Aviation Investigation Final Report

Location:	San Andreas, California	**Accident Number:**	WPR13LA050
Date & Time:	November 23, 2012, 15:30 Local	**Registration:**	N8VS
Aircraft:	Sater Coot A-Amphib	**Aircraft Damage:**	Substantial
Defining Event:	Aircraft structural failure	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A witness observed the airplane in a steep bank (estimated at between 60 and 80 degrees) while turning from the base leg to final approach in the traffic pattern. He then observed the airplane enter a spin and stated the airplane was in a near vertical nose-down attitude when the right wing separated from the airframe. Another witness reported that after the airplane's first spin revolution, the leading edge came off of a wing and that during the second spin revolution the other wing separated. A postaccident examination of the airplane revealed that both wings had separated from the airplane about the same spanwise location (about 17 inches outboard of the wing attach points). The right wing's front spar fracture face showed areas of tension and compression failures of the wood fibers that were consistent with the wing failing in a downward direction. Both the leading edge and front spar of the left wing had diagonal cuts through them that were consistent with having been struck by the airplane's propeller. The inboard front spar fracture face was examined, but the fiber failures were destroyed by the ground impact, so a directionality of failure could not be determined. However, the propeller strike on the leading edge and front spar could only occur if the left wing failed upward into the propeller. There were no obvious signs of rot or preexisting conditions in the wood spars examined, and none of the wing attachment bolts failed. The witness reports indicating that the airplane was in a continuous steepening turn from the downwind leg to final approach immediately before the accident and the observed damage suggest that the pilot's control inputs stressed the airplane's wings beyond their design capabilities.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's excessive flight control inputs, which led to flight that exceeded the structural limits

of the airplane and resulted in structural failure of both wings.

Findings

Aircraft	(general) - Capability exceeded
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Maneuvering	Aircraft structural failure (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On November 23, 2012, about 1530 Pacific standard time, a Sater Coot A-Amphibian experimental amateur-built airplane, N8VS, was substantially damaged following a loss of control and impact with terrain while maneuvering near the Calaveras County-Maury Rasmussen Field Airport (CPU), San Andreas, California. The pilot, who was the sole occupant of the airplane, sustained fatal injuries. The personal flight was being operated in accordance with 14 Code of Federal Regulations (CFR) Part 91, and no flight plan was filed. Visual meteorological conditions prevailed for the local flight, which had departed CPU about five minutes prior to the accident.

During the course of the investigation, the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) received statements from three witnesses. Two of the witnesses were friends of the pilot and had flown with him on the day of the accident, and just prior to the accident flight.

Witness #1, who is also a rated pilot, reported that he occupied the rear seat on the first flight of the day. He stated that during the flight the landing gear was left extended, the canopy was off, and that the accident pilot commented about how much more rudder was required to turn the airplane; the witness agreed, after he momentarily took control of the airplane. Subsequent to landing uneventfully and refueling, witness #1 stated that the accident pilot then flew a second flight at about 1420 with witness #2; he observed that the canopy was attached for this flight, but the landing gear remained extended. The witness revealed that the flight was uneventful, with the exception that the [traffic] pattern was wider with an extended downwind, the turns appeared to be of 20 to 30 degrees [of bank], smooth, and there was no visible overshoot [of the runway] on final. The witness reported that the accident pilot stated that he felt that the airplane handled poorly with the landing gear down, and that he was anxious to see how it handled with the gear up; the accident pilot then decided to fly the airplane once more to see how it handled with the gear up. The witness added that the accident pilot stated that he was going to do a flyby over the runway with the landing gear retracted and that they could tell him how everything looked after he returned. The witness observed the takeoff and noticed instantly that the climb rate had accelerated, and then watched it climb to about 1,500 feet above ground level (agl); the landing gear was never extended after it was retracted following the takeoff. The witness revealed that the airplane then flew about 2 miles before making a turn to [right] downwind, and that when established

on downwind he noticed that the airplane was traveling much faster than on the other flights. The witness further revealed that when the airplane was abeam the numbers he observed it make a base leg, but it did not square up on base leg, and that the bank angle increased in an effort not to overshoot the final approach leg. The witness added that when the airplane was [turning] from base to final the bank angle had increased to about 60 degrees, and at about 800 feet agl the airplane nosed down, appearing to stall. The witness stated that he then heard the power being applied and observed the airplane in a more nose down attitude and going into a spin. The witness added that after the first revolution of the spin he observed the leading edge come off of a wing, and after the second revolution and approaching a third, it appeared as if the other wing had separated. The airplane then went out of view.

Witness #2, who is also a rated pilot, reported that the accident pilot decided to take a second flight and asked him if he would like to go along, to which the witness accepted. The witness stated that after putting the canopy on and taking off, the accident pilot made right traffic before landing uneventfully. The witness reported that after they had returned the accident pilot said that he would go up again to cycle the landing gear; [he had not done this on the two previous flights]. The witness revealed that he observed the airplane depart and the landing gear retract without any negative issues. He added that at this time everything appeared to be normal as the airplane turned on to base leg . Then, at about the point where he should have started his turn from base leg to final the aircraft went into about a 75 to 80-degree descending left bank and about a 90-degree left turn, at which point the aircraft continued to roll inverted. The witnesses reported that he then observed the airplane in a near vertical [nose down] attitude when the right wing [separated], at which time it started to spin vertically. The witness added that the left wing was still attached to the airplane as it went out of sight, and that he did not recall hearing any change in the throttle or rpm during the entire flight, although after the airplane turned to the left the engine noise did increase.

Witness #3 was driving south on the main highway which borders the airport when he observed an airplane that he characterized as flying erratically in a right to left direction. The witness stated that he observed a relatively small piece separate from the body of the airplane, followed by it going into a vertical, straight down dive. The witness added that another pale-yellow piece separated completely away from the airplane early into the dive. He then lost sight of the aircraft behind a hill.

PERSONNEL INFORMATION

The pilot, age 68, held a private pilot certificate with airplane single-engine land, airplane multiengine land, and instrument airplane ratings. His most recent Federal Aviation Administration (FAA) third-class airman medical certificate was issued on December 1, 2010.

A review of the pilot's two most recent logbooks, #6 and #7, revealed that he had accumulated 5,138 hours of total flying time. There was not an accurate breakdown of flights time in single-engine and multiengine airplanes, as the only time forwarded from the previous logbooks was the total time. The last logbook entry was dated July 24, 2012; there was no recorded time in

the accident airplane make and model. The pilot's most recent flight review in accordance with Federal Aviation Regulation (FAR) 61.56, was dated April 27, 2008, and his most recent instrument proficiency check in accordance with FAR 61.57(d), was dated September 13, 2009.

AIRCRAFT INFORMATION

The airplane, a Sater Coot A-Amphibian, (serial number, Sater Coot #1), was a low wing, tricycle gear, propeller driven, two-seat amphibious homebuilt airplane. It was powered by a single Franklin 6A&6V335 engine, rated at 210 horsepower, and was mounted on a pedestal behind the cockpit in a pusher configuration. The airplane was designed with wing roots to act as sponsons to stabilize it in the water. No current maintenance records were recovered during the investigation.

METEOROLOGICAL INFORMATION

At 1555, the automated weather reporting facility located at the Stockton Metropolitan Airport (SCK), Stockton, California, about 35 nautical miles (nm) southwest of the accident site, reported wind 290 degrees at 5 knots, visibility 10 miles, sky clear, temperature 18 degrees Celsius (C), dew point 11 degrees C, and an altimeter setting of 30.18 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The accident site, which was located about 1.25 nm south of the approach end of runway 31 at CPU, was examined by a Federal Aviation Administration (FAA) aviation safety inspector assigned to the Sacramento Flight Standards District Office, Sacramento, California. The inspector reported that the main wreckage consisted of the remains of the fuselage, engine, and empennage in an inverted position. The right wing was located about 90 feet north-northwest of the main wreckage. Additionally, a large section of the left wing minus the leading edge was found about 40 feet south of the main wreckage and the left wing leading edge was found about 20 feet west of the right wing. The inspector reported that the site varied in slope from 10 to 20 degrees from the location of the right wing to where the fuselage came to rest. The tail section of the airplane was observed intact and inverted. The cockpit was destroyed with only the belly skin remaining, and the nose tip area of the cockpit was identified as the initial impact point. The inspector stated that one side of the cockpit was recovered with the glass intact, while the opposite side of the frame was partially intact with pieces of shattered glass observed throughout the accident site. Strips of fabric and splinters of wood frame were scattered throughout the area as far as 200 yards downhill from the main wreckage.

MEDICAL AND PATHOLOGICAL INFORMATION

On November 27, 2012, an autopsy was performed on the pilot by the Calaveras County Office of The Coroner, Angels Camp, California. The pilot's death was attributed to multiple traumatic injuries.

Toxicological testing was performed by the FAA Civil Aerospace Medical Institute (CAMI), Oklahoma City, Oklahoma. The report revealed that testing for carbon monoxide and cyanide was not performed, no ethanol was detected in either muscle or liver, and no listed drugs detected in liver.

TESTS AND RESEARCH

A detailed examination of the wreckage was performed by the Airworthiness Group assigned to the accident, which consisted of a NTSB structures engineer and a FAA airworthiness aviation safety inspector. The group reported that the entire airplane was accounted for in the wreckage. The main focus of the examination centered on the left and right wings, as they were both recovered away from the main wreckage site.

A review of the NTSB Group Chairman's Factual Report revealed:

Right wing

The right wing was recovered about 90 feet north-northwest of the main wreckage. The wing was essentially intact from the side-of-body out to the tip with the exception of the lower, inboard trailing edge aft of the rear spar that was recovered separately. The aileron remained attached to the wing. The fabric covered aluminum leading edge was intact with no apparent damage. The fabric was intact on both the upper and lower surfaces of the wing. The front and rear spars were fractured about 17 inches outboard of the wing attach points. The two forward and one rear attach bolts remained installed and intact. The front spar fractured through the outboard bolt holes for the upper and lower finger straps. The front spar fractured about 3 inches outboard of the point where the spar transitions from a rectangular cross section to a more conventional upper and lower cap with web cross section. The spar was also fractured spanwise through the center of the rectangular cross section area. Examination of the fracture showed areas of splintered fibers normally consistent with tension failure and areas of in-plane or flat fracture normally consistent with compression failure. The front spar fractures on the inboard and outboard portions matched. There were no obvious signs of rot or pre-existing conditions in the wood spars examined.

Left wing

A large section of the left wing minus the leading edge was found about 40 feet south of the main wreckage, and the leading edge was found about 20 feet west of the right wing. Most of the left wing was recovered in three main pieces. The largest piece included the rear spar, wing ribs, upper and lower fabric skins, and attached aileron. A section of the front spar, about 15 feet 8 inches long that extended from the wing tip inboard, was separated from the wing. The fabric covered aluminum leading edge skin was also recovered separated from the wing. The leading edge ribs were separated from the front spar and remained attached to the leading edge skin by the wing tip light wire. The front and rear spars were fractured about 17 inches outboard of the wing attach points. The two forward and one rear attach bolts remained

installed and intact. The front spar fractured through the outboard bolt holes for the upper and lower finger straps. A portion of the front spar, about 38 inches long, that included the attach points, a portion of the center section, and the inboard section of wing front spar was recovered separated near the main wreckage site. The left wing inboard fracture face was caked in dirt and mud that destroyed most of the fracture features. The left wing front spar had a diagonal cut that extended from the upper spar cap down and inboard about 18 inches to the lower spar cap. There was a matching U-shape cut area in the leading edge skin. The skin around the cut was curled inward. The area of the front spar between the inboard fracture and the cut was not conclusively identified in the wreckage. There were no obvious signs of rot or pre-existing conditions in the wood spars examined. (Refer to the Group Chairman's Factual Report, which is attached to the public docket.)

Pilot Information

Certificate:	Private	**Age:**	68,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	December 1, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 27, 2008
Flight Time:	5138 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Sater	**Registration:**	N8VS
Model/Series:	Coot A-Amphib	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	Sater Coot #1
Landing Gear Type:	Tricycle; Hull	**Seats:**	2
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	1950 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Franklin
ELT:	Not installed	**Engine Model/Series:**	6A&6V335
Registered Owner:	Russell W. Hackler	**Rated Power:**	145 Horsepower
Operator:	Russell Hackler	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SCK,33 ft msl	**Distance from Accident Site:**	30 Nautical Miles
Observation Time:	15:55 Local	**Direction from Accident Site:**	248°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.18 inches Hg	**Temperature/Dew Point:**	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	San Andreas, CA (CPU)	**Type of Flight Plan Filed:**	None
Destination:	San Andreas, CA (CPU)	**Type of Clearance:**	None
Departure Time:	15:30 Local	**Type of Airspace:**	

Airport Information

Airport:	Calaveras CO-Maury Rasmussen CPU	**Runway Surface Type:**	Asphalt
Airport Elevation:	1325 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	31	**IFR Approach:**	None
Runway Length/Width:	3603 ft / 60 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	38.14611,-120.648056

Administrative Information

Investigator In Charge (IIC):	Little, Thomas
Additional Participating Persons:	Thomas Weeks; Federal Aviation Administration; Sacramento, CA
Original Publish Date:	November 6, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85650