Aviation Investigation Final Report

Location:	Metlakatla, Alaska	**Accident Number:**	ANC19FA019
Date & Time:	May 20, 2019, 15:56 Local	**Registration:**	N67667
Aircraft:	De Havilland DHC 2	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control on ground	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Scheduled		

Analysis

The commercial pilot was conducting his first scheduled commuter flight from the company's seaplane base to a nearby island seaplane base with one passenger and cargo onboard. According to company pilots, the destination harbor was prone to challenging downdrafts and changing wind conditions due to surrounding terrain. Multiple witnesses at the destination stated that the airplane made a westerly approach, and the wind was from the southeast with light chop on the water. Two witnesses reported the wings rocking left and right before touchdown. One witness stated that a wind gust pushed the tail up before the airplane landed. A different witness reported that the airplane was drifting right during the touchdown, and another witness saw the right (downwind) float submerge under water after touchdown, and the airplane nosed over as it pivoted around the right wingtip, which impacted the water.

Flight track and performance data from the cockpit display units revealed that, as the airplane descended on the final approach, the wind changed from a right headwind of 6 knots to a left quartering tailwind of 8 knots before touchdown. The crosswind and tailwind components were within the airplane's operational limitations. Examination of the airframe, engine, and associated systems revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation or egress.

During the final approach and descent, the pilot had various wind information available to him; the sea surface wind waves and signatures, the nearest airport observation winds, the cockpit display calculated wind, and the visual relative ground speed. Had the pilot recognized that the winds had shifted to a quartering tailwind and the airplane's ground speed was faster than normal, he could have aborted the landing and performed another approach into the wind. Although crosswind landings were practiced during flight training, tailwind landings were not because new pilots were not expected to perform them. Although the crosswind component was well within the airplane's limits, it is possible that combined with the higher ground speed, the inexperienced pilot was unable to counteract the lateral drift during touchdown in a rapidly shifting wind.

The pilot was hired the previous month with 5 hours of seaplane experience, and he completed company-required training and competency checks less than 2 weeks before the accident. According to the chief pilot (CP), company policy was to assign newly hired pilots to tour flights while they gained experience before assigning them to commuter flights later in the season. The previous year, the CP distributed a list of each pilot's clearances for specific types of flights and destinations; however, an updated list had not been generated for the season at the time of the accident, and the flight coordinators, who were delegated operational control for assigning pilots to flights, and station manager were unaware of the pilot's assignment limitations.

Before the flight, the flight coordinator on duty completed a company flight risk assessment that included numerical values based on flight experience levels. The total risk value for the flight was in the caution area, which required management notification before releasing the flight, due to the pilot's lack of experience in the accident airplane make and model and with the company, and his unfamiliarity with the geographical area; however, the flight coordinator did not notify management before release because the CP had approved a tour flight with the same risk value earlier in the day. Had the CP been notified, he may not have approved of the pilot's assignment to the accident flight.

The pilot's minimal operational experience in seaplane operations likely affected his situational awareness in rapidly changing wind conditions and his ability to compensate adequately for a quartering tailwind at a higher-than-normal ground speed, which resulted in a loss of control during the water landing and a subsequent nose-over.

Probable Cause and Findings

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

The pilot's inadequate compensation for a quartering tailwind during a water landing, which resulted in a loss of control and subsequent nose-over. Contributing to the accident was the company's inadequate operational control of the flight release process, which resulted in assignment of an inexperienced pilot to a commuter seaplane flight.

Findings

Aircraft	(general) - Not attained/maintained
Personnel issues	Use of equip/system - Pilot
Personnel issues	Total experience w/ equipment - Pilot
Environmental issues	Crosswind - Response/compensation
Environmental issues	Tailwind - Response/compensation
Organizational issues	Scheduling of personnel - Operator
Organizational issues	Availability of policy/proc - Operator
Organizational issues	Personnel records - Operator
Organizational issues	Within group(s)/organization - Operator
Organizational issues	Adequacy of safety program - Operator

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Landing	Loss of control on ground (Defining event)
Landing	Nose over/nose down

On May 20, 2019, about 1556 Alaska daylight time, a float-equipped de Havilland DHC-2 (Beaver) airplane, N67667, sustained substantial damage when it was involved in an accident near Metlakatla, Alaska. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (*CFR*) Part 135 commuter flight.

According to company dispatch documents, the flight was a scheduled commuter flight with one passenger and cargo onboard, which originated from Ketchikan Harbor Seaplane Base (5KE), Ketchikan, Alaska, and was destined for Metlakatla Seaplane Base (MTM), Metlakatla, Alaska, about 16 miles southeast.

A review of GPS track data revealed that the airplane departed 5KE about 1543 and traveled southeast over an area known as the Tongass Narrows, then south to Metlakatla Harbor at an altitude of about 800 ft. The airplane made a right turn to a 240° (magnetic) heading in the southern portion of the harbor then the data ended. (See figure 1.)

Figure 1. Flight track (red) and wind observation.

There were three witnesses to the airplane's approach and landing. One of the witnesses, who was taking photographs near the pier, reported that the wind appeared to be pushing the airplane right during touchdown and that the airplane was drifting right as the floats contacted the water. After the airplane skipped once or twice, the left wing "dipped" down, then the right wing "dipped down and dug into the water," which resulted in the airplane nosing over and the right wing separating.

Another witness, who was in a boat, stated that the airplane hit the water hard and he saw the right float "dig into the water" before the airplane turned over as it pivoted around. The third witness stated that the airplane appeared to be "teetering back and forth" and a gust of wind appeared to push the tail upward as the right wing dropped down and the airplane nosed over. She stated that the wind was from the southeast with gusts of 13 mph and the water was less than choppy. The inverted airplane partially sank with the front fuselage and cockpit under water. (See figures 2 and 3.)

Figure 2. The airplane during the landing sequence after a brief touchdown on the left float. (Source: Nicholas King.)

Figure 3. The airplane inverted after the accident. (Source: Nicholas King.)

Two boats in the area immediately responded, followed by a Metlakatla Police vessel with volunteer emergency medical technicians onboard. According to statements provided by the first responders, there were numerous boxes, mail, debris, and ATV tires obscuring their view and inhibiting access to the cockpit. After some debris was removed through the left cargo door, the passenger in the front right seat was removed after her shoulder harness was cut; the pilot was removed from the cockpit about 20 minutes later.

Pilot Information

Certificate:	Commercial; Private	**Age:**	51,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 21, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 3, 2019
Flight Time:	(Estimated) 1623 hours (Total, all aircraft), 20 hours (Total, this make and model), 1532 hours (Pilot In Command, all aircraft), 26 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		**Age:**	Female
Airplane Rating(s):		**Seat Occupied:**	Front
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

According to the operator's training records, the pilot was hired with 1,606 total hours of flight experience, including 5 hours of previous seaplane experience and no experience in Alaska. He began initial company training on April 22, 2019 and completed a competency check flight in a float-equipped DHC-2 on May 3, 2019, after completing 4 flights and 5.4 training hours. The pilot completed initial operating experience (IOE) flight requirements on May 11, 2019, with 6.9 hours of experience and 11 landings, which allowed him to be assigned to commuter flights in accordance with 14 *CFR* 135.244. His last IOE flight was to MTM. At the time of the accident, the pilot had accumulated about 22 hours in the accident airplane make and model. He flew 6.5 hours as pilot-in-command (PIC) on tour flights in the weeks before the accident flight.

A review of the pilot’s personal flight logbook revealed that, before flying for the operator, he gained most of his flight experience as a Cessna 208 and Cessna 182 pilot in skydiving operations.

Aircraft and Owner/Operator Information

Aircraft Make:	De Havilland	**Registration:**	N67667
Model/Series:	DHC 2	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1309
Landing Gear Type:	Float	**Seats:**	8
Date/Type of Last Inspection:	April 16, 2019 100 hour	**Certified Max Gross Wt.:**	5600 lbs
Time Since Last Inspection:		**Engines:**	1
Airframe Total Time:	29575 Hrs as of last inspection	**Engine Manufacturer:**	
ELT:	C126 installed, not activated	**Engine Model/Series:**	
Registered Owner:	Blue Aircraft, LLC	**Rated Power:**	
Operator:	Venture Travel, LLC	**Operating Certificate(s) Held:**	Commuter air carrier (135), On-demand air taxi (135), Commercial air tour (136)
Operator Does Business As:	Taquan Air	**Operator Designator Code:**	TQ0A

The airplane was equipped with Edo model 679-4930 floats.

The airplane was configured with two Chelton Integrated Display Units (IDU) that operated as a primary flight display (PFD) and a multi-function display (MFD). The PFD displayed aircraft parameter data, including altitude, airspeed, vertical speed, and heading. The MFD displayed navigational information on a moving map, including wind information in the upper left corner, as shown in Figure 4. During normal system operation, wind was calculated during periods of relatively wings-level flight (bank < 6°). The wind calculation considered true airspeed, heading, ground speed, and track information.

Figure 4. Chelton IDU calculated wind indication.

Company dispatch documents for the accident flight indicated that the airplane's takeoff weight was 4,915 lbs and center of gravity was -1.6 inches, which were within operating limitations.

The Viking DHC-2 Flight Manual states that the maximum crosswind component for takeoff and landing is 10 mph. It does not stipulate a maximum tailwind component, but company pilots stated that 10 mph is generally accepted as the limit.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PANT,109 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	23:53 Local	**Direction from Accident Site:**	183°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.7 inches Hg	**Temperature/Dew Point:**	13°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ketchikan, AK (5KE)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Metlakatla, AK (MTM)	**Type of Clearance:**	None
Departure Time:	15:40 Local	**Type of Airspace:**	Class G

Calculated wind velocity from the one of the airplane's IDUs indicated that the wind during takeoff was from 090° (magnetic) at 15 knots. As the airplane climbed through an indicated altitude of 750 ft, the wind shifted to 290° at 9 knots and remained from the west throughout the en route portion of the flight and the initial segment of the visual approach to the destination. As the airplane descended and turned onto its final approach path of about 242°, the wind shifted from 253° at 6 knots, becoming southerly at 2 knots, then from 083° at 8 knots over the 30 seconds before the airplane landed. This was a shift of 170° and 14 knots, which resulted in a change from a 6-knot headwind to a 7-knot tailwind, and a 2-knot right crosswind to a 3-knot left crosswind component during the approach and landing sequence. According to the manufacturer's operating handbook, the values can contain errors and wind peaks and gusts are not calculated.

Company pilots stated that the winds at MTM can be challenging and unpredictable due to the effects of the surrounding high terrain. Company check airmen stated that MTM is known for downdrafts on the water when the wind is from the east and southeast, where the highest mountains are located.

Airport Information

Airport:	Metlakatla MTM	**Runway Surface Type:**	Water
Airport Elevation:	0 ft msl	**Runway Surface Condition:**	Water-choppy;Wet
Runway Used:	W	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 5000 ft	**VFR Approach/Landing:**	Straight-in

The automatic surface observing system (ASOS) for MTM was not reporting information at the time of the accident.

No windsock was evident at MTM during the investigation, although it was listed in the Alaska chart supplement.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	55.131668,-131.57055(est)

The airplane came to rest inverted on an easterly heading with the right wing separated and floating about 15 ft to the west. First responders stated that the passenger's front right seat was removed to facilitate rescue and subsequently sank in the bay. A postaccident examination of the airframe revealed that all other major components were attached. The floats, float struts, spreader bars, and control cables were intact. The right and left sea rudders were each fractured at the lower welds and exhibited minor bending deformation. (See figure 5.)

Figure 5. The airplane after recovery from the harbor.

The right wing forward fuselage attachment lug was fractured and exhibited dull, dimpled fracture surfaces; the rear attachment was fractured and deformed rearward. The right flap was attached to the fuselage by the inboard bracket, with the control rod fractured. An indentation on the right side of the fuselage was consistent with the right flap in the land position during impact. The left wing, aileron and flap were intact and attached. The left flap was extended to the land position. The cockpit flap position indicator was slightly above the land position. Flight control continuity was established from the pilot's control wheel to the left aileron and right wing aileron pulley and the elevator. Rudder and elevator trim cable continuity was established to the aft trim tabs; however, the trim cables could not be moved due to airframe deformation and cable constriction forward of the cockpit upper trim wheels.

The forward fuselage above the cockpit was fractured at the upper center windshield brace, and the forward upper skin was deformed inward and downward into the left side of the cockpit. The left forward door (pilot's) was secure in place with minor deformation. The right forward door was secure in place with mild deformation and the door opening mechanism worked properly. The right cabin door was open and attached partially by the forward lower attachment. The opening mechanism worked properly. Exit placards were in place.

The aft fuselage and empennage exhibited crushing deformation around the circumference, consistent with rescue efforts and recovery damage noted in photographs. The elevator and rudder were attached and exhibited full control movement.

The propeller was attached to the engine and the engine exhibited no damage. Full engine control continuity was observed. The propeller was rotated by hand and engine crank case continuity was established. The three propeller blades were secure in the hub and only one blade exhibited mild aft bending throughout the span and scrapes in various directions.

There were no pre-impact anomalies discovered during the airframe and engine examination that would have resulted in a loss of control during landing.

Organizational and Management Information

Taquan Air is a 14 *CFR* Part 135 air carrier that holds on-demand and commuter operations specifications. The company operated 14 airplanes, of which 10 were DHC-2 Beavers, and employed about 23 pilots, with most working on a seasonal basis, and 4 check airmen. The company conducted tour flights, lodge support flights, scheduled commuter flights, and charter flights.

The chief pilot (CP) was responsible for hiring and training pilots. He stated that, each season, pilots were hired to fulfill the summer tour and lodge flights; however, attracting new pilots had become very difficult due to a pilot shortage in Alaska. The company usually hired people with a minimum of 100

hours of seaplane time. He hired the accident pilot, because he had a good attitude and was willing to learn, even though he had very few hours and no operational experience in seaplanes.

The company training program for initial hire pilots included practice and evaluation of crosswind landings. Company check airmen stated that tailwind landings were not taught or practiced, because pilots were not expected to perform tailwind landings due to elevated risks of touchdown at greater ground speed.

The CP stated that new seasonal pilots were typically assigned to tour flights for 4 to 6 weeks after training. Tour flights were released in groups of multiple airplanes in good weather, and new pilots did not have to make many decisions. Usually by mid-June, pilots were assigned to commuter flights that were easy routes (such as MTM) and then progressed to more challenging destinations at the CP's discretion. He stated that information about which pilot was ready for a specific type of flight was communicated through "tribal knowledge." There were no formal meetings with check airmen or flight coordinators. The company station manager and senior flight coordinator (FC) stated that they assigned pilots based on a qualification list that was posted in the flight coordinator's office, but no list was provided to them for the current year. The station manager, who supervised the flight coordinators, stated that she understood that once a pilot completed IOE, he could be assigned to commuter flights, which conflicted with the CP's policy.

The company used a flight risk assessment (FRA) process that required the FC on duty to tabulate a risk number based on weather, equipment, landing area, and manpower assessments. Both the pilot and the FC were required to sign the FRA, and if the value was in the caution area, management had to be notified. The FRA for the accident flight indicated a total of 12, which was in the caution area, based on factors such as the pilot having less than 500 hours of flight experience in the airplane type, less than 1 year with the company, the pilot's lack of familiarity with the area, and distraction. The flight coordinator on duty, who was also the company's senior flight coordinator, did not notify the CP because he previously approved a tour flight with the same value for the accident pilot earlier that day under the same conditions, although the type of flight was different.

The company General Operating manual (GOM) indicated that the director of operations routinely delegated the duty of operational control to the FC on duty. Operational control is defined as "the exercise of authority over initiation, conducting, and terminating a flight."

The CP stated that the company usually had an all-pilot pre-season safety meeting each year, but they had not scheduled one this year yet. He also stated that important information was disseminated to pilots through an all-read board posted in the pilot ready room, yet the posted all read board did not have the new seasonal pilots listed.

Additional Information

The FAA Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook, FAA-8083-23, states in Chapter 6 that:

In water landings, the major objectives are to touch down at the lowest speed possible, in the correct pitch attitude, without side drift, and with full control throughout the approach, landing, and transition to taxiing. Make normal landings directly into the wind. The greater the speed difference between the seaplane and the water, the greater the drag at touchdown, and the greater the tendency for the nose to pitch down. This is why the touchdown is made at the lowest possible speed for the conditions.

If the seaplane touches down while drifting sideways, the sudden resistance as the floats contact the water creates a skidding force that tends to push the downwind float deeper into the water. The combination of the skidding force, wind, and weathervaning as the seaplane slows down can lead to a loss of directional control and a waterloop. If the downwind float submerges and the wingtip contacts the water when the seaplane is moving at a significant speed, the seaplane could flip over. See figure 6.3. (Figure 6.)

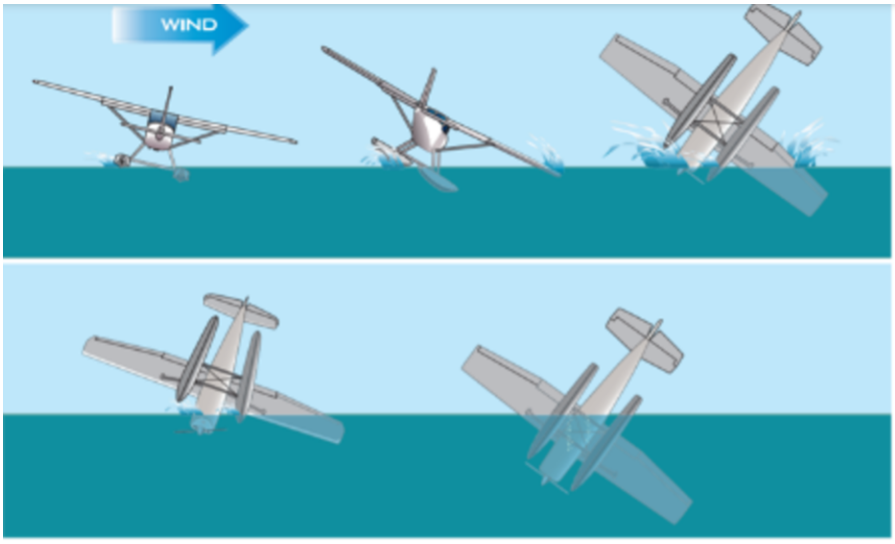

Figure 6. Figure 6-3 in the FAA Seaplane Handbook illustrating the hazard of landing while drifting sideways in a crosswind at significant speed.

While a landplane pilot seldom thinks about the additional force placed on the landing gear by a higher groundspeed at touchdown, it is a serious concern for the seaplane pilot. A small increase in water speed translates into greatly increased water drag as the seaplane touches down, increasing the tendency of the seaplane to nose over. In light winds, this usually presents little problem if the pilot is familiar with how the seaplane handles when touching down at higher speeds and is anticipating the increased drag forces. In higher winds, the nose-down force may exceed the ability of the pilot or the flight controls to compensate, and the seaplane will flip over at high speed.

Administrative Information

Investigator In Charge (IIC):	Price, Noreen
Additional Participating Persons:	Jon Percy; Federal Aviation Administration; Juneau, AK Michael O'Brien; Taquan Air; Ketchikan, AK
Original Publish Date:	May 27, 2021
Last Revision Date:	
Investigation Class:	Class 2
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99456