



Aviation Investigation Final Report

Location:	Anchorage, Alaska	Accident Number:	ANC14LA071
Date & Time:	August 31, 2014, 18:00 Local	Registration:	N93E
Aircraft:	DEHAVILLAND DHC 2	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	1 Minor, 3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that, just after takeoff while the airplane was about 100 ft above ground level, the engine lost all power. He attempted to restart the engine but was unsuccessful. He subsequently made a forced landing in an area of densely populated trees. During postaccident bench testing, the engine-driven fuel pump produced widely inconsistent fuel flow rates. Disassembly of the pump revealed that the oil seal on the spline driver shaft was split and that it was protruding through the opening in the thrust washer. The engine oil seal was not found inside the pump. It could not be determined whether the seal had ever been installed or if the seal had deteriorated inside the housing. The seal housing and pump bearings were dirty, and numerous pieces of foreign matter were noted within the seal and pump housing. Based on the evidence, it is likely that the fuel pump malfunctioned and caused a disruption of adequate fuel to the carburetor, which resulted in a loss of engine power.

Probable Cause and Findings

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

The loss of engine power during takeoff due to a malfunction of the engine-driven fuel pump.

Findings

Aircraft

Fuel pump - Malfunction

Factual Information

History of Flight	
Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

On August 31, 2014, about 1800 Alaska daylight time, a deHavilland DHC-2 "Beaver" airplane, N93E, was substantially damaged during a collision with trees and terrain following a loss of engine power during takeoff from Lake Hood Strip, Anchorage, Alaska. Of the four people on board, one passenger received minor injuries and the private pilot and two additional passengers were not injured. The flight was being operated as a visual flight rules (VFR) personal flight under the provisions of 14 Code of Federal Regulations Part 91 when the accident occurred. Visual meteorological conditions prevailed and no flight plan was filed for the flight destined for a hunting camp approximately 30 miles west of Anchorage.

In a written statement to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) following the accident, the pilot stated he was making a second trip to camp that day when the engine lost power after takeoff at an altitude of about 100 feet above ground level. He unsuccessfully attempted to restart the engine, and made a forced landing in an area of densely populated spruce trees. During the forced landing the airplane sustained substantial damage to the fuselage, wings, and horizontal stabilizer.

The engine and airframe were examined by the NTSB IIC at the facilities of Alaska Aircraft Sales on September 4. No airframe anomalies were noted that would have precluded normal operation. The engine was examined, and all the internal components were intact and functional. The magnetos, carburetor, and engine driven fuel pump were removed from the engine for further examination.

On December 4 and again on January 14, 2015, the NTSB IIC, along with another NTSB investigator examined the removed engine accessories at the facilities of Alaskan Aircraft Engines. The magnetos and carburetor were tested with no anomalies noted. The engine driven fuel pump was tested on two separate test benches, and run through a variety of RPM/Fuel Flow/Fuel Pressure tests. Fuel flow results from the various tests revealed widely inconsistent flow rates under the same test conditions. A control fuel pump was also tested on the same equipment, with consistent results in fuel flow.

The pump was disassembled and several anomalies were noted. The spline driver oil seal on the spline driver shaft was split, and was protruding through the opening in the spline driver thrust washer. The engine oil seal was not found inside the pump. It is unknown if the engine oil seal was installed, or if the ring itself deteriorated inside the housing. The overall appearance of the seal housing and pump bearings were dirty and numerous pieces of foreign matter were noted within the seal and pump housing.

The fuel pump was installed on the airplane on November 1, 2000, and the engine had accrued about 520 hours of operation since the install.

Pilot Information

Certificate:	Private	Age:	52
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:	July 2, 2014
Occupational Pilot:	No	Last Flight Review or Equivalent:	July 8, 2013
Flight Time:	1013.5 hours (Total, all aircraft), 592 hours (Total, this make and model), 900 hours (Pilot In Command, all aircraft), 11.1 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	DEHAVILLAND	Registration:	N93E
Model/Series:	DHC 2	Aircraft Category:	Airplane
Year of Manufacture:	1956	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	1149
Landing Gear Type:	Tailwheel	Seats:	5
Date/Type of Last Inspection:	July 11, 2014 Annual	Certified Max Gross Wt.:	5370 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	4025 Hrs	Engine Manufacturer:	Pratt & Whitney
ELT:	C126 installed, activated, did not aid in locating accident	Engine Model/Series:	R-985-B5
Registered Owner:	On file	Rated Power:	450 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	PALH,132 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	01:53 Local	Direction from Accident Site:	170°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	3 knots / None	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	270°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.72 inches Hg	Temperature/Dew Point:	16°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Anchorage, AK (LHD)	Type of Flight Plan Filed:	None
Destination:	Anchorage, AK	Type of Clearance:	VFR
Departure Time:		Type of Airspace:	Class D

Airport Information

Airport:	LAKE HOOD LHD	Runway Surface Type:	
Airport Elevation:	73 ft msl	Runway Surface Condition:	Dry
Runway Used:	32	IFR Approach:	None
Runway Length/Width:	2200 ft / 75 ft	VFR Approach/Landing:	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor, 2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor, 3 None	Latitude, Longitude:	61.191112,-149.97055(est)

Administrative Information

Investigator In Charge (IIC):	Shaver, Christopher
Additional Participating Persons:	Ryan Fowler; FAA Anchorage FSDO; Anchorage, AK
Original Publish Date:	August 11, 2015
Last Revision Date:	
Investigation Class:	<u>Class</u>
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90001

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.