



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Houghton Lake, Michigan	<b>Accident Number:</b>	CEN18LA280
<b>Date &amp; Time:</b>	July 8, 2018, 06:43 Local	<b>Registration:</b>	N4329R
<b>Aircraft:</b>	Best Off Skyranger	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	1 Serious
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot was conducting a local private flight when the airplane had a sudden loss of engine power shortly after takeoff. The pilot reported that after an uneventful takeoff, as the airplane climbed through 150 ft above ground level, the engine speed rapidly decreased from 6,200 rpm to 4,700 rpm. Despite the pilot's corrective actions, the engine continued to operate at a decreased power setting and the airplane was unable to maintain altitude. The pilot reported that there were trees ahead of the airplane's flight path, so he turned into the wind and maneuvered to land on a nearby golf course fairway. The pilot stated that the airplane had insufficient altitude and airspeed to flare normally, which resulted in a hard landing and substantial damage to both wings and the empennage.

The pilot reported that he did not observe any anomalies during his preflight inspection or his before-takeoff engine runup, and that the fuel tank contained about 12 gallons of automotive fuel. A postaccident engine examination did not reveal any evidence of mechanical malfunctions or failures that would have precluded normal operation during the flight. Although the atmospheric conditions were conducive for the formation of carburetor icing, the airplane's engine was equipped with carburetors with a variable-venturi design that are generally not prone to carburetor icing. Therefore, the reason for the partial loss of engine power could not be determined with the available evidence.

## Probable Cause and Findings

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

A partial loss of engine power during takeoff for undetermined reasons.

## Findings

<b>Not determined</b>	(general) - Unknown/Not determined
-----------------------	------------------------------------

# Factual Information

## History of Flight

Takeoff	Loss of engine power (partial) (Defining event)
Landing	Off-field or emergency landing
Landing	Hard landing

On July 8, 2018, about 0643 eastern daylight time, a Best Off Skyranger experimental light-sport airplane, N4329R, was substantially damaged when it was involved in an accident at Houghton Lake State Airport (5Y2), Houghton Lake, Michigan. The pilot sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he did not observe any anomalies with the airplane or its engine during the preflight inspection or the before-takeoff engine run-up. The fuel tank contained about 12 gallons of automotive fuel before the flight. The pilot reported that the takeoff roll, rotation, and initial climb from runway 16 were uneventful; however, as the airplane climbed through 150 ft above ground level, the engine speed rapidly decreased from 6,200 rpm to 4,700 rpm. He verified that the throttle was full forward, the ignition switch was selected to both, the fuel valve was open, and that available fuel was in the tank. The pilot also turned on the electric fuel pump. Despite the pilot's corrective actions, the engine continued to operate at a decreased power setting, and the airplane was unable to maintain altitude. The pilot reported that there were trees ahead of the airplane's flightpath, so he made a turn into the wind and maneuvered to land on a nearby golf course fairway. The pilot stated that the airplane had insufficient altitude and airspeed to flare normally, which resulted in a hard landing on the fairway.

A postaccident wreckage examination was completed by a Federal Aviation Administration (FAA) airworthiness inspector. The FAA inspector reported that both wings and the empennage sustained substantial damage during the forced landing. The Rotax 582 engine did not exhibit any crankcase or cylinder fractures, and there were no oil/fluid leaks observed on the exterior engine components. The firewall-mounted oil reservoir contained ample engine oil. The three-blade propeller remained attached to the engine and exhibited blade damage consistent with rotation at impact. Two spark plugs, one from each cylinder, were removed and exhibited normal wear signatures. The remaining two spark plugs were damaged during the accident and were not removed.

Both carburetors had separated from their respective induction tubes during impact; however, both carburetor throttle arms remained attached to the control cable that was continuous to the cockpit throttle. A partial disassembly of both carburetors revealed ample

automotive fuel in their respective bowls. No contamination was observed in the carburetor bowls or the fuel screens. The FAA inspector rotated the propeller by hand and confirmed mechanical continuity of the internal drivetrain components of the engine. The dual electronic ignition system appeared undamaged and was not tested. The postaccident examination did not reveal any evidence of a mechanical malfunction that would have precluded normal engine operation during the flight.

According to a carburetor icing probability chart contained in FAA Special Airworthiness Information Bulletin CE-09-35, entitled "Carburetor Icing Prevention", the recorded temperature and dew point were in the range of susceptibility for the formation of carburetor icing. The bulletin notes that if ice forms in the carburetor of a fixed-pitch propeller aircraft, the restriction to the induction airflow will result in roughness in engine operation and a drop in engine speed.

The airplane was not equipped with a carburetor heat system; however, the engine was equipped two variable-venturi sliding carburetors (e.g. sliding carburetors) that are generally not prone to carburetor icing, according to Aircraft Powerplants, Fifth Edition by Bent/McKinley.

## Pilot Information

<b>Certificate:</b>	Sport Pilot	<b>Age:</b>	44, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Sport pilot None	<b>Last FAA Medical Exam:</b>	
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	February 5, 2018
<b>Flight Time:</b>	(Estimated) 45.3 hours (Total, all aircraft), 7 hours (Total, this make and model), 12 hours (Pilot In Command, all aircraft), 7 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Best Off	<b>Registration:</b>	N4329R
<b>Model/Series:</b>	Skyranger No Series	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2002	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental light sport (Special)	<b>Serial Number:</b>	481
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	April 7, 2018 Condition	<b>Certified Max Gross Wt.:</b>	1150 lbs
<b>Time Since Last Inspection:</b>	8.4 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	292.7 Hrs at time of accident	<b>Engine Manufacturer:</b>	Rotax
<b>ELT:</b>	C91A installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	582
<b>Registered Owner:</b>		<b>Rated Power:</b>	65 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	HTL,1150 ft msl	<b>Distance from Accident Site:</b>	6 Nautical Miles
<b>Observation Time:</b>	06:53 Local	<b>Direction from Accident Site:</b>	71°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	8 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	200°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.32 inches Hg	<b>Temperature/Dew Point:</b>	17°C / 10°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Houghton Lake, MI	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Houghton Lake, MI	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Houghton Lake State 5Y2	<b>Runway Surface Type:</b>	Grass/turf
<b>Airport Elevation:</b>	1165 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	16	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	2750 ft / 104 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious	<b>Latitude, Longitude:</b>	44.32611,-84.78833(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Fox, Andrew		
<b>Additional Participating Persons:</b>	Michael W Matthews; Federal Aviation Administration, Grand Rapids FSDO; Grand Rapids, MI		
<b>Original Publish Date:</b>	May 27, 2021	<b>Investigation Class:</b>	3
<b>Note:</b>	The NTSB did not travel to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=97817">https://data.nts.gov/Docket?ProjectID=97817</a>		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).