



National Transportation Safety Board Aviation Accident Final Report

Location:	Houston, TX	Accident Number:	CEN16FA211
Date & Time:	06/09/2016, 1309 CDT	Registration:	N4252G
Aircraft:	CIRRUS DESIGN CORP SR20	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot was attempting to land the airplane at a busy airport with high volume airline traffic. While attempting to sequence the airplane between airplanes, the air traffic controller issued numerous instructions to the pilot, which included changing runways multiple times. The pilot was instructed to go around twice by the local controller; the first time because an air carrier airplane was overtaking the accident airplane and the second time because the airplane was too high to make a safe landing. During the airplane's third approach, a new local controller came on duty. On this approach, the pilot again had difficulty descending fast enough to make a safe landing, and she elected to perform another go-around. The new local controller then issued the pilot a lengthy clearance as the pilot was performing the go-around procedure. Data retrieved from the airplane revealed that, during the go-around, the pilot did not follow the recommended go-around procedure; specifically, the pilot did not attain a speed between 81 to 83 knots indicated airspeed (KIAS) before raising the flaps. Rather, the airplane's airspeed was 58 KIAS when the pilot raised the airplane's flaps while in a left turn, which resulted in exceedance of the critical angle of attack and a subsequent aerodynamic stall and spin into terrain.

Postaccident examination of the airframe and engine did not reveal any anomalies that would have precluded normal operation. The air traffic control instructions given to the pilot during the three approaches were complex and potentially distracting. The initial local controller elected to keep the airplane in the traffic pattern rather than transferring the airplane to an approach controller for resequencing when airline traffic interrupted the pilot's first landing attempt and when the pilot displayed difficulty landing the airplane on her second landing attempt. The complex instructions from the second local controller during the pilot's go-around following her third landing attempt, were unnecessary at that time and likely distracted the pilot from monitoring critical flight parameters.

The pilot was attempting to comply with ATC instructions throughout the flight and the pilot's actions are understandable as the instructions were largely consistent with the pilot's goal to land at the busy airport. However, compliance with ATC instructions greatly increased the

pilot's workload as it led to an extended period of close-in maneuvering at a Class B airport due to the larger and faster airplanes converging on the airport. During this extended period of maneuvering the pilot did not assert the responsibilities that accompany being a pilot-in-command and did not offload the workload by either requesting to be re-sequenced, telling the controller to standby, or stating "unable." This allowed for an increased likelihood of operational distractions associated with air traffic communications and affected the pilot's ability to focus on aircraft control.

Probable Cause and Findings

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

The pilot's improper go-around procedure that did not ensure that the airplane was at a safe airspeed before raising the flaps, which resulted in exceedance of the critical angle of attack and resulted in an accelerated aerodynamic stall and spin into terrain. Contributing to the accident were the initial local controller's decision to keep the pilot in the traffic pattern, the second local controller's issuance of an unnecessarily complex clearance during a critical phase of flight. Also contributing was the pilot's lack of assertiveness.

Findings

Aircraft	Angle of attack - Capability exceeded (Cause) Airspeed - Not attained/maintained (Cause)
Personnel issues	Incorrect action performance - Pilot (Cause) Motivation/respond to pressure - Pilot (Factor) Decision making/judgment - ATC personnel (Factor) Unnecessary action - ATC personnel (Factor)

Factual Information

History of Flight

Approach-VFR go-around	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On June 9, 2016, at 1309 central daylight time, a Cirrus SR20 airplane, N4252G, impacted terrain following a loss of control during a go-around at William P. Hobby Airport (HOU), Houston, Texas. The private pilot and the two passengers were fatally injured, and the airplane sustained substantial damage. The airplane was registered to and operated by Safe Aviation, LLC, Moore, Oklahoma, under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as a personal flight. Visual meteorological conditions prevailed, and a visual flight rules flight plan had been filed. The airplane departed from University of Oklahoma Westheimer Airport (OUN), Norman, Oklahoma, about 1000 and was destined for HOU.

As the airplane approached HOU, a high-volume air carrier airport surrounded by Class B airspace, the pilot was given numerous instructions by air traffic controllers to sequence it between several Boeing 737 airplanes. An air traffic control (ATC) group was formed to review the interactions between the controllers and the pilot. The following information was extracted from the ATC group report, which is available in the public docket of this investigation.

- 1252:47 – The pilot contacted HOU tower, and the local controller cleared the pilot to land on runway 4 and told her to follow a Boeing 737 that was on a 3-mile final approach to runway 4.
- 1254:39 – The local controller directed the pilot to maintain maximum forward airspeed due to a Boeing 737 on a 9-mile final approach that was trailing the airplane and traveling 80 knots faster.
- 1256:58 – Due to the trailing Boeing 737, which was overtaking the airplane, the local controller directed the pilot to go around and fly runway heading.
- 1257:37 – The local controller instructed the pilot to make a right base to runway 35, informed her of another Boeing 737 on a 5-mile final for runway 4, and stated that she would be landing before the Boeing 737.
- 1258:16 – The local controller told the pilot that he would call her base turn.
- 1258:48 – The local controller issued a traffic advisory for an additional Boeing 737 inbound to runway 4, and the pilot reported that traffic in sight. The local controller told the pilot to pass behind that traffic and land on runway 35.
- 1259:20 – The local controller asked the pilot to turn left 30° to resolve a perceived traffic conflict between the airplane and the inbound Boeing 737.
- 1259:30 – The local controller asked the pilot if she would like to follow the Boeing 737 to runway 4. The pilot responded that she would, and the local controller cleared her to land on runway 4. A few seconds later the local controller told the pilot, "just maneuver back for the straight-in, I don't know which way you're going now, so just turn back around to runway 35."
- 1300:13 – The local controller asked the pilot which direction she was turning. She responded, "I thought I was turning a right base for 35..." The controller asked her to keep the right turn "tight," and the pilot acknowledged.

1300:31 – The local controller cleared the pilot to perform a straight-in approach to runway 35, and the pilot replied, "straight in to runway 35 and I don't believe I'm lined up for that." According to radar data, at this time, the airplane was about 2 nautical miles south of runway 35. The local controller told the pilot to turn right to a heading of 040° and climb to 1,600 ft.

1301:16 – The airplane was southeast of runway 35, heading 040°, and the local controller told the pilot to make a right turn to land on runway 35. 1302:02 – The local controller prompted the pilot to begin her descent to land on runway 35, and the pilot replied that she was "trying to lose altitude."

1303:25 – The local controller told the pilot that she "might be too high." The pilot replied that she would perform a go-around, and the controller acknowledged and told her to fly a right traffic pattern for runway 35.

1304:38 – The local controller told the pilot that she was cleared to land on runway 35 and that no other traffic was expected inbound.

1306:00 – The local controller advised the pilot of a Boeing 737 on a short final to runway 4 ahead of her, and the pilot acknowledged that she had the airplane in sight.

1307:03 – The local controller provided a wind check and cleared the pilot to land on runway 35, and the pilot replied, "35 cleared to land trying to get down again."

1307:49 – A new local controller took over the position.

1308:21 – The airplane was over runway 35, and the pilot called that she was going around. The new local controller responded with the following 16-second transmission, "OK, Cirrus 52G, just go ahead and make the left turn now to enter the downwind, midfield downwind for runway 4, if you can just keep it in a nice tight low pattern, I'm going to have traffic 4 miles behind you so I need you to just kind of keep it in tight if you could." The pilot responded, "OK, this time will be runway 4, turning left, 4252G." The controller continued with the following 23-second transmission, "And actually I might end up sequencing you behind that traffic, he's on 4 miles a minute, um, it is gonna be a bit tight with the one behind it so when you get on the downwind, stay on the downwind and advise me when you have that 737 in sight. We'll either do 4 or we might swing you around to 35, uh, uh, ma'am, ma'am, uh, straighten up, straighten up!"

Witnesses saw the airplane at a low altitude when it turned to the left and descended. A security camera video showed that the airplane spun to the left and was about 45° nose down in a slightly left-wing-low attitude before impact with terrain. The airplane impacted an unoccupied automobile in a hardware store parking lot about 1/2-mile north of runway 35. The video showed that the airplane's airframe parachute rocket motor activated during the impact; however, the parachute remained stowed in the empennage and did not deploy.

Pilot Information

Certificate:	Private	Age:	46, Female
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 Without Waivers/Limitations	Last FAA Medical Exam:	10/28/2014
Occupational Pilot:	No	Last Flight Review or Equivalent:	05/02/2014
Flight Time:	332.6 hours (Total, all aircraft), 303.6 hours (Total, this make and model), 253 hours (Pilot In Command, all aircraft), 28 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

A review of the pilot's logbook revealed that she received her private pilot certificate on May 2, 2014. According to the logbook, she had landed within Class B airspace at least four times. Her most recent flight in Class B airspace was to Dallas Love Field (DAL), Dallas, Texas, and consisted of a landing on May 30, 2016, and a takeoff on June 3, 2016. There was no evidence that she had flown to HOU before the accident flight.

Interviews with the pilot's flight instructors and review of her logbook did not find evidence that the pilot had completed a flight review in the previous 24 calendar months, as required by 14 CFR 61.56(c). (Title 14 CFR 61.56(c) states that a person may not act as pilot-in-command of an aircraft unless that person has accomplished a satisfactory flight review within the preceding 24 calendar months.)

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	Registration:	N4252G
Model/Series:	SR20	Aircraft Category:	Airplane
Year of Manufacture:	2012	Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	2217
Landing Gear Type:	Tricycle	Seats:	5
Date/Type of Last Inspection:	01/16/2016, Annual	Certified Max Gross Wt.:	3050 lbs
Time Since Last Inspection:	42 Hours	Engines:	1 Reciprocating
Airframe Total Time:	429 Hours at time of accident	Engine Manufacturer:	CONT MOTOR
ELT:	C126 installed, activated, aided in locating accident	Engine Model/Series:	IO-360-ES
Registered Owner:	SAFE AVIATION LLC	Rated Power:	200 hp
Operator:	SAFE AVIATION LLC	Operating Certificate(s) Held:	None

The manufacturer's checklist for a balked landing/go-around states that the airplane should be pitched to maintain the best angle of climb, between 81 to 83 knots indicated airspeed (KIAS), before raising the flaps. The manufacturer's published stall speed at 0° bank angle, idle power, and flaps up is 69 KIAS. The stall speed at 0° bank angle, idle power, and flaps full down is between 59-61 KIAS. An excerpt from the pilot's operating handbook concerning stall speeds is located in the public docket of this investigation.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KHOU, 47 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	1753 UTC	Direction from Accident Site:	164°
Lowest Cloud Condition:	/ 3600 ft agl	Visibility	10 Miles
Lowest Ceiling:	Broken / 3600 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	12 knots / 16 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	100°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.94 inches Hg	Temperature/Dew Point:	32° C / 22° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	NORMAN, OK (OUN)	Type of Flight Plan Filed:	VFR
Destination:	Houston, TX (HOU)	Type of Clearance:	VFR
Departure Time:	1000 CDT	Type of Airspace:	Class B

Data from the National Oceanic and Atmospheric Administration showed that, at the accident location, at 1309, the altitude of the sun was about 83° above the horizon, and the azimuth of the sun was about 158°.

Airport Information

Airport:	WILLIAM P HOBBY (HOU)	Runway Surface Type:	Concrete
Airport Elevation:	46 ft	Runway Surface Condition:	Dry
Runway Used:	35	IFR Approach:	None
Runway Length/Width:	6000 ft / 150 ft	VFR Approach/Landing:	Go Around

HOU has 4 runways: 4/22, 35/17, 13L/31R, and 13R/31L. According to HOU tower personnel, in the period leading up to the accident, HOU was landing runways 4 and 35 and departing runways 4, 12L/R, and 35. Most of the traffic was landing on runway 4 and departing from runway 12R.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	2 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Fatal	Latitude, Longitude:	29.660000, -95.289444 (est)

All major airplane components were accounted for at the accident site. The nose of airplane was aligned about 330° magnetic. The propeller was separated just aft of the propeller flange. All three blades remained attached to the hub and displayed curling, chordwise scratches, and leading edge nicks and gouges. The wing remained attached to the fuselage.

Medical And Pathological Information

The Harris County Institute of Forensic Sciences, Houston, Texas, conducted an autopsy on the pilot. The cause of death was multiple blunt force injuries, and the manner of death was ruled an accident.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilot. Testing was negative for carbon monoxide and ethanol. The following substances were detected:

Ibuprofen detected in urine
Naproxen detected in urine
Zolpidem detected in heart blood

Ibuprofen and naproxen are non-steroidal anti-inflammatory drugs, and their use would generally not present a hazard to aviation safety. Zolpidem is a prescription medication used to treat insomnia and may impair mental and/or physical ability required for the performance of potentially hazardous tasks, such as driving, flying, and operating heavy machinery. Due to adverse side-effects, the FAA recommends waiting at least 24 hours after use of zolpidem before flying.

On the pilot's most recent medical application, she reported the use of doxycycline and dapsons for acne. The use of zolpidem was not reported.

Tests And Research

The airplane was equipped with a Garmin G1000 Integrated Flight Deck and a Heads Up Technologies recoverable data module (RDM) data recorder. Flight data recorded by these

devices were downloaded by the National Transportation Safety Board's Vehicle Recorder Division in Washington, DC. Review of the data revealed that, at 1308:19, the airplane began to pitch nose up, while at 63 knots indicated airspeed (KIAS) and 102.8 ft mean sea level (msl). The airplane began climbing at 9-11° nose up, while traveling at 66-74 KIAS with full flaps extended. According to ATC communications, at 1308:21 the pilot reported the go-around and the tower controller begin transmitting a clearance. At 1308:26, the airspeed was 74 KIAS, which was the highest airspeed that the airplane achieved during the climb out, and the airspeed then began to decrease. At 1308:36, the tower controller finished his clearance and began another part of the clearance at 1308:42 and continued transmitting past the last recorded point. At 1308:45, the airplane entered a left turn with the airspeed decreasing through 64 KIAS. At 1308:52, power was reduced from 94% to about 81%, with a corresponding reduction in engine parameters. The flaps were moved from full to half flaps at 1308:56, with the airplane at 13° nose up, 18° of left bank, and 62 KIAS. The flaps were fully retracted (0° flaps) at 1309:02 with the airplane in a 26° left bank and travelling at 58 KIAS. One second later, the airplane was in a 71° left bank, the pitch dropped to 5° nose low, and engine power increased to 90%. No further data were recorded.

Additional Information

FAA Advisory Circular (AC) 61-98C, "Current Requirements and Guidance for the Flight Review and Instrument Proficiency Check," dated November 20, 2015, states, in part, that the intent of a flight review is a routine evaluation of the pilot's ability to conduct a safe flight. The AC further states that, regardless of the pilot's experience, the flight instructor should review at least those maneuvers considered critical to safe flight such as stabilized approaches to landings, slow flight, stall recognition, stalls, stall recovery, and spin recognition and avoidance.

FAA Safety Team AFS-850 16-08, "Fly the Aircraft First," dated August 2016, provides a reminder to pilots to maintain aircraft control at all times. It states, in part, "The top priority – always – is to aviate." It further states, "Rounding out those top priorities are figuring out where you're going (Navigate), and, as appropriate, talking to ATC or someone outside the airplane (Communicate). It seems simple to follow, but it's easy to forget when you get busy or distracted in the cockpit."

Administrative Information

Investigator In Charge (IIC):	Jason T Aguilera	Report Date:	12/12/2017
Additional Participating Persons:	Christopher Cotton; FAA Houston FSDO; Houston, TX Kurt Gibson; Continental Motors Inc; Mobile, AL Bradley T Miller; Cirrus Aircraft Corporation; Duluth, MN Brannon Mayer; Cirrus Aircraft Corporation; Duluth, MN Les Doud; Hartzell Propeller Inc; Piqua, OH		
Publish Date:	12/12/2017		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93351		

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.

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