



ERA20LA039

West Liberty, Kentucky

November 15, 2019

Rans S7 – N831RS

NTSB ENGINE EXAMINATION REPORT

December 17, 2019

PARTICIPANTS IN THE EXAMINATION

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HISTORY OF FLIGHT

On November 15, 2019, about 1535 central standard time, an experimental, amateur-built Rans S7 Courier airplane, N831RS, was substantially damaged during a forced landing to a field in West Liberty, Kentucky. The private pilot was not injured. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan had been filed for the cross-country flight.

ENGINE INFORMATION

Engine Manufacturer: Rotax

Engine Model Number: 582

Engine Serial Number: 5742405

Recent Inspection: November 15, 2018 – Conditional Inspection

Recent Recorded Tachometer Time: 651 hours as of condition inspection, 202.9 hours on engine

Änderungsstand / Modification record				5
Lufttüchtigkeitsanweisung bzw. Änderung: Airworthiness directive or modification:	Ges. Std.: TSN:	Datum: Date:	Unterschrift & LFZ W. Nr.: Signature & Licence no.:	
11-15-18 651.0 Tach 202.9 TTENG Inspected engine per condition inspection. Checked engine controls. Lubricated components. Cleaned air filter. Muffler installed after weld repair by owner. Run up + leak check satisfactory. I certify that this engine has been inspected thru a condition inspection and found to be in safe condition.				
END				

Picture 1. Most Recent Maintenance on Engine

INITIAL EXAMINATION

The engine remained mounted to the airplane and the following was noted:

- The engine remained attached to the airframe through all engine mounts.
- The crankcase remained intact.
- The cylinders remained attached to the crankcase.
- There was no oil in the oil injection tank.
- The propeller remained attached to the engine and the blades were not damaged.
- The propeller could be rotated through 360° of motion by hand.



DETAILED EXAMINATION

Exhaust System

The exhaust system was partially separated from the engine. It exhibited corrosion and was removed for further examination. There were no obstructions in the exhaust system.



Figure 1. View of exhaust system.

Intake System

The air filter was removed from the engine. The filter was not obstructed but did exhibit impact damage.

Cylinders

Compression was observed on both cylinders when rotating the propeller through by hand. The exhaust Y-pipe was removed to examine the interior of the cylinders. The magneto side piston exhibited vertical scoring and had no lubrication. The PTO side piston exhibited a small amount of lubrication and a minor amount of scoring was noted.



Figure 2. Front piston (PTO Side)

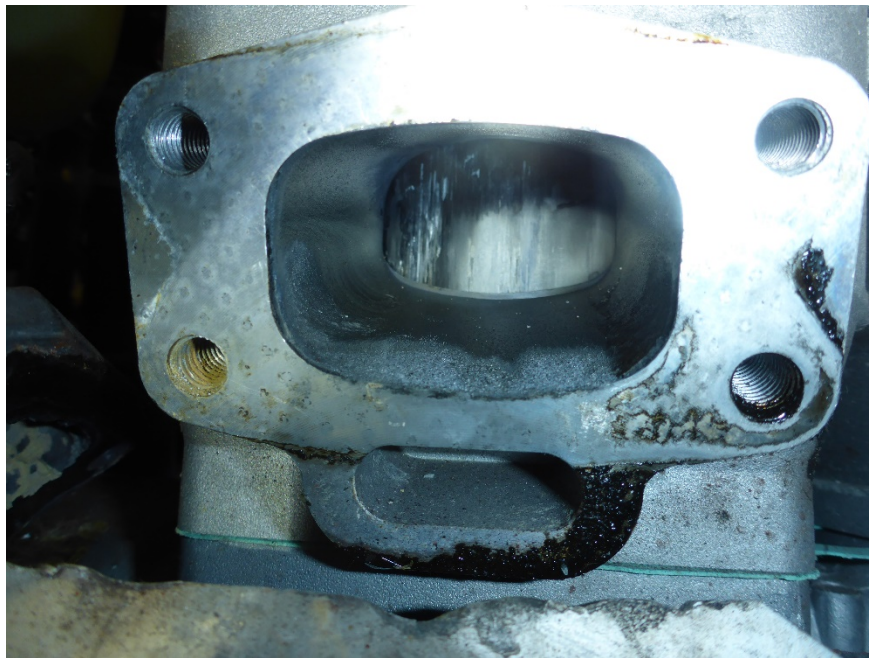


Figure 3. Aft piston (magneto side)

When the propeller was rotated by hand, the rotary valve rotated without anomaly. The rotary valve lubrication tank was about half full.

Spark Plugs

The spark plugs were removed from the engine and exhibited normal wear. They were not oil soaked. The power takeoff (PTO) side No. 2 and magneto side No. 3 spark plugs had removable caps. The PTO No. 1 and Magneto No. 4 spark plugs had non-removable plugs.



Figure 4. View of Spark Plugs

Oil System

The oil injection tank did not contain oil in it. The oil tank was a gravity fed system, and the oil line went slight “uphill” before getting to the engine. The oil tank was not a Rotax product. No

oil leaks or streaking was observed around the oil tank. The oil tank was filled with oil, and no leaks were observed.



Figure 5. View of oil injection tank as found. Note: no oil.

The oil injection port was examined in both carburetors and there was no evidence of excessive oil or pooling was noted.

There was no oil streaking noted on the airframe.



Figure 6. View of underside of airframe. Note: No oil streaks.

Fuel System

The PTO carburetor float bowl was removed and fuel was noted in the bowl. There were no anomalies with the floats. The PTO carburetor main jet was removed and not obstructed. The fuel filter screen was examined, no debris was noted, and was not crushed.



Figure 7. View of PTO Carburetor bowl.

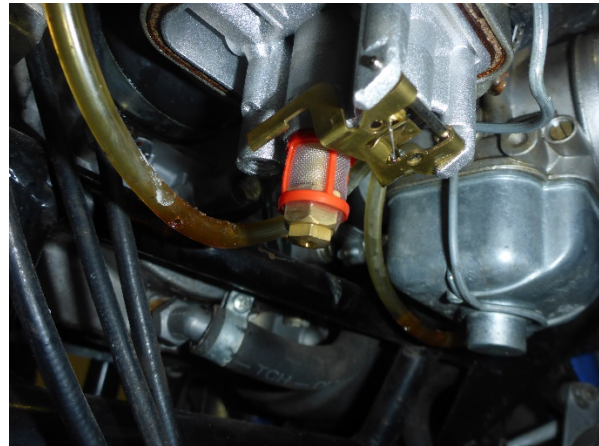


Figure 8. View of PTO Carburetor Fuel Filter Screen.

The magneto side carburetor bowl was removed and fuel was noted in the bowl. There were no anomalies with the floats. The magneto side carburetor main jet was removed and not obstructed. The fuel filter screen was examined, no debris was noted, and was not crushed.

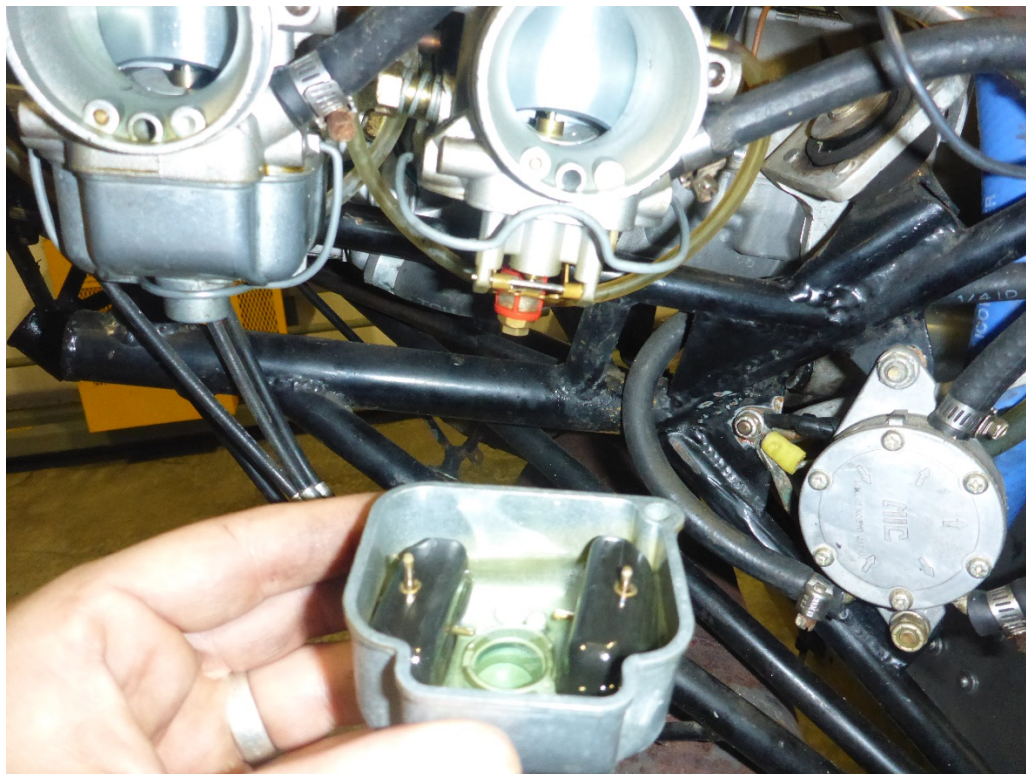


Figure 9. View of aft (magneto) carburetor with fuel filter screen in background.

The gascolator was examined and had a drain valve on it. The Federal Aviation Administration inspectors drained the gascolator on the accident site and noted no debris in the 100LL fuel.

Cooling System

The coolant tank was about half full of coolant. There was a small amount of coolant in the overflow tank.

SUMMARY

The examination revealed that the aft (magneto side) piston seized during flight as a result of lack of lubrication as seen by the vertical scoring on the piston and lack of oil in the oil injection tank.

FUTURE ACTIVITIES

The wreckage will remain in storage at AMF Aviation in Springfield, Tennessee, until it is released by the National Transportation Safety Board IIC.