

Report of Findings

Date of accident: September 10 2020
Location of accident: Niota, TN USA
Aircraft registration: N56906
Aircraft type: Quad City Challenger 11
Engine type and S/N: Rotax 582 Mod 90 S/N 4015286
NTSB file number: ERA20LA312
Date of Report: October 26 2020
File number: 2020-053

Original Accident Location.

- Niota, Tennessee USA

Preliminary engine inspection

Inspection carried out at: Hanger at the West Wind Airpark Airport Niota, TN

Date of inspection: October 26, 2020

Persons in attendance

Oversight by: David L. Robinson FAA Aviation Safety Inspector

ENGINE

Rotax Engine Model Number: Rotax 582 Mod 90

Rotax engine serial number: 4015286

Rotax Production Date: 24.06.1991

OVERVIEW:

- See NTSB Preliminary Report

Initial condition of Engine as presented prior to detailed inspection

- The aircraft sustained substantial damaged from the post impact and post impact fire.
- The Rotax 582 Mod 90 engine was still attached to the engine mount.
- 3 blade composite propeller was damaged from impact and post impact fire. 2 of the 3 propeller blades were broken off approximately 12" from the propeller hub. The one remaining attached propeller blade was damaged and fractured approximately 12" from the propeller hub.
- The engine had an aftermarket belt drive reduction system that is normally found on Challenger aircraft.
- Both carburetors were displaced from there respective intake sockets. The displaced carburetors were due to the impact and post impact fire damage
- The rubber carburetor sockets were fire damaged and mostly consumed by the post impact fire.
- The electrical and ignition systems were fire damaged and partially consumed by the post impact fire.
- The coolant hoses were fire damaged and mostly consumed by the post impact fire.
- The exhaust system was still intact and attached to the engine.

Detailed Engine Inspection

Spark Plugs & Spark plug Caps

- The 4 spark plug caps were fire damaged and partially consumed by the post impact fire.
- The #1 PTO (Power take-off) spark plug suffered impact damage. The spark plug was an NGK R BR8ES with removable resistor cap. The spark plug electrode was white in color and appeared in good overhaul condition. The spark plug gap was 0.20"
- The # 2 PTO (Power Take-off) spark plug suffered impact damage. The spark plug was an NGK R BR8ES with removable resistor cap. The spark plug electrode was white in color and appeared in good overhaul condition. The spark plug gap was 0.19"
- The # 3 MAG (Magneto) spark plug was in good physical condition. The spark plug was an NGK R BR8ES with removable resistor cap. The spark plug electrode was white in color and appeared in good overhaul condition. The spark plug gap was 0.20"
- The # 4 Mag (Magneto) spark plug suffered slight impact damage. The spark plug was an NGK R BR8ES with removable resistor cap. The spark plug electrode was white in color and appeared in good overhaul condition. The spark plug gap was 0.17"

Ignition System

The ignition system was substantially fire damaged and mostly consumed by the post impact fire. The ignition system could not be functionally tested.

The ignition modules were relocated from their original positions and placed onto the air frame several feet away from the engine. The ignition modules were fire damaged and blistered from the excessive heat from the post impact fire.

Fuel System including carb inspection and fuel lines

The fuel system and fuel lines were fire damaged and mostly consumed by the post impact fire.

The PTO (power take-off) carburetor was displaced from the engine- The carburetor was fire damaged, and the float bowl was no longer attached to the carb. The main jet was clear of any obstructions. No anomalies were seen with the PTO carburetor.

The MAG (Magnet) carburetor was displaced from the engine- The carburetor was fire damaged, and the float bowl was no longer attached to the carb. The main jet was clear of any obstructions. No anomalies were seen with the MAG carburetor.

The aircraft was equipped with an aftermarket automotive electric fuel pump. The fuel pump was damaged by the post impact fire and could not be tested for functionality.

Lubrication system

The owner/operator was required to pre-mix fuel and oil for the Rotax engine as the injection system was not installed.

The Rotary valve lubrication system was fire damaged and mostly consumed by the post impact fire.

Cylinder and cylinder head

The exhaust Y pipe was removed so the sides of the PTO and Mag Pistons could be examined for condition and signs of metal transfer or seizure marks. No signs of metal transfer or seizure marks were observed between the cylinders and pistons.

The cylinder head and cylinders were removed and examined. No anomalies seen with either the cylinder head, pistons, piston rings or cylinders.

The pistons had a what appeared to be a build up of lead on the crown which indicated the engine was running 100LL Avgas.

Rotary Valve

The rotary valve was inspected through the intake system. No anomalies were seen with the rotary valve system.

Cooling system

The coolant hoses were consumed by the post impact fire and the coolant system was fire damaged. The coolant radiators were examined and found displaced from the aircraft and slightly damaged from impact. No anomalies were seen with the coolant system.

Air Filter system

The air filters were consumed by the post impact fire and were not available for examination.

Exhaust system

The exhaust system was removed from the engine and examined. The exhaust system sustained minor impact damage but was complete and unmodified. No anomalies were seen with the exhaust system

Gearbox

An aftermarket belt drive reduction system was installed on this aircraft. The belt drive was fire damaged and mostly consumed by the post impact fire.

Crankcase and crankshaft

The crankcase was intact and undamaged. The crankshaft was examined for condition and corrosion. Corrosion was found next to the PTO connecting rod; however, this corrosion could have formed post impact as the engine was subjected to a post impact fire and fire extinguishing agent was used on the aircraft. This extinguishing agent could have entered the engine and caused corrosion to take place. Corrosion normally causes damage to crankshaft and connecting rod bearings that can result in a catastrophic failure. No failure of these bearing components was observed.

Engine Maintenance and Journey Log:

Not available for examination.

The Rotax 582 engine has either a 300hr OR 5-year TBO. It is unknown the operating hours on the engine, however the engine was manufactured on June 24th, 1991, and was 29 years old. This engine should have received a minimum of 5 overhauls during its life span. No records indicate the engine ever received an overhaul