



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Ravenna, Ohio	<b>Accident Number:</b>	GAA17CA337
<b>Date &amp; Time:</b>	June 11, 2017, 11:50 Local	<b>Registration:</b>	N33FM
<b>Aircraft:</b>	Cessna 172	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

## Analysis

The flight instructor reported that, during an instructional flight, while on short final, he told the student pilot to "pitch down" to maintain airspeed. He added that the student did not respond and that he again instructed the student to "pitch down now" while simultaneously pressing forward on the yoke. He further added that, as he pushed forward on the yoke, the student "pulled [back] with equal force on the yoke." Subsequently, the flight instructor pushed forward on the yoke "with greater force" than the previous attempt and stated, "my plane," to the student, but "continued to wrestle the controls with the student" as the airplane entered an aerodynamic stall. The airplane then impacted the runway threshold hard, the nose landing gear collapsed, and the airplane veered off the runway to the right.

The student pilot reported that this was his first flight with this flight instructor but that he had accumulated about 82 hours of dual instruction previously. He added that, during the second landing of the day, while on final approach, "the instructor had me pull the power and told me nose down." He further added that he "felt we were getting low and I told the instructor I wanted to increase power but the instructor told me to 'nose down.'" The student pilot reported that the instructor again stated multiple times to "nose down," but he "did not believe there was enough room to continue nose down." The student pilot reported that the flight instructor subsequently took the flight controls and nosed the airplane down and that the airplane impacted the runway threshold hard and veered off the runway.

The fuselage and firewall sustained substantial damage.

The flight instructor and student pilot reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

During postaccident correspondence with the National Transportation Safety Board investigator-in-charge, the flight instructor reported that he could not recall if, during preflight, he and the student pilot discussed the positive transfer of the flight controls.

Federal Aviation Administration Advisory Circular 61-115, "Positive Exchange of Flight Controls Program," dated March 10, 1995, stated, in part:

During flight training, there must always be a clear understanding between students and flight instructors of who has control of the aircraft. Prior to flight, a briefing should be conducted that includes the procedure for the exchange of flight controls. A positive three-step process in the exchange of flight controls between pilots is a proven procedure and one that is strongly recommended.

When an instructor is teaching a maneuver to a student, the instructor will normally demonstrate the maneuver first, then have the student follow along on the controls during a demonstration and, finally, the student will perform the maneuver with the instructor following along on the controls. When the flight instructor wishes the student to take control of the aircraft, he/she says to the student, "You have the flight controls." The student acknowledges immediately by saying, "I have the flight controls." The flight instructor again says, "You have the flight controls." During this procedure, a visual check is recommended to see that the other person actually has the flight controls. When returning the controls to the instructor, the student should follow the same procedure the instructor used when giving control to the student. The student should stay on the controls and keep flying the aircraft until the instructor says, "I have the flight controls." There should never be any doubt as to who is flying the aircraft.

## 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 perform a go-around during final approach, which resulted in an aerodynamic stall and a hard landing. Contributing to the accident was the flight instructor's failure to brief the student pilot on the positive transfer of aircraft control during preflight.

### Findings

Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	Angle of attack - Capability exceeded
Personnel issues	Lack of action - Instructor/check pilot
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Forgotten action/omission - Instructor/check pilot
Personnel issues	Lack of communication - Instructor/check pilot

## Factual Information

### History of Flight

<b>Prior to flight</b>	Miscellaneous/other
<b>Approach-VFR pattern final</b>	Aerodynamic stall/spin
<b>Approach-VFR pattern final</b>	Loss of control in flight (Defining event)
<b>Landing-flare/touchdown</b>	Hard landing
<b>Landing-landing roll</b>	Runway excursion

### Flight instructor Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	62, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	February 15, 2017
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	April 27, 2016
<b>Flight Time:</b>	(Estimated) 2037 hours (Total, all aircraft), 326 hours (Total, this make and model), 2001 hours (Pilot In Command, all aircraft), 68 hours (Last 90 days, all aircraft), 32 hours (Last 30 days, all aircraft)		

### Student pilot Information

<b>Certificate:</b>	Student	<b>Age:</b>	56, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	June 28, 2016
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 93.5 hours (Total, all aircraft), 22.6 hours (Total, this make and model), 26.8 hours (Last 90 days, all aircraft), 15.1 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N33FM
<b>Model/Series:</b>	172 S	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2012	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	172S11196
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	October 17, 2016 Annual	<b>Certified Max Gross Wt.:</b>	2250 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	250.2 Hrs as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	C126 installed	<b>Engine Model/Series:</b>	IO-360-L2A
<b>Registered Owner:</b>		<b>Rated Power:</b>	180 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KPOV, 1197 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	15:57 Local	<b>Direction from Accident Site:</b>	0°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	10 knots /	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	270°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	30.11 inches Hg	<b>Temperature/Dew Point:</b>	26°C / 15°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	RAVENNA, OH (POV )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	RAVENNA, OH (POV )	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	11:00 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	PORTAGE COUNTY POV	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	1197 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	27	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3499 ft / 75 ft	<b>VFR Approach/Landing:</b>	Full stop;Traffic pattern

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	41.210277,-81.251663(est)

## Preventing Similar Accidents

### Prevent Aerodynamic Stalls at Low Altitude

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.

An aerodynamic stall can happen at any airspeed, at any altitude, and with any engine power setting. Pilots need to be honest with themselves about their knowledge of stalls and preparedness to recognize and handle a stall situation. Training can help pilots fully understand the stall phenomenon, including angle-of-attack concepts and how weight, center of gravity, turbulence, maneuvering loads and other factors can affect an airplane's stall characteristics. The stall characteristics may be different in each type of plane, so learn them before you fly.

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.

Reducing angle of attack 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. This may seem counterintuitive at low altitudes, but is a necessary first step.

See [http://www.nts.gov/safety/safety-alerts/documents/SA\\_019.pdf](http://www.nts.gov/safety/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

<b>Investigator In Charge (IIC):</b>	Gerhardt, Adam
<b>Additional Participating Persons:</b>	Jose Borges; FAA/FSDO; Cleveland, OH
<b>Original Publish Date:</b>	September 7, 2017
<b>Note:</b>	This accident report documents the factual circumstances of this accident as described to the NTSB.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=95363">https://data.nts.gov/Docket?ProjectID=95363</a>

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](#).