Aviation Investigation Final Report

Location:	Newport News, Virginia	**Accident Number:**	ERA23FA008
Date & Time:	October 6, 2022, 15:07 Local	**Registration:**	N97883
Aircraft:	Cessna 172	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	1 Fatal, 2 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor was giving the student pilot his first flight lesson in an airplane. According to the pilot-rated passenger, who was observing the flight in the back seat, the student pilot assisted with the takeoff. The instructor told the student that she would tell him when to start pulling back during the takeoff roll. The instructor then initiated the takeoff roll and when the airplane reached rotation speed, she told the student pilot to start pulling back. The student pilot pulled back on the control wheel and the airplane began to climb. However, he continued to pull back and the airplane stalled less than 200 ft above the ground. The left wing dropped, and the airplane descended toward the ground. The flight instructor tried to get control of the airplane, but it was too late, and the airplane impacted a ditch adjacent to the runway. A postaccident examination of the airplane and engine revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation.

Though part of the flight lesson syllabus included instruction on the positive exchange of flight controls, the student pilot could not recall what instruction the flight instructor gave him regarding the takeoff. His only memory of the flight was when the airplane was airborne and stalling. He did not remember if his hands were on the controls. The pilot-rated passenger did not recall the flight instructor discussing positive transfer of the flight controls before taking off.

Though the flight instructor provided the student pilot instruction on how to perform the takeoff, she most likely did not anticipate that he would continue to pull back on the controls after the airplane became airborne. The airplane then exceeded its critical angle of attack and stalled. The instructor attempted to regain control, but the airplane did not have sufficient altitude to recover and it impacted the ground.

Probable Cause and Findings

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

The flight instructor's failure to monitor the student pilot on takeoff and her delayed remedial action to stop him from exceeding the airplane's critical angle of attack, which resulted in a low altitude aerodynamic stall from which she was unable to recover.

Findings

Personnel issues	Monitoring other person - Instructor/check pilot
Personnel issues	Delayed action - Instructor/check pilot
Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	Pitch control - Capability exceeded
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Initial climb	Aerodynamic stall/spin (Defining event)
Initial climb	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On October 6, 2022, at 1507 eastern daylight time, N97883, a Cessna 172, was substantially damaged when it impacted terrain on takeoff from the Newport News/Williamsburg International Airport (PHF), Newport News, Virginia. The flight instructor was fatally injured, and the student pilot and the pilot-rated passenger were seriously injured. The flight was being conducted as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

A review of airport surveillance video revealed that after the airplane departed runway 20, it entered a steep, nose-high pitch attitude and climbed to an altitude of about 50-100 ft above the runway before the left-wing dropped rapidly. The airplane then entered a descending left turn before it impacted terrain west of the runway.

A witness, who was a flight instructor, was taxiing south on taxiway Alpha when he observed the accident airplane in a nose-high pitch attitude (about 30° nose up) on takeoff. He said the airplane reached a height of about 200 ft above the ground when the left wing “stalled” and dropped. The witness thought the instructor of the accident airplane tried to recover from the stall because the airplane’s wings leveled out momentarily before the left wing dropped again, and the airplane hit the ground on its belly. The witness described what he observed as a “power on stall.”

The pilot-rated passenger onboard the accident airplane, who was seated behind the student pilot in the rear left seat, knew the student pilot from school. The student pilot had asked him to go on the flight because he was nervous about this being his first training flight. The pilot-rated passenger said the flight instructor had the student pilot assist with the takeoff. She had him place his hands on the control wheel and advised him that she would tell him when to start pulling back during the takeoff roll. The pilot-rated passenger said the takeoff roll was normal, and when the airplane reached rotation speed, the flight instructor told the student pilot to start pulling back on the control wheel. The student pilot pulled back on the control wheel and the airplane lifted off the runway. The pilot-rated passenger said everything was normal "at first" and the airplane began to climb. But the student pilot kept pulling back on the control wheel and the airplane pitched up, the stall horn came on, and the airplane began to stall before it “nose-dived” to the ground. The stall horn stayed on until impact. The pilot-rated passenger

said the flight instructor was trying hard to get control of the airplane before it hit the ground. He thought she may have pushed the nose over at one point, but by the time she could get control, “it was too late.”

The student pilot said that this was his first training flight. He was more “excited than nervous” and the pilot-rated passenger was there because he just wanted to come along and “see the flight.” The student pilot said he met the flight instructor once before the flight and she told him the first lesson would involve learning how to performa a preflight inspection of an airplane followed by a flight around the local area. The student pilot said that before boarding the airplane the flight instructor showed him how to perform a preflight inspection of the airplane.

The student pilot said that he did not recall portions of the accident, but he did recall the flight instructor starting the engine and taxiing to the runway. He did not recall if the flight instructor told him how they were going to perform the takeoff roll, or the actual takeoff roll itself. However, he remembered being airborne and the airplane “stalling.” He said the nose of the airplane “was really high” and the back of the airplane was low. The student pilot did not recall hearing the stall horn, but remembered the flight instructor was “yelling.” He did not remember what she was saying, and he did not recall if his hands were on the control wheel. The student pilot said he “blacked out” (he thought due to shock), and he did not remember the airplane impacting the ground. His next memory was waking up in the hospital.

PILOT INFORMATION

The flight instructor’s logbook was not recovered. Information provided by the flight school that operated the airplane revealed that she had accrued about 333.8 total flight hours at the time of the accident, about 75.5 hours of which were as a flight instructor.

WRECKAGE INFORMATION

The airplane came to rest in a ditch on a magnetic heading of about 090°. All major components of the airplane were located at the accident site and there was no postimpact fire. The engine was pushed into the firewall and the fuselage, both wings, and the empennage sustained substantial damage. The tail control surfaces exhibited minor to no damage. Flight control continuity was established from all major flight control surfaces to the cockpit. The flap actuator was in the fully retracted position and the elevator trim tab actuator was found in the 5° tab up position.

The engine was separated from the airframe and examined. When the engine was manually rotated via the propeller, valvetrain continuity and compression were established on each cylinder. A lighted borescope was used to examine the interior of each cylinder and no anomalies were noted. All eight spark plugs were removed from the engine and exhibited normal wear/color per the Champion Check-A-Plug chart. Both magnetos remained attached to the engine and no damage was noted. Both magnetos produced spark from all ignition towers when rotated by hand.

Examination of the fuel system revealed that both wing fuel tanks were breached from impact and contained an unmeasured amount of fuel. Both fuel caps were secure to each wing. Air was blown through the fuel/vent lines and no blockages were noted. The fuel selector was on "both" and a small amount of 100LL fuel was observed in the airframe fuel filter bowl. Some debris was noted in the bowl, but the filter screen was absent of debris. The carburetor remained attached to the engine and no external damage was noted. The throttle cable remained attached to the carburetor throttle control arm and the arm was positioned in a mid-range position. The cockpit throttle control knob was also observed in a mid-range position.

A postaccident examination of the airplane and engine revealed no evidence of any mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was completed on the flight instructor by the Department of Health, Office of the Chief Medical Examiner, Norfolk, Virginia, on October 7, 2022. The cause of death was determined to be multiple blunt force injuries and the manner of death was an accident.

Toxicology testing performed at the Federal Aviation Administration Forensic Sciences Laboratory identified Fluconazole in the instructor's heart blood and liver. Fluconazole is a drug that treats fungal infections and is not considered impairing.

Hospital admission blood and urine specimens for the student pilot were requested within 24 hours of the accident; however, the specimens were not provided for testing until three weeks after the accident. As such, the specimens would not provide any toxicological insight into the condition of the student pilot at the time of the accident. No testing was performed.

ADDITIONAL INFORMATION

A review of the flight school's Flight Course Syllabus – Flight Lesson 1- Introductory Flight, revealed the following objectives:

-Review and understand the use of checklists during the preflight Inspection, engine starting, before-takeoff, after-landing parking, and securing procedures.

-Identify the required certificates and documents on board the airplane.

-Locate and understand how to use onboard safety equipment including the fire extinguisher and first aid kit.

-Understand the technique for the positive exchange of flight controls.

-Understand how to taxi the airplane including using the brakes.

-Become familiar with collision avoidance procedures.

-Become familiar with a normal takeoff and climb; and normal approach and landing.

-Understand how to conduct basic maneuvers including straight-and-level flight, climbs, descents, level offs, and medium-banked turns.

-Understand how to use the trim controls to relieve control pressures.

The student said he did not recall any instruction provided by the flight instructor before takeoff. According to the pilot-rated passenger, he did not recall the flight instructor discussing the technique used for a positive exchange of the flight controls with the student pilot before takeoff.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	22,Female
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	October 16, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 20, 2022
Flight Time:	(Estimated) 333.8 hours (Total, all aircraft), 299.5 hours (Pilot In Command, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	18,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	August 27, 2022
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	0 hours (Total, all aircraft), 0 hours (Total, this make and model)		

Pilot-rated passenger Information

Certificate:	Private	**Age:**	18,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	June 15, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 26, 2021
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N97883
Model/Series:	172 P	**Aircraft Category:**	Airplane
Year of Manufacture:	1984	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	17276237
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 27, 2022 100 hour	**Certified Max Gross Wt.:**	2408 lbs
Time Since Last Inspection:	8.2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	12472 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-320 D2J
Registered Owner:	RICK AVIATION INC	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	Pilot school (141)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PHF,42 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	14:54 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	24°C / 10°C
Precipitation and Obscuration:			
Departure Point:	Newport News, VA	**Type of Flight Plan Filed:**	None
Destination:	Newport News, VA	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class D

Airport Information

Airport:	NEWPORT NEWS/WILLIAMSBURG INTL PHF	**Runway Surface Type:**	Concrete
Airport Elevation:	42 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	20	**IFR Approach:**	None
Runway Length/Width:	6526 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 2 Serious	**Latitude, Longitude:**	37.131889,-76.492972

Preventing Similar Accidents

Prevent Aerodynamic Stalls at Low Altitude (SA-019)

The Problem

While maneuvering an airplane at low altitude in visual meteorological conditions, many pilots fail to avoid conditions that lead to an aerodynamic stall, recognize the warning signs of a stall onset, and apply appropriate recovery techniques. Many stall accidents result when a pilot is momentarily distracted from the primary task of flying, such as while maneuvering in the airport traffic pattern, during an emergency, or when fixating on ground objects.

What can you do?

- Be honest with yourself about your knowledge of stalls and your preparedness to recognize and handle a stall situation in your airplane. Seek training to ensure that you fully understand the stall phenomenon, including angle-of attack (AOA) concepts and how elements such as weight, center of gravity, turbulence, maneuvering loads, and other factors affect an airplane's stall characteristics.
- Remember that an aerodynamic stall can occur at any airspeed, at any attitude, and with any engine power setting.
- Remember that the stall airspeeds marked on the airspeed indicator (for example, the bottom of the green arc and the bottom of the white arc) typically represent steady flight speeds at 1G at the airplane's maximum gross weight in the specified configuration. Maneuvering loads and other factors can increase the airspeed at which the airplane will stall. For example, increasing bank angle can increase stall speed exponentially. Check your airplane's handbook for information.
- Reducing AOA by lowering the airplane's nose at the first indication of a stall is the most important immediate response for stall avoidance and stall recovery.
- Manage distractions when maneuvering at low altitude so that they do not interfere with the primary task of flying.
- Resist the temptation to perform maneuvers in an effort to impress people, including passengers, other pilots, persons on the ground, or others via an onboard camera. "Showing off" can be a deadly distraction because it diverts your attention away from the primary task of safe flying.
- Understand that the stall characteristics of an unfamiliar airplane may differ substantially from those of airplanes with which you have more flight experience.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-019.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

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