Aviation Investigation Final Report

Location:	Kodiak, Alaska	**Accident Number:**	ANC17LA053
Date & Time:	September 4, 2017, 14:30 Local	**Registration:**	N16GP
Aircraft:	Cessna U206G	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control on ground	**Injuries:**	4 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

The airline transport pilot reported that, while attempting to takeoff in an amphibious, float-equipped airplane in choppy ocean waters, the airplane began to lose speed while simultaneously pitching forward. He subsequently aborted the takeoff, and the airplane struck a large swell, the right forward float strut fractured, the airplane rolled to the right, and the right wing's lift strut was substantially damaged. The pilot's initial examination of the airplane revealed that the left nosewheel was partially deployed even though the landing gear handle was in the "up" position.

Multiple witnesses observed the airplane depart to the east toward an area of unprotected water. One witness reported about 8-ft ocean swells in the unprotected area of the takeoff run, and another witness reported a strong wind from the east. Photos of the accident airplane taken during the rescue indicate rough water near the accident site with large ocean swells. Further, the forecast that day called for 9-ft seas and 25 knot winds. Guidance for takeoffs in float-equipped airplanes states that severe damage can occur when taking off in sea conditions with large swells. Although the pilot was aware of the ocean conditions he still attempted to takeoff in a protected area; however, the airplane did not lift off before reaching the ocean and encountered the large swells.

A postaccident examination of the airplane revealed that the left and right mechanical portion of the landing gear retraction system was improperly rigged, and the amphibious float cable loops were set to an inappropriately low tension load. No evidence of a hydraulic leak was present inside the amphibious floats or the fuselage.

Due to the improperly rigged landing gear, it is likely that the landing gear up-locks disengaged during the impact with the ocean swells. However, neither the pilot nor any of the witnesses reported the airplane yawing about its vertical axis during the takeoff run; thus, it is unlikely that the left nosewheel deployed during the accident airplane's water run. Furthermore, it is likely that the hydraulic lines were breached when the rear float struts were impact damaged, which then released hydraulic pressure and allowed the previously unlocked nosewheel to partially deploy after the accident.

Probable Cause and Findings

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

This probable cause was modified on November 27, 2018. Please see the docket for this accident to view the original probable cause.

The pilot's improper decision to takeoff in an area of rough water and ocean swells, which resulted in a failure of the right float struts.

Findings

Personnel issues	Decision making/judgment - Pilot
Environmental issues	Choppy surface - Decision related to condition

Factual Information

History of Flight

Takeoff	Loss of control on ground (Defining event)
Takeoff-rejected takeoff	Collision with terr/obj (non-CFIT)

On September 4, 2017 about 1430 Alaska daylight time, an amphibious float-equipped Cessna U206 airplane, N16GP, sustained substantial damage while attempting to depart the water at Trident Basin Seaplane Base (T44), Kodiak, Alaska. The airplane was registered to and being operated by the pilot as a 14 *Code of Federal Regulations* Part 91 visual flight rules flight. The airline transport pilot and three passengers were not injured. Marginal visual meteorological conditions existed and no flight plan had been filed.

According to the pilot during the takeoff run, the airplane encountered small swells and began to lose speed, while simultaneously pitching forward. In an effort to correct for the forward pitching moment, the pilot applied full aft elevator. Shortly thereafter, he aborted the takeoff, but the airplane continued to pitch forward when it was struck by a larger swell. The right forward float strut fractured and the airplane rolled to the right, which resulted in substantial damage to the right wing's lift strut. An initial examination of the airplane by the pilot revealed that the left nose wheel was partially deployed with the landing gear handle in the up position.

A pilot rated witness reported that the accident pilot was talking to several pilots, prior to boarding the airplane, the morning of the accident and specifically asked him "what do you think?" and "which way to go?". He went on to state that one of the options, rather than the typical north departure, was to use "The Cut", which is an easterly departure through a break between the islands. He said this worked as long as the aircraft was airborne before exiting the protected area, as ocean swells were encountered on the other side of the islands.

Another pilot rated witness reported that he leaned out his office door and watched as the accident pilot started his water run. He said his initial thought was that the airplane "must be really heavy" because it took a very long time for the airplane to accelerate onto the step. As the airplane disappeared through "The Cut", he saw the wings start rocking up and down, as the airplane, still on step, encountered the ocean swells on the other side.

A third pilot rated witness reported that he observed the accident airplane begin its water run. He stated that the airplane was in the plow for an estimated 1,100 ft, prior to accelerating onto the step. The airplane then went through the "The Cut" where it encountered about 8-foot-tall ocean swells, and disappeared. He continued to hear the airplane's engine operating at full power for about 15 seconds before it abruptly stopped. He then jumped in his skiff and motored through "The Cut" to the accident site to assist with the rescue of the airplane and its occupants.

A fourth pilot rated witness who aided in the recovery of the airplane the day of the accident reported wind from the east at 15 to 20 knots, 1 to 1 ½ ft seas, with 6 to 8-inch swells. He also stated that there was no evidence of a hydraulic oil leak on the water as the airplane was towed back to the docks at T44.

Neither the pilot, nor any of the multiple witnesses reported the airplane yawing about its vertical axis during the takeoff run.

Photos of the accident airplane taken during the rescue indicate rough water near the accident site with large ocean swells.

The coastal waters forecast for Chiniak Bay on September 4, called for seas of 9 ft, with wind out of the southeast at 25 knots and rain, and a Small Craft Advisory had been issued.

The closest weather reporting facility was Kodiak Airport (PADQ), Kodiak, Alaska, about 4.5 miles southwest of the accident site. At 1428, a METAR from PADQ was reporting, in part: wind 100° at 15 knots; visibility, 4 statute miles, mist; clouds and ceiling, scattered clouds at 1,000 ft, overcast clouds at 3,100 ft; temperature, 54° F; dew point 54° F; altimeter, 29.59 inches of Mercury.

The airplane was equipped with EDO 696-3500 amphibious floats. The hydraulic lines that service the landing gear are routed through the hollow float struts to their attach points on the deck of the floats.

The mechanic who removed the airplane from the water the day after the accident reported that all three of the right float struts were separated completely from their attach points and the hydraulic lines servicing the landing wheels were severed.

A postaccident examination of the airplane revealed that the left and right mechanical portion of the landing gear retraction system was not rigged correctly, and the amphibious float cable loops were set to about a 17-pound tension load. No evidence of a hydraulic leak was present inside the amphibious floats or the fuselage.

The EDO Model 696-3500 Service and Maintenance Manual states in part: "Rig the cable loop to a 75 – 125-pound tension load."

The book, How To Fly Floats, published by EDO Corporation, Rough Water Take-offs states in-part: "When possible, take-offs in rough water should be avoided. Before attempting a rough water take-off, do some reconnaissance of the area first. You may happen to find more favorable surface conditions nearby. Pay special attention to any severe swell conditions that may exist and keep an eye out for swells produced by moving boat traffic. There is a very good possibility that severe damage can be done to either the floats, the attachment gear or the aircraft in big swell conditions."

Pilot Information

Certificate:	Airline transport	**Age:**	41,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	May 18, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 31, 2017
Flight Time:	16000 hours (Total, all aircraft), 200 hours (Total, this make and model), 16000 hours (Pilot In Command, all aircraft), 180 hours (Last 90 days, all aircraft), 90 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N16GP
Model/Series:	U206G	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U20604467
Landing Gear Type:	N/A; Amphibian	**Seats:**	
Date/Type of Last Inspection:	July 1, 2017 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:	1576.1 Hrs as of last inspection	**Engine Manufacturer:**	
ELT:	C91 installed, not activated	**Engine Model/Series:**	
Registered Owner:	On file	**Rated Power:**	
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:	PADQ	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	22:28 Local	**Direction from Accident Site:**	230°
Lowest Cloud Condition:	Scattered / 1000 ft AGL	**Visibility**	4 miles
Lowest Ceiling:	Overcast / 3100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	100°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.59 inches Hg	**Temperature/Dew Point:**	12°C / 12°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Kodiak, AK (T44)	**Type of Flight Plan Filed:**	None
Destination:	Kodiak, AK	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	TRIDENT BASIN T44	**Runway Surface Type:**	Water
Airport Elevation:	0 ft msl	**Runway Surface Condition:**	Water-choppy
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 None	**Latitude, Longitude:**	57.780834,-152.391387

Administrative Information

Investigator In Charge (IIC):	Banning, David
Additional Participating Persons:	Matthew Dahl; Federal Aviation Administration; Juneau, AK J.J. Frey
Original Publish Date:	April 23, 2018
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=96079