Aviation Investigation Final Report

Location:	Anderson, South Carolina	**Accident Number:**	ERA12FA303
Date & Time:	April 27, 2012, 12:56 Local	**Registration:**	N154CK
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot receiving instruction performed several takeoffs and landings with a flight instructor aboard. The flight instructor then disembarked and told the pilot to perform three additional solo takeoffs and landings (to a full stop), which the instructor observed from the ground. According to the flight instructor, the pilot's first flight around the airport traffic pattern appeared normal and terminated in a full stop landing and taxi back to the runway for the next takeoff. The instructor stated that the airplane appeared to touch down normally during the second landing; however, shortly thereafter the engine power increased and the airplane began to ascend. The airplane then climbed at a steep angle, entered an aerodynamic stall, and impacted terrain to the left of the runway.

Review of data recorded by an onboard recoverable data module showed that as the airplane approached the runway during the landing, the stall warning activated and 1 second later the pilot increased engine power. As the engine power increased, the airplane began an unarrested turn to the left and the pilot retracted the airplane's flaps from the fully extended to the fully retracted position, which was contrary to the airframe manufacturer's published procedure for a balked landing. The data showed that after it reached an altitude of about 75 feet above ground level, the airplane entered an aerodynamic stall, and then rolled left while pitching down. The data recording ended before the airplane impacted terrain.

Examination of the wreckage revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. The installed whole airframe parachute system likely deployed during the postimpact fire; however, given the low altitude at which the aerodynamic stall occurred, it is unlikely that preimpact deployment of the system would have positively affected the outcome of the accident.

Review of the pilot's flight logs showed that he had accumulated more than 330 total hours of flight experience, including more than 220 hours in the accident airplane; however, he had not previously flown the accident airplane solo before the accident flight. Review of autopsy and toxicology test results showed no evidence of any preexisting condition that would have been expected to result in the pilot's incapacitation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain control of the airplane during the aborted landing, which resulted in an aerodynamic stall and impact with terrain.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	(general) - Not attained/maintained

Factual Information

History of Flight

Takeoff	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On April 27, 2012, about 1256 eastern daylight time, a Cirrus Design Corp. SR22, N154CK, was substantially damaged when it impacted terrain shortly after takeoff from Anderson Regional Airport (AND), Anderson, South Carolina. The private pilot/owner was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the flight. The local personal flight was operated under the provisions of Title 14 Code of Federal Regulations Part 91.

The pilot's flight instructor, and close friend, recounted the events that transpired prior to and during the accident flight. According to the flight instructor, he had been providing the pilot with flight instruction toward his instrument rating in the weeks preceding the accident flight. The purpose of the flight on the day of the accident was to practice flying under visual flight rules. The flight originated at Greenville Downtown Airport (GMU), Greenville, South Carolina about 1000, and they proceeded to Oconee County Airport (CEU), Clemson, South Carolina, where the pilot performed 1 full stop practice landing, then departed for AND. The flight instructor then monitored the pilot as he performed about 6 or 7 practice takeoffs and landings, all of which terminated in a full stop and taxi back to runway 23. The pilot then taxied the airplane to the fixed base operator (FBO), where the flight instructor disembarked and told the pilot to perform 3 additional practice takeoffs and landings.

The pilot's first solo takeoff and landing appeared normal, and after the landing the pilot taxied the airplane back to the beginning of the runway before initiating the takeoff, as he had done previously with the flight instructor aboard. During the second circuit, the flight instructor observed the airplane's landing light on final approach to the runway. The airplane appeared to land normally, touching down within the first 10 to 15 percent of the runway. Expecting the airplane to continue down the runway and exit on a taxiway, he was surprised when he saw the landing light begin to ascend. As it approached, he could see that the airplane had pitched upward steeply, to an angle of about 40 degrees. The airplane climbed in that attitude until the left wing suddenly dropped, similar in appearance to an aerodynamic stall. The airplane then descended in a steep, nose-down attitude until the he lost sight of it behind sloping terrain southeast of runway 23.

PERSONNEL INFORMATION

The pilot, age 58, held a private pilot certificate with a rating for airplane single-engine land. According to his Federal Aviation Administration (FAA) airman file, the pilot was issued a Notice of Disapproval of Application following unsatisfactory performance of the practical portion of his private pilot certificate practical evaluation on November 14, 2009. The pilot was subsequently re-examined on Area

of Operation IV, Tasks D and F (Soft-Field Approach and Landing and Short-Field Approach and Landing), and issued a private pilot certificate on November 28, 2009. The pilot's most recent FAA third-class medical certificate was issued on July 22, 2010, with the limitation "Must have available glasses for near vision."

Review of the pilot's personal flight log showed that he began flight training in July 2008. He accumulated 113 total hours of flight experience between that time and the time he earned his private pilot certificate. All but 16 of those hours were completed in Cessna 172 airplanes. In December 2009, the pilot purchased the accident airplane, and since that time, the pilot had accumulated 226 additional hours of flight experience. Additionally, all of the flight experience the pilot had accumulated since that time were logged as either dual flight instruction, or logged with a flight instructor signoff.

METEOROLOGICAL INFORMATION

The weather conditions reported at AND, at 1256, included clear skies, visibility 10 statute miles, winds from 265 degrees magnetic at 9 knots, temperature 26 degrees Celsius (C), dew point 17 degrees C, and an altimeter setting of 30.02 inches of mercury. The calculated wind components for runway 23 included a headwind of 7 knots and a right crosswind of 5 knots.

AIRPORT IN FORMATION

The Anderson Regional airport was comprised of intersecting runways configured in a 5/23 and 17/35 orientation. Runway 23 was 6,002 feet long by 149 feet wide, was aligned on a heading of 231 degrees magnetic, and was equipped with a 4-light precision approach path indicator. A parallel taxiway was present on the northwest side of the runway, and the runway intersected runway 17/35 about 3,200 feet beyond the approach threshold. The airport elevation was 782 feet.

FLIGHT RECORDERS

Recoverable Data Module (RDM)

A crash-hardened flight data recording device was installed in the vertical stabilizer of the accident airplane, and was recovered from the airplane at the accident site. The RDM recorded numerous flight parameters at a rate of 1 Hz. Data from the RDM were downloaded without incident, and about 145 hours of flight time were present. The data contained the entirety of the accident flight. All altitudes given below are pressure altitudes recorded by the RDM, unless otherwise stated.

The details of the accident flight recorded by the RDM were consistent with the recount of events provided by the flight instructor. As the airplane was on final approach to runway 23, the flaps were fully extended, the airspeed varied between 91 and 99 knots, and the descent rate varied between 1,120 feet per minute and 688 feet per minute. During the final approach, the engine power generally decreased from about 32 percent power to 25 percent as the airplane crossed the runway threshold, at 1255:44.

The airplane continued to descend over the next 11 seconds until reaching a low altitude of 742 feet, about 1,700 feet beyond the runway threshold. During that time, the pitch remained relatively stable until 1255:54, when it began to increase, and the stall warning activated 1 second later. At 1255:56, the engine power began increasing and 3 seconds later, the flap position switch transitioned from the down

to the up position as the pitch continued to increase to a maximum of 13 degrees nose up. Over the next several seconds, the airplane began turning left and had departed the left lateral boundary of the runway by 1256:01. By 1256:03, the engine power had reached 101 percent, the stall warning remained active, the heading had drifted left from 234 degrees to 208 degrees, the pitch had increased to a maximum of 15 degrees nose up, and the airplane had climbed 75 feet.

The final data point was recorded at 1256:05. At that time, the airplane's pressure altitude was 825 feet (about 50 feet above ground level), the heading was 177 degrees, the pitch was 3 degrees nose up, the roll was 57 degrees left wing down, the airspeed was 70 knots, the stall warning was active, the flaps were retracted, and the engine power was at 98 percent. The airplane was 167 feet left of the runway boundary at that point.

WRECKAGE AND IMPACT INFORMATION

The initial impact point (IIP) was located about 250 feet from the left edge of runway 23, at a point about 2,730 feet from the runway threshold. The IIP was located about 128 feet south of the airplane's final RDM recorded position, on a 180-degree magnetic bearing. The IIP consisted of a 1.5-foot-deep crater that was 7 feet long by 5 feet wide. Located within the crater were two of the three composite propeller blades, which had separated at the propeller hub. An approximate 50-foot wreckage path, oriented about 160 degrees magnetic, led from the initial impact point to the main wreckage. Along the wreckage path were broken pieces of the engine cowling and windscreen. The main wreckage was oriented roughly 330 degrees magnetic, and consisted of the fuselage, wings, and empennage. The fuselage and right wing were almost completely consumed by a post-impact fire.

The fuselage, including the instrument panel, cabin, baggage compartment, and right wing, was nearly consumed by the post-impact fire. The left wing and empennage remained relatively intact.

Flight control continuity was confirmed from the rudder, elevator, and left aileron control surfaces to the cabin area; however, due to the extent of thermal damage, control continuity for the right aileron could not be confirmed. Measurement of the flap actuator correlated to the flaps being retracted at impact. The pitch and roll trim motors were found positioned near neutral trim positions.

The fuel selector was found set to the left main fuel tank position, and during the wreckage recovery about 15 gallons of fuel was recovered from the left wing fuel tank. The standby attitude indicator was recovered displaying a wings-level inverted attitude. No other flight instrument or switch positions could be discerned due to the extent of the post-impact fire damage.

The whole-airframe parachute system activation handle was located within its holder, with the safety pin removed. The parachute remained packed and was thermally damaged. The parachute system enclosure cover was found 10 feet to the right of the wreckage. Both reefing line cutters were found expended and had their ignition loops in place. The rocket motor, pick-up collar, lanyards, and incremental bridle were not located within the wreckage.

The engine remained attached to the firewall via various hoses, cables, and wires. Continuity of the valvetrain and powertrain were confirmed through rotation of the propeller. Compression was observed on all cylinders except number 5. Borescope examination of the cylinder revealed the presence of ingested dirt underneath both the intake and exhaust valve heads. Examination of both turbochargers revealed the presence of ingested dirt, though both remained free to rotate. The fuel pump input drive

rotated freely by hand and its input driveshaft was intact. Rotation of both magneto drives produced spark at all terminal leads.

Two of the three propeller blades had separated from their respective hub sockets, and were recovered from within the initial impact point.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Anderson County Coroner, Anderson, South Carolina. The stated cause of death was "blunt force trauma."

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on samples of the pilot's blood, urine, and vitreous. No carbon monoxide or cyanide was detected in the blood sample. No ethanol was detected in the vitreous sample. Ranitidine and Tamsulosin were detected in samples of blood and urine. Diphenhydramine, Ibuprofen, Nadolol, Quinine, and Tetrahydrozoline were only detected in the pilot's urine.

ADDITIONAL INFORMATION

According to the airframe manufacturer's Pilot's Operating Handbook, at the airplane's maximum gross weight and most forward center of gravity, with 0 degrees of bank, the indicated stall speed was 73 knots with the flaps retracted and 62 knots with the flaps fully extended.

The manufacturer's "Balked Landing/Go-Around" procedure stated in part, "…apply full power, then reduce the flap setting to 50%. If obstacles must be cleared during the go around, climb at 75-80 [knots indicated airspeed] with 50% flaps. After clearing any obstacles, retract the flaps and accelerate to the normal flaps up climb speed."

Review of guidance provided by the airframe manufacturer for deployment of the whole-airframe parachute system showed that, "Altitude loss from level flight deployments has been demonstrated at less than 400 feet. With these numbers in mind it might be useful to keep 2,000 feet AGL [above ground level] in mind as a cut-off decision altitude. Above 2,000 feet, there would normally be time to systematically assess and address the aircraft emergency. Below 2,000 feet, the decision to activate the [the whole-airframe parachute system] has to come almost immediately in order to maximize the possibility of successful deployment."

Pilot Information

Certificate:	Private	**Age:**	58,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 22, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 17, 2012
Flight Time:	339 hours (Total, all aircraft), 226 hours (Total, this make and model), 203 hours (Pilot In Command, all aircraft), 73 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N154CK
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3467
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 15, 2011 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	138 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	264 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-N
Registered Owner:	BILL AIR LLC	**Rated Power:**	310 Horsepower
Operator:	BILL AIR LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	AND,782 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	12:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	265°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	26°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Anderson, SC (KAND)	**Type of Flight Plan Filed:**	None
Destination:	Anderson, SC (KAND)	**Type of Clearance:**	None
Departure Time:	12:55 Local	**Type of Airspace:**	

Airport Information

Airport:	Anderson Regional Airport KAND	**Runway Surface Type:**	Asphalt
Airport Elevation:	782 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	23	**IFR Approach:**	None
Runway Length/Width:	6002 ft / 149 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.493888,-82.707778

Administrative Information

Investigator In Charge (IIC):	Diaz, Dennis
Additional Participating Persons:	Todd Clamp; FAA/FSDO; West Columbia, SC Brannon D Mayer; Cirrus Aircraft; Duluth, MN Jason Lukasik; Continental Motors Inc.; Mobile, AL
Original Publish Date:	July 18, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=83490