Aviation Investigation Final Report

Location:	Piscataquis County, Maine	**Accident Number:**	ERA14LA446
Date & Time:	September 19, 2014, 16:30 Local	**Registration:**	N180GK
Aircraft:	Cessna 180B	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that, while maneuvering the float airplane about 2,500 ft above ground level, he heard a "slight squeal" coming from the engine before it started to sputter. After the airplane had descended to about 1,500 ft, the engine and propeller "completely stopped." The pilot determined that the airplane would not reach a nearby lake and chose an unpaved road in the woods for the forced landing. The right wing struck a tree about 60 ft above the ground, and the airplane then impacted the road, which resulted in substantial damage to the wings, fuselage, and empennage.

Examination of the engine revealed that the crankshaft could be rotated freely by hand, and removal of the oil sump revealed piston material and the No. 3 exhaust valve head, which was fractured at the stem below the head. Disassembly of the engine revealed normal wear and appearance on all of the cylinders except for the No. 3 cylinder, piston, and exhaust valve. Metallurgical examination of the No. 3 exhaust valve revealed that the fracture had initiated at the outer surface of the valve stem and that the valve had fractured due to fatigue at the transition of the stem to the valve.

Probable Cause and Findings

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

The fatigue fracture of the No. 3 exhaust valve, which initiated at the outer surface of the valve stem and resulted in the subsequent total loss of engine power over terrain unsuitable for landing.

Findings

Environmental issues	Tree(s) - Contributed to outcome
Aircraft	Recip eng cyl section - Fatigue/wear/corrosion
Aircraft	Recip eng cyl section - Failure

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Emergency descent	Collision with terr/obj (non-CFIT)

On September 19, 2014, at 1630 eastern daylight time, a float equipped Cessna 180B, N180GK, was substantially damaged during a forced landing following a total loss of engine power, while maneuvering near Piscataquis County, Maine. The private pilot/owner and passenger sustained minor injuries. Visual meteorological conditions prevailed, and no flight plan was filed for the flight that departed Mud Pond, Maine about 1530. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

In a telephone conversation with a Federal Aviation Administration (FAA) aviation safety inspector, the pilot said that he was maneuvering about 2,500 feet north of Lake Ross, Maine when he heard a "slight squeal" from the engine before it started to sputter. About 1,500 feet during the subsequent descent, the engine and propeller "completely stopped."

The pilot determined the airplane would not reach Lake Ross, and selected an unpaved road in the woods for the forced landing. The right wing struck a tree about 60 feet above the ground, and the airplane impacted the road, resulting in substantial damage to the wings, fuselage, and empennage.

The pilot held a private pilot certificate with ratings for airplane single-engine land and sea. His most recent FAA third class medical certificate was issued May 27, 2014. The pilot reported 1,200 total hours of flight experience, of which 950 hours were in the accident airplane make and model.

The airplane was manufactured in 1959, and its most recent annual inspection was completed May 24, 2013, at 4,013 total aircraft hours. A Continental O-470K33 remanufactured engine was installed in the airplane on August 20, 2005 and the engine had accrued 605 hours since that date.

The wreckage was recovered to a maintenance facility where a cursory examination of the engine was performed. There was no external damage, but a borescope examination of the No. 3 cylinder revealed that the exhaust valve was fractured at the stem and the top of the No. 3 piston was damaged. The engine was retained for further examination.

On October 27, 2014, the engine was examined under the supervision of an FAA aviation safety inspector at the manufacturer's facility in Mobile, Alabama.

The crankshaft "freely" rotated by hand, and removal of the oil sump revealed "piston material" and what was identified as the No. 3 exhaust valve head, which was fractured at the stem below the head. Disassembly of the engine revealed normal wear and appearance on all cylinders with the exception of the No. 3 cylinder, piston, and exhaust valve.

The magnetos were tested, and both produced spark at all terminal leads.

The fractured exhaust valve head, stem, and rotocoil were submitted to the manufacturer's engineering department for metallurgical examination. The report prepared by the manufacturer stated that the valve fractured at the transition of the stem to the valve, also exhibited post separation damage. The fracture initiated at the outer surface of the valve stem and grew in fatigue.

An NTSB metallurgist reviewed the reports generated by these exams, and concurred with their findings.

Pilot Information

Certificate:	Private	**Age:**	59
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 27, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1200 hours (Total, all aircraft), 950 hours (Total, this make and model), 70 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N180GK
Model/Series:	180B	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	50509
Landing Gear Type:	Tailwheel; Float	**Seats:**	
Date/Type of Last Inspection:	May 24, 2014 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	42 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4013 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	O-470 SERIES
Registered Owner:	NORRIS GARY L	**Rated Power:**	0 Horsepower
Operator:	NORRIS GARY L	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PQI,534 ft msl	**Distance from Accident Site:**	74 Nautical Miles
Observation Time:	16:15 Local	**Direction from Accident Site:**	84°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.31 inches Hg	**Temperature/Dew Point:**	11°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Mud Pond, ME	**Type of Flight Plan Filed:**	None
Destination:	Lake Ross, ME	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	44.694858,-69.382583(est)

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	Paul Hubbard; FAA; Portland, ME
Original Publish Date:	September 24, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90113