Aviation Investigation Final Report

Location:	Sitka, Alaska	**Accident Number:**	ANC18FA044
Date & Time:	June 8, 2018, 20:00 Local	**Registration:**	N1203A
Aircraft:	Piper PA18	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was flying a lodge client on a wildlife viewing flight in a floatplane. About 2 hours after the planned return time, the airplane was reported overdue and a search was coordinated. The airplane wreckage was located nose down in a confined shallow river the next day. The airplane did not have GPS, ADS-B or a recording system, and there was no radar coverage in the area of the accident; therefore, the flight track was unknown.

The airplane impacted the river bottom in a 70 ° nose down attitude with the front floats absorbing much of the energy and the aft fuselage displaced and twisted right, indicative of impact during a stall/spin. All flight controls were intact and continuous, and the engine exhibited no anomalies. The propeller blades exhibited rearward bends with torsional twist and some chordwise scrapes, and propeller strikes were evident on deadfall trees trunks at the initial impact site, which are all indications of impact with engine power. The right fuel tank cap was not located but given that there was evidence of engine power at impact, it is unlikely that fuel siphoning/exhaustion was causal. It is likely that the pilot was maneuvering the airplane in slow flight to show the passenger wildlife, and, in doing so, exceeded the airplane's critical angle of attack, resulting in the stall.

The airplane was equipped with 4-point shoulder harnesses on both seats; however, first responders reported that the pilot did not have the shoulder harness fittings inserted into the lapbelt buckle. The rear seat passenger was ejected during the impact and examination of the shoulder harnesses for his seat revealed no indication of deformation of the webbing or metal end fittings, indicating he was also likely not using the shoulder harnesses at the time of impact. His lapbelt buckle however, was deformed although it was fully functional. It is possible that the use of the shoulder harnesses may have prevented the rear seat passenger's ejection and/or mitigated some of the occupants' injuries had they been in use at the time of the accident.

Probable Cause and Findings

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

The pilot's exceedance of the airplane's critical angle of attack for unknown reason, which resulted in an aerodynamic stall and a loss of control.

Findings

Aircraft	Angle of attack - Capability exceeded
Personnel issues	Aircraft control - Pilot
Aircraft	Flight compartment equipment - Incorrect use/operation
Aircraft	Passenger compartment equip - Incorrect use/operation

Factual Information

History of Flight

Maneuvering	Unknown or undetermined
Maneuvering	Aerodynamic stall/spin (Defining event)
Enroute	Collision with terr/obj (non-CFIT)

On June 9, 2018, about 2000 Alaska daylight time, a float-equipped Piper PA-18 airplane, N1203A, was substantially damaged when it was involved in an accident near Sitka, Alaska. The commercial pilot and passenger sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* (*CFR*) Part 91 sightseeing flight.

The pilot was the co-owner of the Frontier Charters and Lodge in Sitka. According to the pilot's mother, who was the other owner, the pilot was taking a client on a non-revenue wildlife sightseeing tour to see mountain goats. The pilot filed and activated a local flight plan with Juneau Flight Service (FSS); the plan was to depart from the Sitka Seaplane Base (A29) at 1934 and return at 2030. The flight plan indicated that he was going to Katlian Bay, then Nakwasina Sound. When the airplane was deemed overdue, an alert notice (ALNOT) was issued by Juneau FSS at 2239 and the US Coast Guard (USCG) Sector Juneau coordinated a search and rescue operation with the support of the Alaska State Troopers and the Civil Air Patrol. No emergency locator transmitter (ELT) signal was received. The airplane was not equipped with ADS-B and there was no radar track for the airplane; therefore, the actual track of the airplane is not known.

Figure 1. The accident site on a Google Earth image.

On June 10 about 2210, a USCG MH-60T helicopter located the wreckage about 0.2 mile upriver from Katlian Bay on an arm of the Katlian River (see figure 1). The pilot was located in the front seat of the wreckage and the passenger was missing. The fatally injured passenger was located the next day at 1009, downriver from the airplane, according to USCG records.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	45,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1	**Last FAA Medical Exam:**	March 1, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1640 hours (Total, all aircraft), 140 hours (Total, this make and model), 1600 hours (Pilot In Command, all aircraft)		

Passenger Information

Certificate:		**Age:**	66,Male
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	Lap only
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:			

The pilot's personal logbook was not located. At his last FAA medical exam on March 20, 2018, he reported flight experience of 1,600 total hours and 180 hours in the previous 6 months . According to an instructor of the pilot, the pilot had about 1,000 hrs in a Cessna 185 floatplane, 20-40 hours in a PA-18 floatplane, and about 100 hours in his PA-18 outfitted with wheels.

On June 18, 2015, the pilot's commercial certificate was suspended for 90 days for violation of 14 *CFR* Part 91.7(a) and 91.407(b) for operating an airplane not in an airworthy state and failing to ensure that maintenance was logged appropriately, respectively.

A friend who was a local pilot stated that the pilot flew his airplane "right up to the limit of its capabilities," but was a safe pilot. The pilot's instructor stated that he was a very good and fast learner.

The pilot operated a Cessna 185 floatplane in support of his lodge operation and to fly friends around the local area. According to his mother, the PA-18 was his personal airplane and was not used in support of client activities. She stated that the pilot was being gracious in offering a free sightseeing flight that was not on the lodge schedule to the passenger.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N1203A
Model/Series:	PA18	**Aircraft Category:**	Airplane
Year of Manufacture:	1951	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18-811
Landing Gear Type:	Tailwheel; Float	**Seats:**	2
Date/Type of Last Inspection:	November 28, 2017 Annual	**Certified Max Gross Wt.:**	1499 lbs
Time Since Last Inspection:	3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2244.9 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, not activated	**Engine Model/Series:**	O-320 E2D
Registered Owner:		**Rated Power:**	160 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The airplane was purchased in 2017 and outfitted with Edo 2000 floats in May of 2018.

The airplane's front and rear seats were equipped with TSO C114 compliant four-point AmSafe restraint systems with inertia reels .

There was no evidence of an installed rear seat control stick, which was corroborated by a friend's statement.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PASI,67 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:		**Direction from Accident Site:**	201°
Lowest Cloud Condition:	Few / 5000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.89 inches Hg	**Temperature/Dew Point:**	12°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	SITKA, AK (A29)	**Type of Flight Plan Filed:**	VFR
Destination:	SITKA, AK (A29)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	57.171665,-135.276672(est)

The airplane came to rest about 70° nose-down and wings-level into a small brackish river that was subject to the Katlian Bay tidal effects (see figure 2). National Transportation Safety Board investigators and a Federal Aviation Administration (FAA) safety inspector accessed the accident site on June 12 at low tide, after the wreckage had been exposed to multiple tidal cycles of 2 to 8 ft of depth. The wreckage was heading upriver, about 110°, with the forward 3 ft of the aluminum floats severely buckled and deformed upward about 70°. The aft fuselage was displaced and twisted to the right. The initial impact site was identified about 20 ft upstream where a depression of about 6-by-6 ft with small airplane debris and the engine cowlings was present on the river bottom. At the impact site were 2 large trees trunks that appeared to be waterlogged deadfall consistent with other old tree debris in the river. One of the trunks had fresh propeller cuts. The trees surrounding the river had no evidence of impact. All major components were located at the site.

Figure 2. West view of wreckage on the Katlian River.

Flight control continuity was established at the accident scene. The aileron control cable was separated at the left wing root with broomstraw signatures indicative of an overload failure at impact. The left wing root leading edge exhibited an indentation that corresponded to the diameter of a deadfall tree trunk that was present at the initial impact site. The left and right wings were separated at the rear connections and rotated forward. The left flap control rod was fractured with dull overload signatures. The right flap was attached and in the up position. The empennage, with attached rudder and elevator was displaced and twisted to the right.

The left fuel cap was secure, and the left fuel tank had some liquid present. The left fuel quantity sight gauge was half filled with clear river water. The right fuel cap was missing and not located at the scene. The right tank filler neck, gasket and skin exhibited mechanical fractures and displacements in a forward direction. The right fuel tank had a small amount of liquid present that did not smell like avgas and appeared to be brackish river water. The right fuel sight gauge was cloudy and had no indication of liquid. A fueling funnel with filter was located in the wreckage.

The master electrical switch was in the on position, the throttle lever was at idle, the mixture level was in the full rich position and the carburetor heat was off. The elevator trim indicated full down position. The fuel selector valve was between "right" and "off". The gascolator fuel filter had minor debris and brackish water present.

The engine was attached to the airframe and remained under water until recovery. The propeller was attached, and the blades were secure. Each of the two blades were bowed rearward with some span wise twist evident. One blade had significant chord wise scrapes at mid span. Examination of the engine revealed there were no preaccident anomalies with the cylinder barrels, pistons, cylinder heads, valves or valve seats. The spark plugs had corrosion but normal wear indications. The magnetos were attached, and spark was evident at each terminal when manually rotated. The carburetor was intact with the fuel inlet line fractured. The fuel inlet filter had white salt like debris present. The carburetor bowl had seawater present.

The ELT was secure in its mount in the "armed" position, connected to the antennae.

No preaccident anomalies were noted with the airframe or engine that would have precluded normal operation.

Additional Information

Aerodynamic Stall

Chapter 4 of the Airplane Flying Handbook, states the following concerning stalls.

A stall is an aerodynamic condition which occurs when smooth airflow over the airplane's wings is disrupted resulting in loss of lift. Specifically, a stall occurs when the AOA-the angle between the chord line of the wing and the relative wind-exceeds the wing's critical AOA. It is possible to exceed the critical AOA at any airspeed, at any attitude, and any power setting.

Medical and Pathological Information

The Alaska State Medical Examiner's Office, Anchorage, Alaska, performed an autopsy of the pilot and the passenger. The cause of death for both was blunt force injuries.

The FAA's Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma, performed toxicology tests on specimens from the pilot; results were negative for ethanol, drugs and carbon monoxide.

Survival Aspects

The USCG personnel who were the first on scene stated that the pilot was strapped into the front seat with only the lap belt. The shoulder harness fittings were not inserted into the buckle. Examination of the restraint system revealed that the overhead inertia reel was intact and attached to a structural tube that was fractured at both ends and deformed at the center bracket. The inertia reel was fully functional and exhibited no anomalies. The lapbelt buckle connector was undamaged and fully functional.

The rear seat shoulder harnesses and inertia reel were firmly attached to the structural overhead tubing that was separated by fractures at the welded joints. The reel was fully functional, and the harnesses and metal fittings exhibited no anomalies or signatures of forced release. The lapbelt webbing was attached firmly to the floor structure on either side of the seat and the buckle exhibited significant deformation outward.

Tests and Research

The ELT was an Ack Technologies model E-01 which was designed to transmit on 121.5 MHz. It was removed from the wreckage and tested at an avionics facility for functionality. The unit transmitted successfully, but only tested satisfactorily 3 out of 6 times with mechanical activation.

Administrative Information

Investigator In Charge (IIC):	Price, Noreen		
Additional Participating Persons:	Dwayne Edwards; Federal Aviation Administration; Juneau, AK		
Original Publish Date:	December 3, 2020	**Investigation Class:**	2
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97443		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.