-Q101257

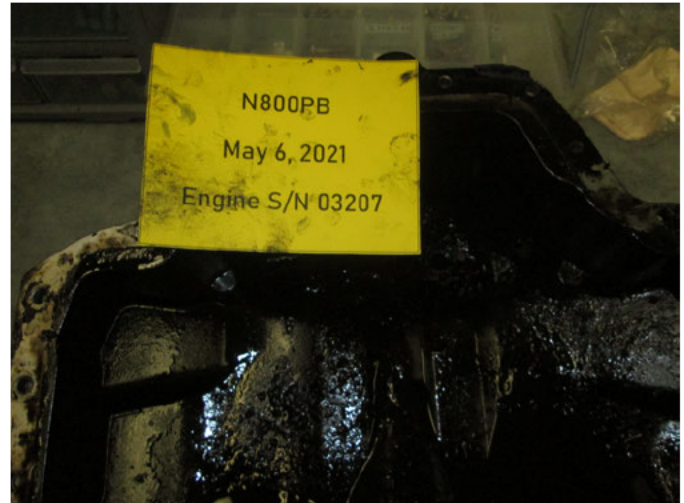
Condition: The alternator exhibited thermal discoloration and damage. The alternator rotated freely by hand.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Oil Sump

Condition: The oil sump contained only a residual amount of oil. The oil drain plug was intact and safety wired. The oil sump contained various metallic particles. The sump also contained an unidentified honeycomb type of material.



Oil Pick-up Tube & Screen

Condition: The oil pickup screen was removed from the sump for examination. The screen was clear and unrestricted. The oil present on the screen was dark in color.

Induction System

Condition: The induction system was intact and exhibited thermal discoloration.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Cylinder #1 Part Number: SL36006W-A20P

Barrel Surface: Steel

Serial #: 366C033815 Work Order Numbers: None

Condition: The cylinder exhibited mechanical damage to the skirt. The skirt required cutting to facilitate removal of the piston from the cylinder. The cylinder bore exhibited rust but otherwise normal wear and operational signatures. The intake and exhaust valves exhibited normal operational signatures.



Cylinder #2 Part Number: SL36006W-A20P

Barrel Surface: Steel

Serial #: 366C033814 Work Order Numbers: None

Condition: The number 2 cylinder and connecting rod exhibited extensive mechanical damage. The cylinder skirt was mechanically removed using a cutting wheel in order to facilitate removal of the piston and connecting rod. The piston and connecting rod remnants could not be removed from the cylinder. The visible portion of the cylinder bore exhibited rust. The intake and exhaust valves could not be accessed due to the inability to remove the piston from the cylinder.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Cylinder #3 Part Number: SL36006W-A20P

Barrel Surface: Steel

Serial #: 366C0333916 Work Order Numbers: None

Condition: The cylinder bore exhibited rust but otherwise normal wear and operational signatures. The intake and exhaust valves exhibited normal operational signatures.



Cylinder #4 Part Number: SL36006W-A20P

Barrel Surface: Steel

Serial #: 366C0333917 Work Order Numbers: None

Condition: The cylinder bore exhibited rust but otherwise normal wear and operational signatures. The intake and exhaust valves exhibited normal operational signatures.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#1 Piston, Rings and Pin Piston Part Number: Illegible

Condition: The number 1 piston exhibited light combustion deposits on the face. The rings moved freely in the ring lands and there were no scoring or scuffing signatures present.



#2 Piston, Rings and Pin Piston Part Number: Illegible

Condition: The number 2 cylinder skirt was mechanically removed in order to attempt removal of the number 2 piston. The piston could not be removed from the cylinder.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#3 Piston, Rings and Pin Piston Part Number: Illegible

Condition: The number 3 piston exhibited light combustion deposits on the face. The rings moved freely in the ring lands and there were no scoring or scuffing signatures present.



#4 Piston, Rings and Pin Piston Part Number: Illegible

Condition: The number 4 piston exhibited light combustion deposits on the face. The rings moved freely in the ring lands and there were no scoring or scuffing signatures present. The piston exhibited a dark appearance.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Camshaft P/N SL18840

Serial number: 01049

Condition: The camshaft exhibited rust on the shaft and lobes. The camshaft exhibited normal wear signatures. The camshaft gear was intact, undamaged and exhibited normal operational signatures.

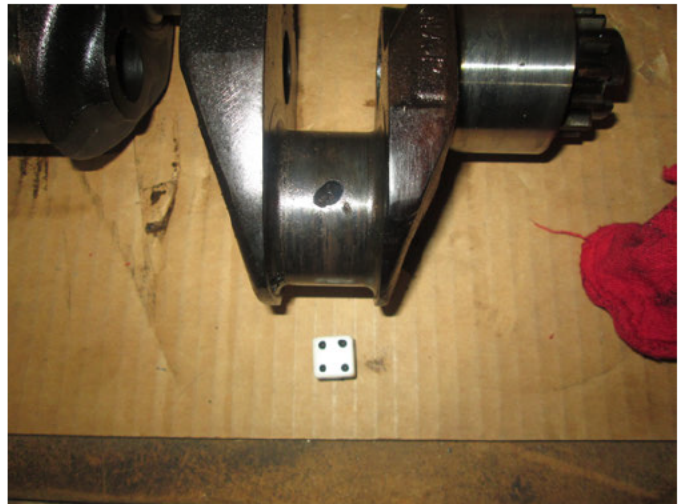
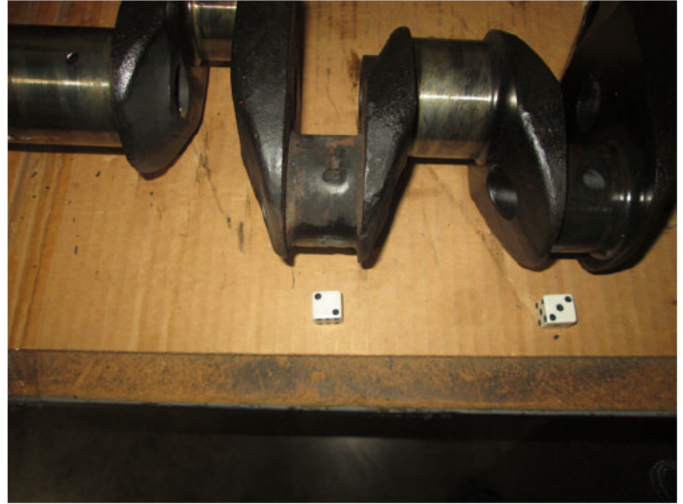


Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Crankshaft P/N SL36500-A31

Serial number: 0134

Condition: The crankshaft exhibited severe lubrication distress signatures on all connecting rod bearing journals consistent with a systemic loss of oil pressure. The number 2 connecting rod journal exhibited extreme lubrication distress signatures resulting in obliteration of the connecting rod bearing and cap. All main bearing journals exhibited some lubrication distress signatures. The crankshaft propeller flange was intact and exhibited normal operational signatures. The crankshaft gear was intact, secure and exhibited normal operational signatures.



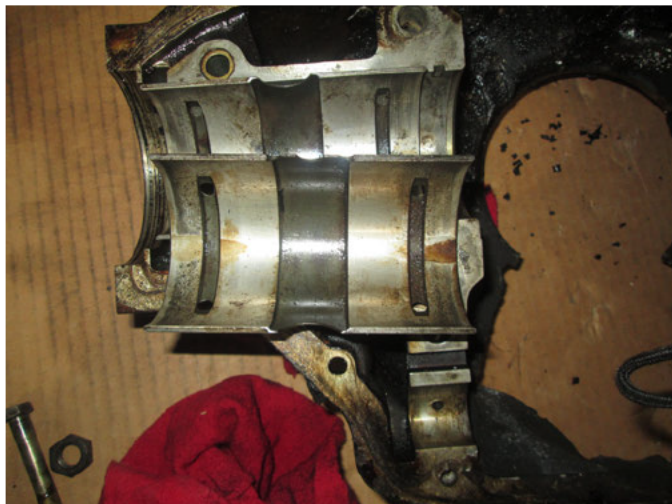
Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#1 Main Bearings

Part #: SL13884

Date Code: 11-01

Condition The number 1 main bearing exhibited slight lubrication distress.



#2 Main Bearings

Part #: SL13884

Date Code: 11-01

Condition The number 2 main bearing exhibited lubrication distress.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#3 Main Bearings

Part #: SL13884

Date Code: 11-01

Condition The number 3 main bearing exhibited lubrication distress.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#1 Connecting Rod Part: SL11750

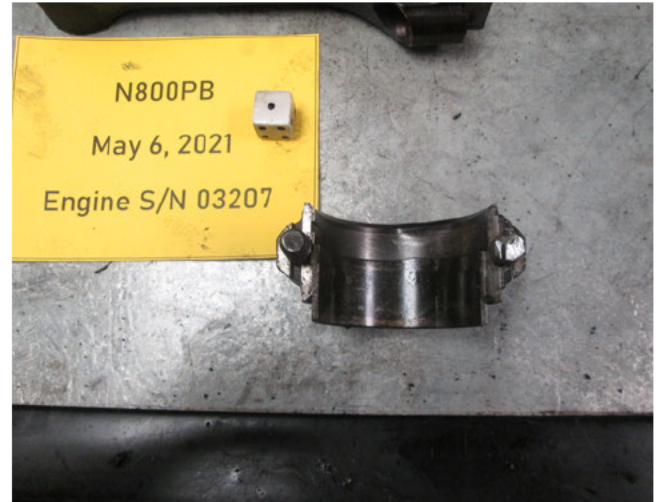
Serial Number 606

Condition: The number 1 connecting rod was intact and exhibited thermal discoloration from lubrication distress. The connecting rod top nut required cutting for removal due to mechanical damage an inability to securely fasten a wrench to the nut flats. This was required in order to facilitate the removal of the 1-3 side of the crankcase. .

#1 Connecting Rod Bearings Part #: SL13521A

Date Code: 1-03

Condition: The number 1 connecting rod bearing exhibited lubrication distress and smearing of the Babbitt exposing the copper layer.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#2 Connecting Rod Part #: Illegible

Serial Number: Illegible

Condition: The number 2 connecting rod exhibited extreme mechanical damage. The connecting rod cap was returned in a box separate from the engine and exhibited extreme mechanical damage. The number 2 connecting rod could not be removed from the crankcase.

#2 Connecting Rod Bearings Part #: Illegible

Date Code: Illegible

Condition: Only fragments of the number 2 connecting rod bearing could be found in the oil sump.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#3 Connecting Rod Part #: SL11750

Serial Number: Illegible

Condition: The connecting was intact and exhibited thermal discoloration from lubrication distress.

#3 Connecting Rod Bearings Part #: SL13521A

Date Code: 1-03

Condition: The number 3 connecting rod bearing exhibited extreme lubrication distress and smearing of the Babbitt exposing the copper layer. The number 3 bearing was extruded.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

#4 Connecting Rod Part #: SL11750

Serial Number: Illegible

Condition: The number 4 connecting rod was intact and exhibited thermal discoloration from lubrication distress.

#4 Connecting Rod Bearings Part #:

Date Code:

Condition: The number 4 connecting rod bearing exhibited severe lubrication distress and smearing of the Babbitt exposing the copper layer.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Crankcase P/N SL36800-W11 Serial Number: S0207

Condition: The crankcase was fractured above the number 2 cylinder mounting deck. There was approximately a 5 inch by 6 inch section missing. The crankcase exhibited discoloration from thermal exposure. The main bearing saddles were intact and all oil galleries were clear of obstructions.



Date	Engine Model	Engine Serial No.	Aircraft Registration	Page
May 6, 2021	IO360B1DA2	03207	N800PB	

Propeller Governor Part number: P-420-003

Serial Number: 031058

Condition: Manufacturer:

