



**Continental Motors, Inc.**

## **ENGINE FIELD INSPECTION REPORT**

# **FINAL**

ENGINE MODEL: IO-360-ES (6)

ENGINE SERIAL: 360204

AIRCRAFT MODEL: Cirrus SR20

SERIAL NUMBER: 1687

REGISTRATION: N764RV

Examiner	Signature	Date
Christopher N Lang		July 17, 2012

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GENERAL INFORMATION			
EXAMINATION		ACCIDENT DATA	
Date	07/12/2012	NTSB Accident #:	ERA12FA438
Facility	On Site	NTSB Investigator:	Jose Obregon
Address	[REDACTED]	FAA Investigator:	Daniel Merrell
City	Moscow	Law Enforcement:	Ricky Wilson, Sheriff Dept.
State and Zip	Tennessee, 38057	Coroner / Medical Examiner	Fayette County

ENGINE INFORMATION	
Make	Continental Motors Inc.
Model	IO-360-ES (6)
Serial No.	360204
Engine Position	Front
Total Time	
Time SOH	
Build Date	06/07/2006
Ship Date	06/13/2006
Removal Date	07/11/2012

AIRCRAFT / ACCIDENT INFORMATION	
Aircraft Make	Cirrus
Aircraft Model	SR20
Aircraft Serial No.	1687
Registration No.	N764RV
Accident Date	07/11/2012
Accident Location	Moscow, Tennessee

**Significant logbook information:** Log books had not been recovered at the time this report was written.

**Report Summary:**

**Search Code:**

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:** Engine was released to the Insurance Company.

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Inspection Witnesses

Name	Christopher N Lang	Name	Jose Obregon
Address	[REDACTED] Mexico, MO 65265	Address	[REDACTED] Doral, FL 33166
Organization	Continental Motors Inc.	Organization	National Transportation Safety Board
Phone No	[REDACTED]	Phone No	[REDACTED]
Name	Daniel Merrell	Name	Brannon Mayer
Address	[REDACTED] Memphis, TN 38118	Address	[REDACTED] Duluth, MN 55811
Organization	Federal Aviation Administration	Organization	Cirrus Aircraft
Phone No	[REDACTED]	Phone No	[REDACTED]
Witness		Witness	
Address		Address	
Organization		Organization	
Phone No		Phone No	
Witness		Witness	
Address		Address	
Organization		Organization	
Phone No		Phone No	

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### EXTERNAL INSPECTION OF ENGINE:

The engine was separated from the airframe and located approximately ten feet from the cockpit. The throttle cable remained attached to the engine and exhibited damage. The engine was found inverted and the oil sump was fractured free of the engine. The propeller and forward section of the engine crankshaft were separated from the engine and located approximately ten feet from the engine. The forward portion of the crankcase and lower, aft portion of the crankcase exhibited damage consistent with impact.





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## ENGINE TEARDOWN AND COMPONENT EXAMINATION

### Exhaust System

Condition: The exhaust system exhibited impact damage.



### Induction System

Condition: The induction system exhibited impact damage. All six induction risers exhibited impact damage. The induction manifold was fractured free of the engine and located in the debris field.



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## IGNITION SYSTEM:

R/H Magneto

Manufacturer: Slick

Model Number: 631?

Serial #: 0605230?

Condition:

The right magneto was fractured free of the engine and located in the debris field. The right magneto exhibited impact damage. The drive shaft turned freely by hand with impulse coupling engagement observed. The right magneto did not produce a spark when rotated by hand and was disassembled with no anomalies noted. The distributor driven and drive shaft drive gears were intact. The magneto drive gear and the drive coupling rubber bushings were not located.



L/H Magneto

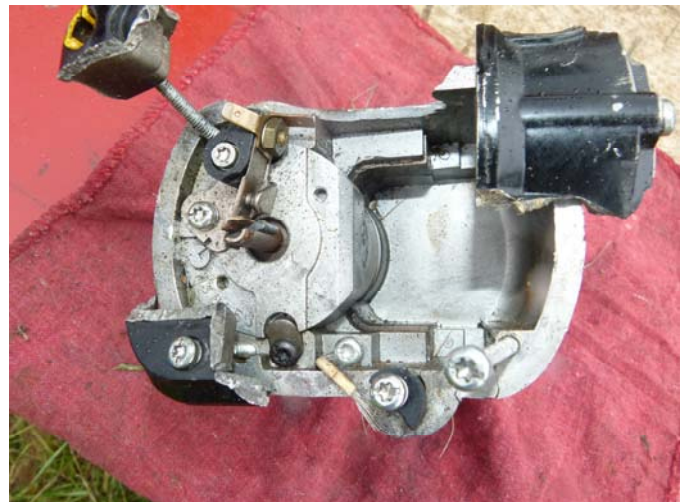
Manufacturer: Slick

Model Number: 6314

Serial #: 06040???

Condition:

The left magneto was fractured free of the engine and located in the debris field.





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**Ignition Harness** Manufacturer: Model/Part Number: Not Marked Serial #: Not Marked  
 Condition: The ignition harness exhibited impact damage.



**Spark Plugs** Manufacturer: Champion Part number:

Condition: The spark plugs exhibited impact damage. The spark plug electrodes exhibited normal operating signatures when compared to the Champion Check A Plug chart. The spark plugs exhibited light colored combustions deposits.



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## FUEL SYSTEM:

Fuel Pump

Manufacturer: TCM

Part Number: 649368-46A4

Serial #: B06FA047

Condition:

The fuel pump exhibited impact damage and only a section of the fuel pump was recovered. No indication of hard particle passage was observed in the fuel pump cavity. The diaphragm was located in the debris field and was intact.



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Fuel Manifold Valve    Manufacturer: TCM    Part Number: 646508-10A7    Serial #: C06FA035

Condition:    The fuel manifold valve exhibited intact safety wire and lead seal. The fuel manifold valve was disassembled and the screen exhibited minor obstructions. The diaphragm plunger and diaphragm retaining nut were tight and secure. No scoring was observed on the fuel valve assembly. No indication of fuel leakage was observed in the vent chamber side of the diaphragm. A small amount of fuel was observed in the manifold valve cavity and tested negative for water using Sar-Gel water finding paste.





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Fuel Nozzles and Lines

Manufacturer:

Size: 1) 3) 5) 2) 4) 6)

Condition: The fuel nozzles and lines exhibited impact damage.



Throttle Body / Metering Unit

Manufacturer: TCM

Part Number: 652844-1A4

Serial #: A06FA034

Condition: The throttle body remained attached to the intact manifold and was located in the debris field. The throttle body control arm was fractured.





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## LUBRICATION SYSTEM:

**Oil Pump** Condition: The oil pump was separated from the engine and exhibited impact damage. Marks consistent with rotation were observed on the oil pump housing.



**Oil Sump** Condition: The oil sump was fractured free from the engine. Fragments of the oil sump were located within the debris field.



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#### Oil Filter

Condition: The oil filter and oil filter adaptor were fractured free of the engine and exhibited impact damage. The oil filter housing was breached. Hand written on the oil filter was a date of "3-6-12" and Tach: "467.1".



#### Oil Screen

Condition: The oil screen exhibited intact safety wire. The oil screen was clear of obstructions and a residue of oil was present.





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Oil Cooler

Manufacturer: Illegible

Model/Part Number:

Serial #:

Condition: The oil cooler remained attached to the engine and exhibited impact damage.



**CYLINDERS:** All cylinders were inspected using a lighted bore scope. The internal combustion chambers exhibited light colored combustion deposits. The cylinder bores were clear of scoring and no evidence of hard particle passage was observed in the cylinder bore ring travel area. All overhead cylinder components exhibited a residue of oil. The intake and exhaust valve faces exhibited light colored combustion deposits. The piston heads were examined using a lighted bore scope and exhibited a material consistent with that of combustion deposits.

Accessory Gears

Crankshaft continuity to the accessory gears was established visually through the bottom of the engine crankcase.





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## ACCESSORIES:

**Starter**

Manufacturer:

Part Number:

Serial #:

Condition: The starter mounting flange remained attached to the starter adaptor. The starter was not located in the debris field.



**Alternator**

Manufacturer:

Part Number:

Serial #:

Condition: The alternator was fractured free from the engine and exhibited impact damage.





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**Propeller Governor**

Part number: Illegible

Serial Number:

**Condition:** The propeller governor remained partially attached to the engine. The control lever exhibited impact damage and moved freely by hand through its full range of travel. The propeller governor drive shaft was fractured. The propeller governor oil screen was clear of obstructions

**Propeller:**

MFG/Model: Hartzell

S/N:

HUB S/N: FP4752B

Blade S/N: 1 K35??8

Blade S/N: 2 Illegible

Blade S/N: 3 Illegible

**Condition:** Blade one was fractured free in the hub and bowed approximately 90 degrees aft and twisted. Blade one exhibited chord wise scratches on the cambered face. Blade two exhibited leading edge polishing and "S" bending. Blade three was bent aft and exhibited leading edge polishing and chord wise scratches on the cambered face.



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