Aviation Investigation Final Report

Location:	Cedar Creek, Missouri	**Accident Number:**	CEN23LA261
Date & Time:	June 23, 2023, 10:00 Local	**Registration:**	UNREG
Aircraft:	Quad City Challenger	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

On the day before the accident, the pilot reported that he drained the fuel and replaced it with new fuel, replaced the fuel filter, and checked all fluid levels and lines; the airplane had not flown since October 2021. The pilot reported that on the day of the accident, he flew the airplane for about 20 minutes and then returned to pick up a passenger. On the second flight, the airplane's engine lost power after flying about 10 minutes. During the forced landing, the airplane impacted trees and terrain which resulted in substantial damage to both wings and the fuselage.

A postaccident examination of the airplane and engine were performed at the pilot's residence. The examination of the engine revealed oil around the power take-off (PTO) piston and cylinder head. The PTO piston displayed signatures consistent with seizure. A piece of old, brittle oil injection line was discovered near the oil injection pump and the fuel, primer, and vent lines were also found in an aged and hardened state. Given the evidence, the PTO piston likely failed due to a lack of oil as a result of the poorly maintained lubrication system, which resulted in a loss of engine power.

There were no maintenance records for the airplane and according to the pilot, the hoses had not been replaced since 2009. The engine manufacturer's maintenance manual states that all lubrication system hoses must be replaced every 5 years.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A seizure of the power takeoff piston due to inadequate maintenance to the lubrication system, which resulted in a lack of oil lubrication and subsequent engine failure.

Findings

Personnel issues	Scheduled/routine maintenance - Pilot
Personnel issues	Lack of action - Pilot
Aircraft	Oil - Not serviced/maintained
Aircraft	Recip eng oil sys - Damaged/degraded

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)

On June 23, 2023, at about 1000 central daylight time, an unregistered Quad City Challenger II airplane was substantially damaged when it was involved in an accident near Cedar Creek, Missouri. The pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated that the airplane had not been flown since October 2021. On the day before the accident, he drained the fuel and replaced it with new fuel, replaced the fuel filter, and checked all fluid levels and lines. On the day of the accident the pilot flew the airplane for about 20 minutes and then landed to pick up the passenger. After takeoff, he flew for about 10 minutes when the engine sputtered, and the engine performance degraded despite his advancing the throttle. The pilot executed a forced landing to a field, impacted trees, and substantially damaged the wings and fuselage.

A postaccident examination of the airplane and engine were performed at the pilot's residence. During the examination, it was noted that the exterior of the engine was covered in oil, particularly concentrated near the power take-off (PTO) piston and cylinder head. A blue oil coating was also evident on the side of the aircraft consistent with the color of the injected oil. The oil injection lines appeared to be in pristine, unused condition and were lacking securing clamps. However, a piece of old, brittle oil injection line was discovered near the oil injection pump, and the fuel, primer, and vent lines were also found in an aged and hardened state.

The magneto piston, cylinder, and combustion chamber appeared to be in normal condition with no anomalies found. However, the PTO piston exhibited vertical scoring, and metal transfer marks were observed on the corresponding locations of the cylinder wall. The transfer of metal was indicative of a piston seizure.

According to the pilot, when he purchased the airplane in 2008, there were no maintenance records available. In 2009, he installed new fuel lines and fuel pump, rebuilt the carburetor, replaced the spark plugs, safety wires, brake lines, wheel innertubes, checked cylinder compressions, drained old fuel, and replaced the trim tab. There was no maintenance performed after 2009 other than annual fuel filter replacement. According to the Rotax maintenance manual for the 582 UL engine, all hoses of the lubrication system must be replaced every 5 years.

Pilot Information

Certificate:	Sport Pilot	**Age:**	61,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Sport pilot None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 31, 2009
Flight Time:	230 hours (Total, all aircraft), 230 hours (Pilot In Command, all aircraft), 1 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Quad City	**Registration:**	UNREG
Model/Series:	Challenger II	**Aircraft Category:**	Airplane
Year of Manufacture:	1995	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental light sport (Special)	**Serial Number:**	unknown
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	Condition	**Certified Max Gross Wt.:**	800 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	700 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	Not installed	**Engine Model/Series:**	582
Registered Owner:	On file	**Rated Power:**	65 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None
Operator Does Business As:	On file	**Operator Designator Code:**	NA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KBBG,1303 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	09:45 Local	**Direction from Accident Site:**	258°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	25°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Cedar Creek, MO	**Type of Flight Plan Filed:**	None
Destination:	Cedar Creek, MO	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	36.57,-92.99(est)

Administrative Information

Investigator In Charge (IIC):	Abraham, Laura
Additional Participating Persons:	Jordan Paskevich; Rotech Motor Ltd Tom Davis; FAA; Kansas City, MO
Original Publish Date:	May 14, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=192453