ROTAX AIRCRAFT ENGINES | BRP

ROTECH FLIGHT SAFETY INC.

Rotech Flight Safety Ltd. [redacted]
Vernon, BC V1H 1M5 Canada
Phone: [redacted]
Website: [redacted]

INVESTIGATION REPORT

ACCIDENT INFORMATION			
Date of accident:	12/19/2015	**NTSB file number:**	ERA16LA076
Location of accident:	Guanica, Puerto Rico	**FAA Inspector:**	Rafael Gonzalez
Location of Investigation:	Lajas Airpark, Puerto Rico	**Law Enforcement:**	Unknown
Investigator In charge:	Heidi Moats	**Corner/Medical Examiner**	N/A
AIRCRAFT INFORMATION			
Aircraft Make:	RANS	**Aircraft registration:**	N124LP
Aircraft Model:	S 12XL	**Aircraft S/N**	Unknown
Propeller make, model & S/N	Wooden 3 blade ground adjustable		
ENGINE INFORMATION			
Engine Type:	Rotax 582 mod 99	**Engine TTSN**	Unknown
Engine Serial Number:	6140712	**Engine TTSOH**	Unknown
Engine Manufacture date:	09/27/2005	**Engine position:**	Pusher
ADDITIONAL INFORMATION			
Persons in attendance:	Rafael Gonzalez -Aviation Safety Inspector– San Juan FSDO		
	Harry Roman – Aviation Safety Inspector – San Juan FSDO		
	Jordan Paskevich – Investigator – Rotech Flight Safety / Rotax		
	Rafael Cortes – Owner/operator of accident aircraft		
Date of Report:	04/13/2016		
RFS File number:	2015-083		

DATE	ENGINE MODEL	ENGINE SERIAL NO	REGISTRATION	File number
12/19/2015	Rotax 582 mod 99	6140712	N124LP	2015-083

NTSB Preliminary

4:54PM On December 19, 2015, about 1120 Atlantic standard time, an experimental amateur-built Rans S-12XL, N124LP, was substantially damaged during a forced landing following a total loss of engine power near Guanica, Puerto Rico.
The sport pilot was not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the flight, which originated from Dr. Hermenegildo Ortiz Quinones Airport (X63), Humacao, Puerto Rico, about 1015, and was destined for Eugenio Maria de Hostos Airport (TJMZ), Mayaguez, Puerto Rico.

The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. According to the pilot, he performed a pre-flight and engine run up with no anomalies noted. He flew the airplane for about an hour before the engine "sounded weird," then began to lose power, until the engine experienced a total loss of power. The pilot unsuccessfully attempted to restart the engine two times using the emergency checklist prior to preforming a forced landing to a field.

During the landing, the airplane incurred substantial damage to the fuselage. A post-accident examination of the engine revealed that there was fuel noted in the fuel tanks, fuel pump, fuel filter, and both carburetors. One spark plug was removed from each cylinder and thumb compression was obtained from all cylinders. However, when the propeller was rotated by hand, a metal scraping sound was heard in the vicinity of the gear box. The engine oil was drained and metal particles were noted in the oil. The engine was retained for further examination.

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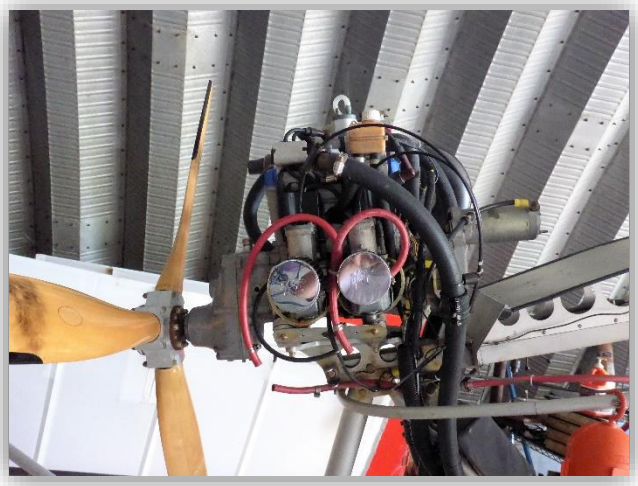
Initial Inspection

The on-site investigation took place on March 16 2016, under the supervision of FAA Airworthiness Inspector, Rafael Gonzalez out of the San Juan PR FAA office. The aircraft wreckage was located in a hanger at the Lajas Airpark in Puerto Rico.

The aircraft suffered impact damage to the landing gear and fuselage. The wings were not attached to the aircraft (previously removed). The aircraft was a pusher configuration with the engine at the back of the fuselage. The engine was found undamaged with the carburetors, exhaust and propeller still attached.



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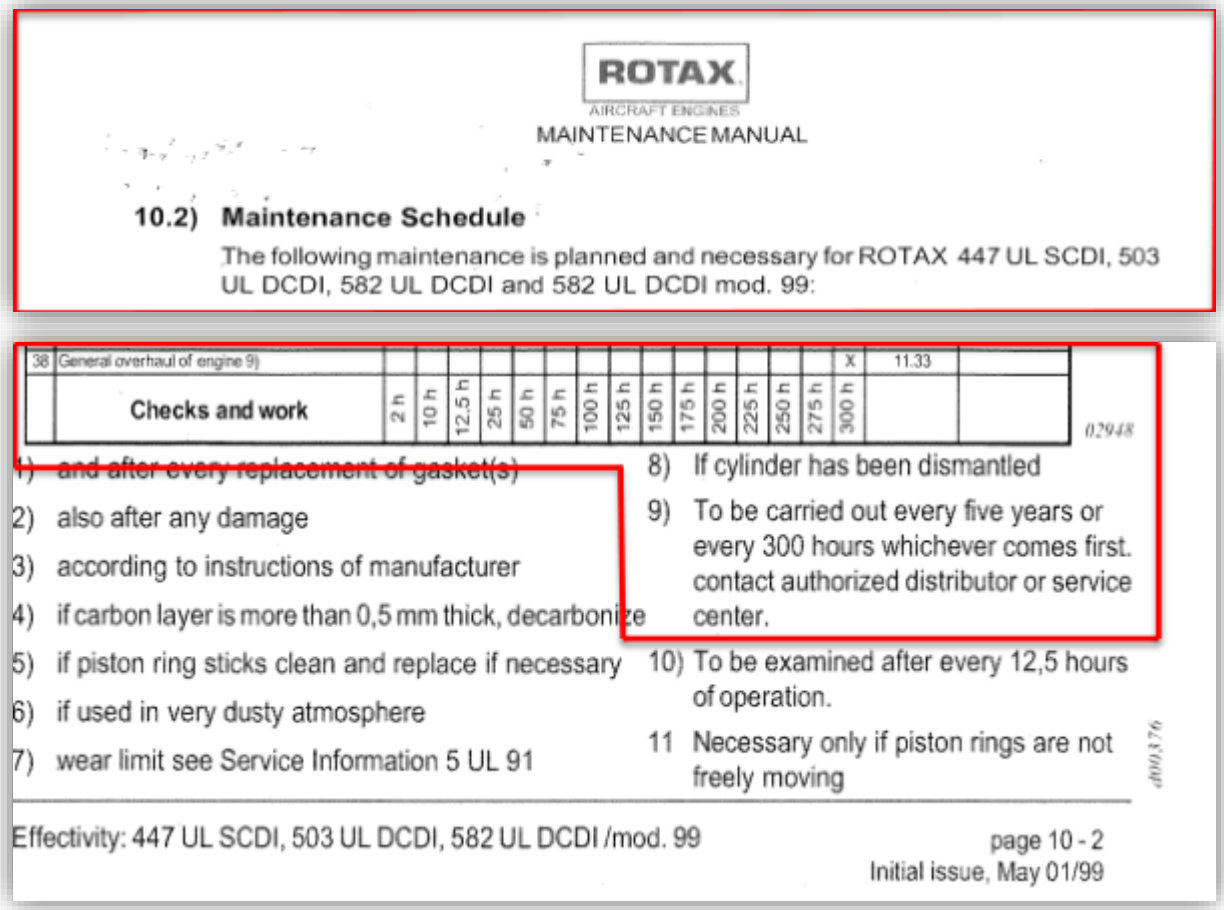
Initial Inspection

The engine that was installed in this aircraft was Rotax 582 Mod 99, with dual carburetors, dual ignition, liquid cooled and electric start. It is a twin cylinder 2 stroke engine with a tuned exhaust, reduction drive gearbox and an oil injection system.
Based on the engine serial number (6140712), this engine was manufactured in September 27, 2005. This would make this Rotax 582 engine over 10 years old. In the Rotax 582 maintenance manual section 10.2**) Maintenance schedule** states the following: “General overhaul of engine to be carried out every five years or every 300 hours whichever comes first”.
The hours on the engine are unknown, but due to calendar time, this engine should have received a minimum of 2 overhauls within its operation life span. Maintenance records that were provided did not indicate an overhaul had ever taken place as per required by the Rotax maintenance schedule.



ROTAX
AIRCRAFT ENGINES
MAINTENANCE MANUAL

10.2) Maintenance Schedule

The following maintenance is planned and necessary for ROTAX 447 UL SCDI, 503 UL DCDI, 582 UL DCDI and 582 UL DCDI mod. 99:

38	General overhaul of engine 9)	2 h	10 h	12.5 h	25 h	50 h	75 h	100 h	125 h	150 h	175 h	200 h	225 h	250 h	275 h	300 h	X	11.33	
	Checks and work																		

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1) ~~and after every replacement of gasket(s)~~
2) also after any damage
3) according to instructions of manufacturer
4) if carbon layer is more than 0,5 mm thick, decarbonize
5) if piston ring sticks clean and replace if necessary
6) if used in very dusty atmosphere
7) wear limit see Service Information 5 UL 91
8) If cylinder has been dismantled
9) To be carried out every five years or every 300 hours whichever comes first. contact authorized distributor or service center.
10) To be examined after every 12,5 hours of operation.
11 Necessary only if piston rings are not freely moving

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Effectivity: 447 UL SCDI, 503 UL DCDI, 582 UL DCDI /mod. 99

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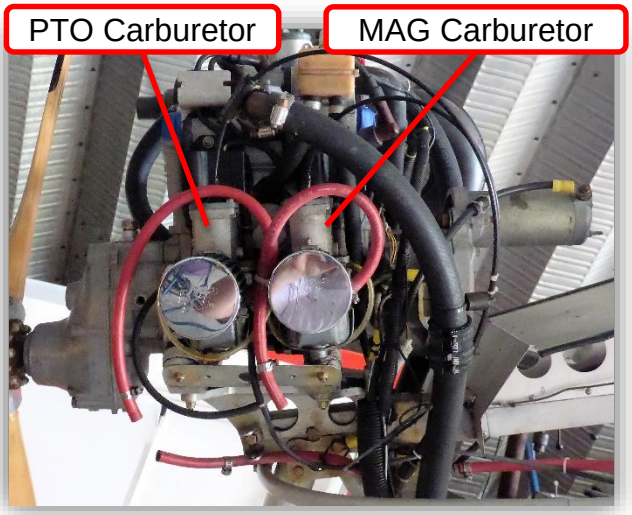
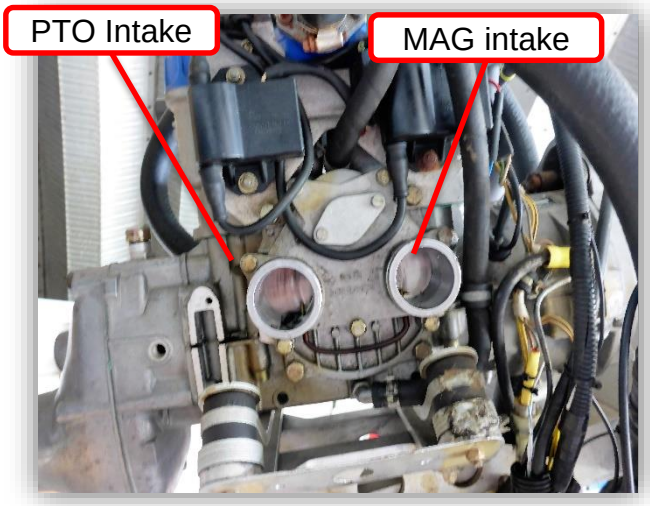
Initial inspection

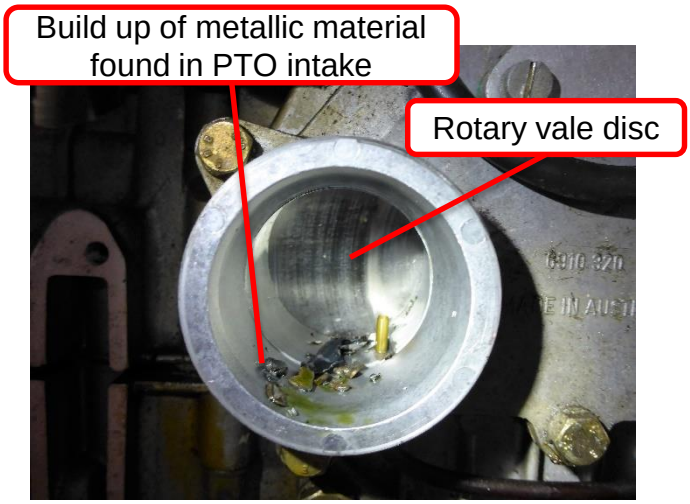
The propeller was rotated by hand to establish continuity. As the propeller was turning a clicking noise could be heard emanating from inside the engine. This clicking noise is not normal and disassembly of the engine was required to determine the source and cause.

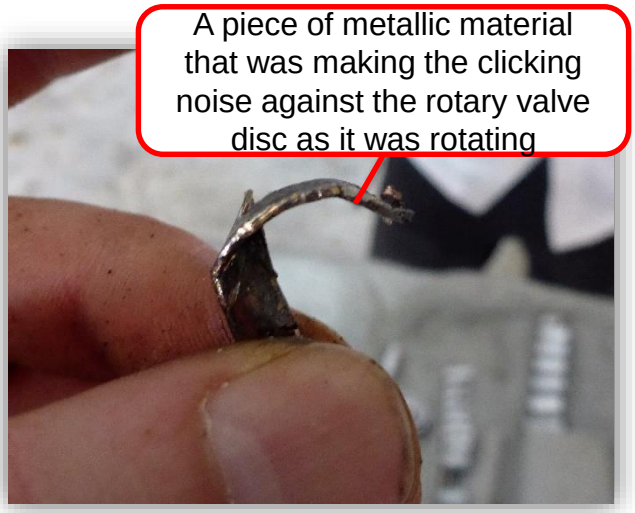
Detailed inspection

Both carburetors were removed to inspect the intake of the engine. The PTO (Power take off) intake had a build up of metallic material contained within and it was making contact with the rotary valve disc, as the engine was rotated. The clicking noise was from the Rotary valve disc making contact with this build up of metallic material.









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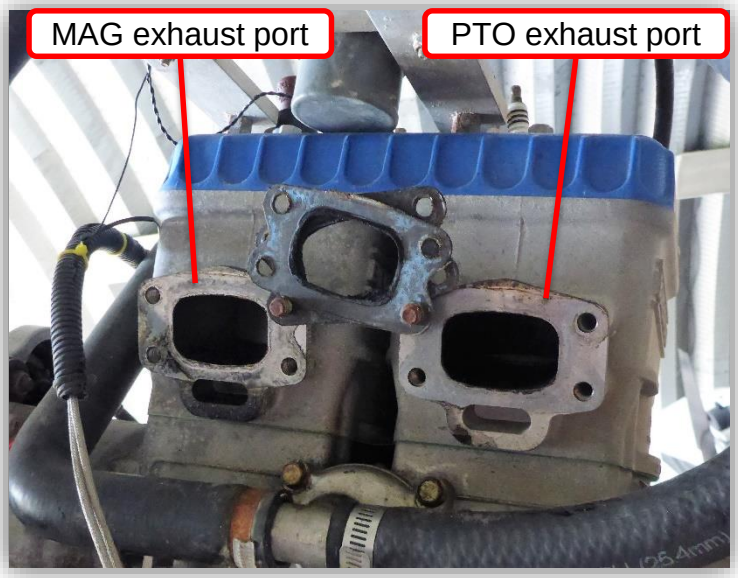
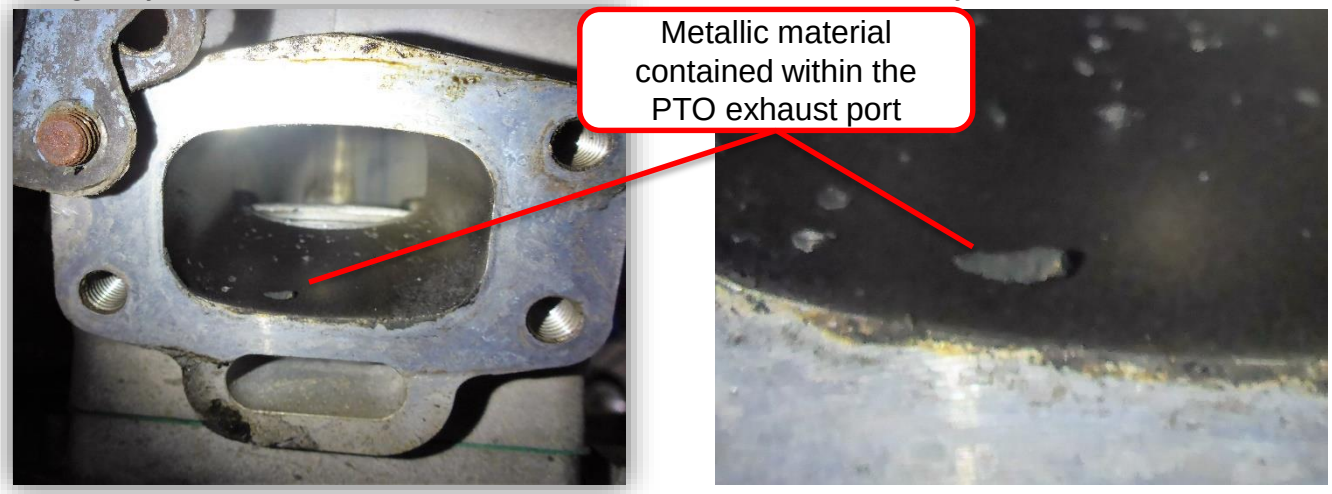
Detailed Inspection

There was no metallic material or any foreign objects found in the MAG side of the intake. This indicated that the metallic material only affected the PTO side of the engine. The exhaust system was removed to determine if the same material was found on the exhaust side of the PTO cylinder.



With the exhaust system removed, examination into the PTO exhaust port showed the same metallic material contained within. This indicated that metallic contamination was throughout the PTO side of the intake, combustion chamber, crankcase and exhaust. No metallic or foreign object material was found on the MAG side of the exhaust system.



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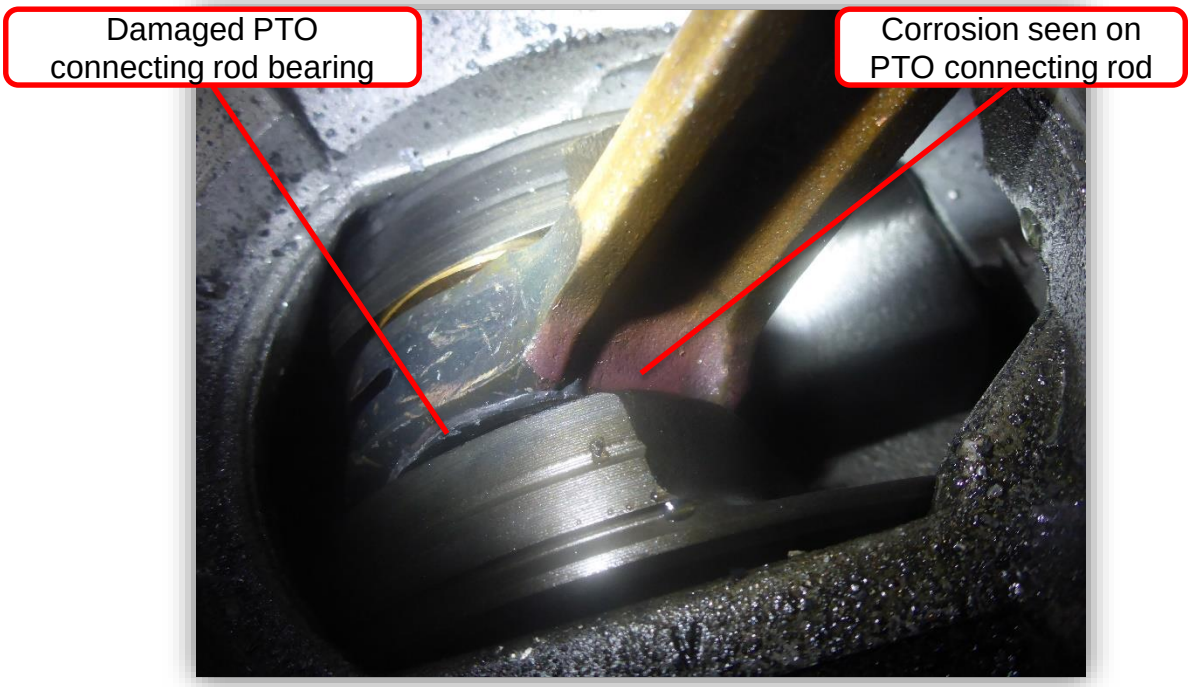
Detailed Inspection

The cylinder head was removed to examine the top of the PTO piston. Impact damage could be seen on the top of the PTO piston. It was determined the impact damage to the piston was caused by the same metallic material found in the intake and exhaust side of the engine.

The PTO cylinder was removed to examine the connecting rod, crankshaft and bearings. With the PTO cylinder removed, corrosion and damage could be seen on the connecting rod and the connecting rod bearing. The damaged connecting rod bearing was made up of the same material that was found contained within the PTO intake manifold.



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Summary

It was discovered that the PTO connecting rod bearing failed and sent metallic shrapnel throughout the PTO side of the engine. It is believed that a piece of this metallic shrapnel made contact and became lodged on the Rotary valve disc, preventing it from rotating and cutting off air and fuel to the engine. This scenario would have caused the engine to loose power and quit running. No other anomalies were found with the engine and installation.

Conclusion

It was concluded the reason for the failed PTO connecting rod bearing was due to corrosion. Evidence of corrosion could be seen on the PTO connecting rod, next to the failed bearing. This engine was required to be overhauled at least 2 times within its operation life span due to calendar time (300 hours or 5 years). An overhaul consists of (but not limited to) a complete tear down of the engine, as well as replacement of all bearings, seals, gaskets crankshaft and piston rings.

Report completed by: Jordan Paskevich, Rotech Flight Safety