



National Transportation Safety Board Aviation Accident Final Report

Location:	PORT BLAKELY, WA	Accident Number:	SEA00FA001
Date & Time:	10/01/1999, 1445 PDT	Registration:	N9766Z
Aircraft:	de Havilland DHC-2 MARK 1	Aircraft Damage:	Substantial
Defining Event:		Injuries:	5 Minor
Flight Conducted Under:	Part 91: General Aviation -		

Analysis

The pilot-in-command (PIC) departed Lake Union seaplane base with four British Broadcasting Company passengers aboard the DeHavilland DHC-2 'Beaver.' The passengers were engaged in aerial videography of an east/west geological fault line crossing from south Seattle through Blakely Harbor near the south end of Bainbridge Island. An onboard video recorder captured a voice instructing 'Keep as low as you can and slow as you can while we're doing this please... .' The PIC's first pass over the south end of Bainbridge Island was uneventful and the aircraft was maneuvered for a second pass. The PIC reported that approaching the upsloping, tree covered terrain he applied climb flaps and power but shortly thereafter realized the climb rate was less than he expected. He attempted a shallow left turn towards downsloping terrain and then leveled the wings as the aircraft descended into the treetops. The scenario was corroborated by two onboard video recordings. The pilot reported no powerplant or control system malfunction during the accident flight. He also reported encountering a downdraft condition over the tree covered terrain. Winds remained below 12 knots throughout the day at reporting stations near the accident site, and the video recordings showed no wind streaking and only sporadic whitecaps on the surface of Puget Sound during the transit from Seattle to the south end of Bainbridge Island.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot-in-command's failure to maintain adequate clearance from trees/terrain. Contributing factors were rising terrain and trees.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: CLIMB

Findings

1. (F) TERRAIN CONDITION - RISING
2. (F) OBJECT - TREE(S)
3. (C) ALTITUDE/CLEARANCE - INADEQUATE - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On October 1, 1999, approximately 1445 Pacific daylight time, a DeHavilland DHC-2 Mark 1 "Beaver," N9766Z, registered to/operated by Kenmore Air Harbor, Inc., and being flown by a commercial pilot, was destroyed when the aircraft impacted terrain following an in-flight collision with tree tops during a climb at the southern end of Bainbridge Island (Port Blakely), Washington. The pilot sustained minor injuries as did the four passengers, all members of a film crew team from the British Broadcasting Company. A company flight plan was in effect and visual meteorological conditions existed at the time. The local flight was to have been operated under 14CFR91 and originated from the Lake Union seaplane base, Seattle, Washington, approximately 1405. The passengers were engaged in aerial videography of an east/west geological fault line crossing from south Seattle through Blakely Harbor near the south end of Bainbridge Island (refer to CHART I).

The pilot was interviewed the day after the accident and reported that after making an initial westbound pass south of the fault line and over the southern end of Bainbridge Island he executed a right 180 degree turn and headed eastbound. After flying east a short distance he executed a second 180 degree right turn and set up for a second pass.

He reported that he made landfall in the vicinity of Restoration Point on the second pass and that he had begun a climb at an airspeed of 100 miles per hour (MPH) with the flaps "UP" prior to this time. He reported applying climb power and as airspeed decelerated below 100 MPH he set "Climb Flaps." He stated that the flaps were lowered before landfall, and that he remembered a pitch change when the flaps began extending.

He further reported that he initially believed that the aircraft's climb performance was acceptable, and that he would clear the trees/terrain; but as the aircraft approached the tree-line he realized the climb rate was less than he expected.

The pilot further reported that he encountered a downdraft and the aircraft transitioned from a climb to a descent. He increased power, attempted a shallow left turn towards down-sloping terrain but then returned to a wings level attitude just before entering the tree tops.

The pilot reported that he encountered no powerplant or control system malfunction during the accident flight.

The pilot submitted a written statement which included the following comments "The [BBC] crew requested that I fly as low as possible over the water westbound about a mile south of our original flight path, followed by a climb over the island. I flew 100-200' over the water and started a climb about 1 mile from the shoreline. I deployed climb flaps and climb power, planning to clear the trees on the rising terrain by 500' or more. The terrain in that area rises sharply from the shoreline and is heavily forested."

"After crossing the shoreline south of Restoration Point, I became aware the aircraft was climbing at a lower than normal rate. I continued the climb and increased power. I encountered a downdraft and had to increase pitch and power to keep from descending into the trees. I was too low and slow at that point to turn toward lower terrain. I saw higher trees ahead and turned about 30 [degrees] left toward lower trees and lower terrain beyond. As I leveled the wings, the aircraft lost sufficient lift and descended into the trees. I tried to keep

the plane in a level attitude until it came to rest..." (refer to attached statement).

PERSONNEL INFORMATION

The pilot, who possessed both a commercial pilot certificate and flight instructor's certificate, reported a total of 1,829 hours of flight experience, all in single engine aircraft. He also reported a total of 240 hours in the DeHavilland DHC-2, all pilot-in-command. He reported that he had accrued 300 hours of flight experience within the previous 90 days of which 200 hours were in the DHC-2. He also reported 88 hours of flight experience within the previous 30 days of which 66 hours were in the DHC-2. The pilot also reported a total of 2 hours of flight experience (all DHC-2) within the 24 hours previous to the accident.

The pilot's most recent medical examination had been conducted 01/25/1999, after which he was issued a second class medical certificate with the restriction that he "must wear corrective lenses." The pilot reported in a post-accident interview that he was wearing corrective lenses at the time of the accident.

AIRCRAFT INFORMATION

The aircraft, a 1953 DeHavilland DHC-2 Mark 1 "Beaver," was powered by a single Pratt & Whitney R-985-AN1, 450 horsepower reciprocating engine. The aircraft was capable of carrying one pilot and seven passengers. The aircraft's right cabin door had been removed prior to the flight under the provisions of a supplemental type certificate to facilitate video-taping while in flight. A remote camera lens had been mounted on the right wing strut and wired directly to a recorder within the cabin. A second, hand-held video camera was also on board.

The aircraft departed Kenmore Air Harbor for Lake Union with 60 gallons of 100 low lead aviation fuel aboard.

METEOROLOGICAL INFORMATION

The aviation surface weather observation taken at Seattle-Tacoma International airport (429 feet above mean sea level [MSL]), bearing 123 degrees magnetic and 11 miles from the accident site, at 1456 reported the following conditions:

Winds from 330 degrees magnetic at 6 knots, clear sky conditions and visibility 10 statute miles, temperature 61 degrees Fahrenheit.

The aviation surface weather observation taken at Bremerton National airport (439 feet MSL), bearing 223 degrees magnetic and 11 miles from the accident site, at 1455 reported the following conditions:

Winds from 030 degrees magnetic and variable from 020 to 080 degrees at 9 knots, clear sky conditions and visibility 10 statute miles, temperature 63 degrees Fahrenheit.

Winds remained below 12 knots throughout the day at both reporting stations and the only gusts reported were 14 knots at Seattle at 1556.

FLIGHT AND COCKPIT VOICE RECORDERS

The aircraft was not equipped with either a cockpit voice recorder or flight data recorder and neither were required. An on-board hand-held video recorder was being operated by one of the passengers during the flight and subsequent accident. A copy of the tape from both the fixed lens unit and the hand-held unit within the aircraft was reviewed. The hand-held unit had an

associated sound track.

The video recording from the hand-held unit showed the aircraft headed westbound approaching the southern portion of Bainbridge Island. About the time the aircraft passed abeam (south) of Restoration Point a voice (British accent) instructed "Keep as low as you can and slow as you can while we're doing this please..." and this was followed by another voice (non-British accent) confirming "low and slow... ." The recording showed the aircraft crossing over the southern end of Bainbridge Island and commencing a right turn. The recording then terminated and picked up again with the aircraft headed westbound and closer to the water surface than the previous flight. Its location was observed to be south and abeam Restoration Point and the aircraft was gradually gaining altitude as it made landfall. The recording then showed the aircraft execute a shallow left turn, return to wings level and then penetrate the top canopy of the trees before rapidly decelerating and coming to rest. The sound of the aircraft's engine was masked by static and wind noise on the recording.

The strut-mounted camera recorded essentially the same images (without a sound track). It also corroborated the aircraft entering the tree canopy after a shallow left turn and return to a wings level attitude.

No wind streaking and only sporadic whitecaps were noted on the surface of Puget Sound during the transit from Seattle to the south end of Bainbridge Island.

WRECKAGE AND IMPACT INFORMATION

The aircraft crashed in heavily wooded terrain approximately one nautical miles southeast of Port Blakely, Washington. The accident site coordinates were estimated to be 47 degrees 34.8 minutes north latitude and 122 degrees 30.2 minutes west longitude. The elevation of the accident site was approximately 340 feet MSL (refer to CHART I).

The Federal Aviation Administration (FAA) inspector who conducted the on-site examination of the aircraft documented the aircraft as having come to rest in a heavily wooded area. The trees were mixed deciduous/conifer in nature and the terrain sloped gradually downhill from the aircraft's tail to its nose. The aircraft was observed to have come to rest upright with its nose oriented towards the east and in a 45 degree right wing down attitude (refer to photograph 1). A swath through the trees, including broken tree trunks, was observed oriented roughly along a west to east bearing line, and a fragment of left wing was noted captured near the top of one of these trees (refer to photograph 2). The aircraft's left and right floats remained partially attached but had been displaced to the north (aircraft left side), and the cockpit/cabin area interior had not been significantly compromised (refer to photograph 3).

The aircraft's empennage, including both horizontal and vertical stabilizers and associated control surfaces, remained attached. The empennage was oriented towards the west and the rudder panel was observed to have been partially torn free at its upper hinges (refer to photograph 4).

The aircraft's left wing and strut remained attached to the fuselage. The right wing was observed to have been torn free from the fuselage and separated into two major portions. The inboard portion was observed located close to the fuselage (refer to photograph 5).

The leading edge of the left wing displayed substantial impact deformation at several locations and its associated aileron and flap remained attached (refer to photograph 6). The remainder of the right wing (outboard section) was observed snagged in a treetop. Its aileron and flap

were observed to have remained attached (refer to photograph 7).

The engine remained attached to the firewall and there was little aftward deformation of the engine into the cockpit area. The propeller remained attached to the engine and all three propeller blades displayed tip curl (refer to photograph 8).

A witness mark (impact impression) was noted on the right side of the fuselage in the area along the fuselage opposite to the inboard edge of the right flap (refer to photograph 9). This witness mark matched the size and shape of the aft-inboard edge of the right flap and, when compared to a similar Beaver, was consistent with a flap setting of between "climb flaps" and "takeoff flaps." The flap indicator needle within the cockpit was observed to be positioned midway between the "climb flaps" and "takeoff flaps" settings. The elevator trim within the cockpit was observed to be set at zero and the rudder trim was set slightly nose right.

MEDICAL AND PATHOLOGICAL INFORMATION

According to the Operator, the pilot submitted a urine sample following the accident which was screened with negative results.

ADDITIONAL INFORMATION

On-site examination of the wreckage was conducted by an inspector from the FAA's Renton Flight Standards District Office on October 2, 1999, after which the wreckage was verbally released to the operator for the purpose of recovery. Written wreckage release was accomplished on October 13, 1999, and is documented on NTSB form 6120.15 (attached).

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	43, Male
Airplane Rating(s):	Single-engine Land; Single-engine Sea	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	01/25/1999
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	1829 hours (Total, all aircraft), 240 hours (Total, this make and model), 1782 hours (Pilot In Command, all aircraft), 300 hours (Last 90 days, all aircraft), 88 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	de Havilland	Registration:	N9766Z
Model/Series:	DHC-2 MARK 1 DHC-2 MARK	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	504
Landing Gear Type:	Float	Seats:	8
Date/Type of Last Inspection:	09/16/1999, 100 Hour	Certified Max Gross Wt.:	5370 lbs
Time Since Last Inspection:	48 Hours	Engines:	1 Reciprocating
Airframe Total Time:	30792 Hours	Engine Manufacturer:	P&W
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	R-985-AN1
Registered Owner:	KENMORE AIR HARBOR, INC.	Rated Power:	450 hp
Operator:	KENMORE AIR HARBOR, INC.	Operating Certificate(s) Held:	On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	GJRA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	SEA, 429 ft msl	Distance from Accident Site:	11 Nautical Miles
Observation Time:	1456 PDT	Direction from Accident Site:	115°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	330°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	16° C / 8° C
Precipitation and Obscuration:			
Departure Point:	SEATTLE, WA (0W0)	Type of Flight Plan Filed:	Company VFR
Destination:		Type of Clearance:	
Departure Time:	1405 PDT	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	4 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	5 Minor	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC): STEVEN A MCCREARY **Report Date:** 05/17/2001

Additional Participating Persons: SARAH MOYE; RENTON, WA

Publish Date:

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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