



Rotech Flight Safety Ltd. [REDACTED]
Vernon, BC [REDACTED] Canada
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INVESTIGATION REPORT

ACCIDENT INFORMATION

Date of accident:	07/05/2014	NTSB file number:	ERA14LA329
Location of accident:	Gasport NY	FAA Inspector:	Randall E. Steele
Location of Investigation:	Royalton Airport, Gasport, New York	Law Enforcement:	Unknown
Investigator In charge:	Timothy W. Monville	Corner/Medical Examiner	Unknown

AIRCRAFT INFORMATION

Aircraft Make:	FLIGHT DESIGN GMBH	Aircraft registration:	N508CT
Aircraft Model:	CT-SW 2006	Aircraft S/N	Unknown
Propeller make, model & S/N	Unknown		

ENGINE INFORMATION

Engine Type:	Rotax 912 ULS	Engine TTSN	Unknown
Engine Serial Number:	5647162	Engine TTSOH	Unknown
Engine Manufacture date:	2006/09/21	Engine position:	Tractor

ADDITIONAL INFORMATION

Persons in attendance:	Randall E. Steele – Rochester, NY FSDO		
	Robert F. Mahaffey – Jackson, MS FSDO		
	Morris Smith – South Mississippi Engine Services - Rotax		
	Jordan Paskevich – Rotech Flight Safety – Rotax Aircraft Engines		
Date of Report:	November / 2 / 2015		
RFS File number:	2015-028		

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07/05/2014	Rotax 912 ULS	5647162	N508CT	2015-028

NTSB Preliminary

On July 5, 2014, about 1233 eastern daylight time, a Flight Design GMBH CT-SW 2006, N508CT, collided with trees then the ground shortly after takeoff from Royalton Airport, Gasport, New York. The private rated pilot sustained serious injuries and the airplane was substantially damaged.

The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as a personal, local flight. Visual meteorological conditions prevailed at the time and no flight plan was filed. The flight was originating at the time of the occurrence.

According to Federal Aviation Administration (FAA) personnel, witnesses reported the pilot performed an engine run-up at the approach end of runway 7, then back taxied down the runway where he turned around and initiated takeoff from runway 25.

Witnesses reported to FAA personnel that at rotation the airplane appeared to pitch up higher than normal followed by up and down pitch oscillations and left bank oscillations, climbing no higher than approximately 75 feet.

The airplane also began a slow bank to the left, before impacting trees south of the runway in a left wing low attitude.

The airplane came to rest nearly inverted on an easterly heading in a heavily wooded area. Witnesses called 911 to report the accident and the pilot was rescued and transported to a hospital for treatment of his injuries.

Updated on Jul 14 2014 9:40AM

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Initial Inspection

The on-site investigation took place on July 1 2015, under the supervision of FAA Airworthiness Inspector, Randall Steele out of the Rochester NY FAA office. The aircraft wreckage was located in the pilot/owners hanger at the Royalton Airport in Gasport, NY.

The aircraft sustained severe frontal impact damage. The Rotax 912 ULS, S/N 5647162 was still attached to the engine mount but not attached to the airframe.

All three propeller blades were unevenly broken off at the hub. Both carburetors were displaced from there respective intake manifolds and the exhaust muffler was found displaced from the engine. The engine's oil tank was separated from aircraft and found next to wreckage on hanger floor.



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Detailed Inspection

Spark Plugs: The Rotax 912ULS is equipped with 8 spark plugs (two per cylinder). The spark plugs were removed from engine and inspected for condition and conformity.

#1 Top Spark Plug	-NGK DCPR8E (Proper Type) -Good Physical condition -Electrode gap of .022 (Proper gap is .023 – 0.27) -Thermal paste on threads	
#1 Bottom Spark Plug	-NGK DCPR8E (Proper Type) -Good Physical Condition -Electrode gap of .020 (Proper gap is .023 – 0.27) -Thermal paste on threads	
#2 Top Spark Plug	-NGK DCPR8E (Proper Type) -Bent threaded Terminal -Electrode gap of .019 (Proper gap is .023 – 0.27) -Thermal paste on threads	
#2 Bottom Spark Plug	- NGK DCPR8E (Proper Type) - Bent threaded Terminal -Electrode gap of .022 (Proper gap is .023 – 0.27) -Thermal paste on threads	
#3 Top Spark Plug	- NGK DCPR8E (Proper Type) - Bent Threaded Terminal - Electrode gap of .021 (Proper gap is .023 – 0.27) -Thermal paste on threads	
#3 Bottom Spark Plug	-NGK DCPR8E (Proper Type) - Good physical condition - Electrode gap of .021 (Proper gap is .023 – 0.27) -Thermal paste on threads	
#4 Top Spark Plug	-NGK DCPR8E (Proper Type) -Good physical condition -Electrode gap of .023 (Proper minimum gap required) -Thermal paste on threads	
#4 Bottom Spark Plug	-NGK DCPR8E (Proper Type) -Good physical condition -Electrode gap of .022 (Proper gap is .023 – 0.27) -Thermal paste on threads	

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Continuity check & Thumb Compression: With the spark plugs removed, a continuity and thumb compression check was done.

During rotation of the engine by the propeller hub, continuity and thumb compression was felt throughout. Fuel was seen squirting out from the fuel line connected to the fuel pump and oil squirted out of the oil pump lines indicating that these systems were operating.

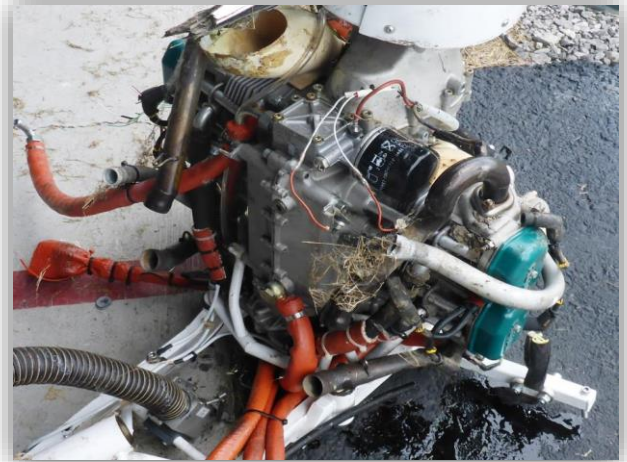
No anomalies were found during the continuity and thumb compression check.

Exhaust system: The 912ULS exhaust system consists of the following:

-4 exhaust pipes from each cylinder.

-1 muffler

The exhaust system was examined for condition, modifications and conformity. The exhaust muffler was found displaced from the exhaust pipes and was found next to the aircraft wreckage. The exhaust muffler was also equipped with a non-Rotax heat shroud for what appeared to be cabin heat. The 4 exhaust pipes were still attached to there respective cylinders and were undamaged. No anomalies were found with the exhaust system.



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Ignition system: The Rotax 912ULS engine is equipped with a dual capacitor discharge ignition system which consists of the following:

- 2 CDI electronic modules
- 4 double ignition coils with cables and connectors
- 4 external triggers
- 1 stator
- 1 magneto flywheel

The ignition system was examined for condition modifications and conformity.

CDI Electronic Modules: No anomalies were found with the CDI electronic modules



Ignition coils and cables: No anomalies were found with the ignition coils and cables.



External Triggers: No anomalies were found with the external triggers.



Stator & Magneto Flywheel: The stator and magneto flywheel are located behind a cover and were not physically examined due to the engine mount blocking access.

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Fuel System: The standard Rotax 912ULS fuel system consists of the following:

- Diaphragm fuel pump fitted on the gearbox that is actuated by an eccentric on propeller shaft
- Fuel rated rubber fire sleeved fuel line that runs from the fuel pump to a distribution block.
- Stainless steel fuel line from distribution block to carburetors
- 2 Bing Constant depression diaphragm carburetors

The fuel system was examined for condition, modifications and conformity.

Fuel Pump: No anomalies were found with the diaphragm fuel pump.

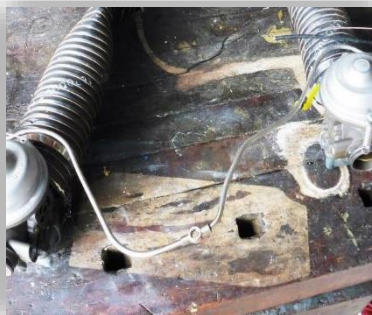
- P/N 893 110
- S/N 12.1814



Rubber Fuel Lines: No anomalies were found with the fuel lines.



Stainless steel fuel line: The stainless steel fuel line was found removed from the distribution block but still attached to both carburetors. No anomalies were found with the stainless steel fuel line.



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Carburetors: The carburetors were found displaced from there intake manifolds but still attached to the stainless steel fuel line. Both carburetors were examined for condition, modification and conformity.



1/3 Carburetor: The 1/3 Carburetor float bowl was removed and examined for fuel contamination. Contamination was found within the 1/3 float bowl underneath the float. No fuel was contained inside.



The main jet was removed and examined for any obstructions and proper size. No obstructions were seen and it was the stock 155 size main jet.



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2/4 Carburetor: The 2/4 Carburetor float bowl was removed and examined for fuel contamination. Contamination was found within the 2/4 float bowl underneath the float. No fuel was contained inside.



The main jet was removed and examined for any obstructions and proper size. No obstructions were seen and it was the stock 155 size main jet.



Other than the contamination found within both the 1/3 and 2/4 Carburetor float bowls, no other anomalies were found.

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Cooling system: The Rotax 912ULS cylinder heads are liquid-cooled. The coolant is pumped by the water pump driven by the camshaft from the radiator to the cylinder heads. The Rotax 912ULS cooling system normally consists of the following:

- Expansion tank
- Overflow bottle
- Radiator
- Water pump
- Rubber Coolant lines

The coolant system was examined for condition, modifications and conformity.

Expansion tank: The expansion tank cap was removed to examine the contents within. No coolant remained within the expansion tank due to a breach in the system from impact. No anomalies were found with the coolant expansion tank.



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Overflow bottle: The coolant overflow bottle was displaced from its original location on the fire wall and was sitting next the aircraft wreckage on the hanger floor. No coolant was seen inside the tank due the system being breached. No anomalies were found with the overflow tank.



Radiator: The radiator was substantially damaged from impact and was found sitting next to aircraft on hanger floor. There was no coolant contained within the coolant radiator due to the system being breached. No anomalies were found with the coolant radiator.



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Water Pump: The Coolant Water Pump was examined for condition and modifications. No anomalies were seen with the Coolant Water Pump. In order to perform a function check, an engine run would be required.



Coolant Lines: The coolant lines were examined for condition. All coolant lines were in good condition with the exception of the lines that connected to the Coolant radiator. The Coolant Radiator lines were breached due to impact damage. No other anomalies were seen with the coolant lines.



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Lubrication System: The Rotax 912ULS is equipped with a dry sump forced flow lubrication system. The standard Rotax oil system consists of the following components:

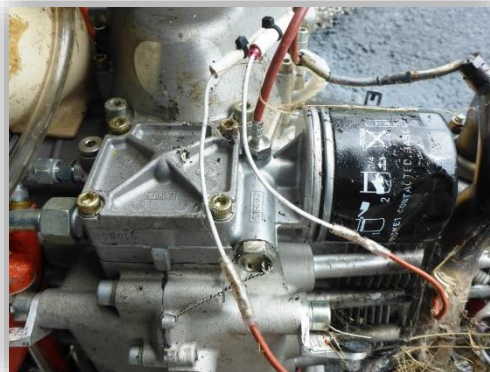
- Dry sump oil Tank
- Trochoid oil pump
- Oil Cooler
- Fire sleeved oil lines
- Oil filter

The lubrication system was examined for condition, conformity and modifications.

Oil Tank: The oil tank was found separated from the engine and firewall. It was sitting next to the aircraft wreckage on the hanger floor. The oil tank was examined and found to be damaged from impact but still contained remnants of oil within. The oil tank still had one of the two oil lines attached. The system however was breached due to impact. No other anomalies were found with the oil tank.



Oil Pump: The Trochoid style oil pump was examined for condition and modifications. No anomalies were found with the oil pump. During rotation of the engine, oil was seen squirting out of one of the breached oil lines. This was an indication that the oil pump was operational. In order to perform a complete function check, an engine run would be required



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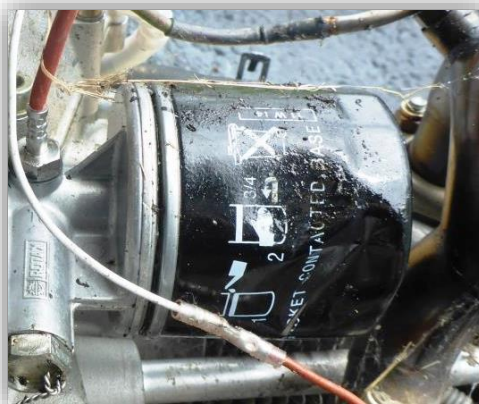
Oil Cooler: The oil cooler was examined for condition, conformity and installation. The oil cooler was in good physical condition and mounted correctly. The oil lines were previously disconnected from the oil cooler causing a breach in the oil system. No further anomalies were found with the oil cooler.



Oil lines: The oil lines were examined for condition and proper type. The oil lines were the proper type but were found disconnected at several locations (prior to this investigation). Some of the oil lines were damaged from impact. No further anomalies were found with the oil lines.



Oil Filter: The oil filter was examined for condition and proper type. The oil filter showed slight impact damage but was the proper ROTAX type filter. No other anomalies were found with the oil filter.



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Preparation For Engine Test Run

It was determined that the engine was in good physical and mechanical condition, and an engine test run could be accomplished. A test run was deemed necessary to determine the operation of certain engine components and to verify running condition.

In order for a proper engine test run, the engine would have to be relocated to a Rotax service facility with an engine test stand and a calibrated propeller.

The engine was shipped to South Mississippi Light Aircraft (SMLA) in Lucedale Mississippi and a test run was scheduled for August 13 2015 under the oversight of FAA Air Safety Investigator, Robert F. Mahaffey out of the Jackson, MS FSDO. A Mr. Morris Smith who is an employee of (SMLA) was also present to help assist with the engine test run.

The engine was removed from the shipping crate and mounted on a engine test stand. A calibrated propeller was installed on the engine propeller shaft and the carburetors were re-installed. All oil lines, fuel lines, coolant lines and engine controls were connected to the engine from the test stand. All fluids were replaced with new and the oils system was purged of all air. All gauges were connected and the engine was ready for a test run.



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Engine Test Run

With the engine mounted and all systems connected to the engine test stand, both Mag switches were turned on. The starter was then engaged and the engine rotated and started within a few rotations.

Oil pressure was noticed on the gauge and the throttle was set to 2200 RPM. A mag check was done and the normal 100 RPM drop was noticed on both A and B magnetos when selected. The RPM was then increased to 3400 RPM for a few seconds and ran at that setting with no anomalies noted.

The engine RPM was then increased to 5600 RPM (Full RPM) and ran without anomalies. The RPM was then manipulated with the throttle level control to check throttle response. A quick throttle response was noticed and the engine ran without hesitation.

The engine throttle RPM was then manually lowered down to 2200 RPM and the engine was manually shut down by turning off the mag switches.

Several engine test runs were completed without any anomalies noted.

A video was taken of the first engine start, test run and shut down sequence.

Conclusion

Other than slight contamination found in carburetor float bowls and improper spark plug gap on several spark plugs, No mechanical anomalies were found during the initial inspection of the engine that was conducted at the pilot/owners hanger on July 1 2015, under the supervision of FAA Airworthiness Inspector, Randall Steele out of the Rochester NY FAA office.

No mechanical anomalies were found during the engine test run that was conducted at South Mississippi Light Aircraft (SMLA) on August 13 2015 under the oversight of FAA Air Safety Investigator, Robert F. Mahaffey out of the Jackson, MS FSDO.