



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Mansfield, Massachusetts	Accident Number:	ERA19FA107
Date & Time:	February 23, 2019, 12:25 Local	Registration:	N224TA
Aircraft:	Cessna 172	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

After practicing maneuvers during the instructional flight, the flight instructor and student pilot approached the airport for landing. Witnesses and airport surveillance video indicated that the airplane entered the landing flare, but continued to float down the runway a significant distance, touching down about 2,800 ft down the 3,503-ft-long runway. The pilots then initiated a takeoff (touch-and-go). Although the published airport traffic pattern for the runway indicated left turns, the airplane performed a climb in a steep right bank before slowing and entering a spiraling decent toward a grass area near the airport terminal building. Examination of the wreckage did not reveal any preimpact mechanical malfunctions that would have precluded normal operation of the airplane. It is likely that the flight instructor allowed the airplane to exceed its critical angle of attack during a turning initial climb after a touch-and-go landing, which resulted in an aerodynamic stall and impact with terrain. Although it could not be determined who was flying the airplane at the time of the accident, the flight instructor is ultimately responsible for the safety of the flight.

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 maintain airplane control during initial climb after a touch-and-go landing, which resulted in an exceedance of the airplane's critical angle of attack and an aerodynamic stall.

Findings

Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	Angle of attack - Not attained/maintained

Factual Information

History of Flight

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

On February 23, 2019, about 1225 eastern standard time, a Cessna 172S, N224TA, was substantially damaged when it impacted terrain during the initial climb after takeoff from Mansfield Municipal Airport (1B9), Mansfield, Massachusetts. The flight instructor and student pilot were fatally injured. The airplane was owned and operated by New Horizon Aviation Inc. as a Title 14 *Code of Federal Regulations* Part 91 instructional flight. Visual meteorological conditions prevailed and no flight plan was filed for the flight, which originated from Norwood Memorial Airport (OWD), Norwood, Massachusetts, about 1125.

After performing maneuvers over the local area, the airplane approached 1B9 for landing. Witnesses and review of airport surveillance video revealed that the airplane was on approach to runway 32, a 3,503-ft-long, 75-ft-wide asphalt runway. The airplane flared over the runway and floated a significant distance before touching down about 2,800 ft down the runway. The pilots then initiated a takeoff (touch-and-go). Although the published traffic pattern for runway 32 indicated left turns, the airplane performed a climb in a steep right bank before slowing and entering a spiraling descent toward a grass area near the airport terminal building.

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	32,Male
Airplane Rating(s):	Single-engine land; Multi-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:	January 11, 2019
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	November 1, 2018
Flight Time:	386 hours (Total, all aircraft), 150 hours (Total, this make and model), 66 hours (Last 90 days, all aircraft), 33 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	None	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:	None	Last FAA Medical Exam:	
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	7 hours (Total, all aircraft), 7 hours (Total, this make and model), 7 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft)		

The flight instructor held a commercial pilot certificate with ratings for airplane single-engine land, airplane multiengine land, and instrument airplane. He also held a flight instructor certificate with a rating for airplane single-engine, issued on November 1, 2018. His most recent Federal Aviation Administration (FAA) first-class medical certificate was issued on January 11, 2019. Review of the flight instructor's logbook revealed that he had accumulated a total flight experience of about 386 hours; of which, 66 and 33 hours were flown during the 90- and 30-day periods preceding the accident, respectively.

The student pilot did not possess a student pilot certificate nor was he required to. Review of the student pilot's logbook revealed that, at that time of the accident, he had completed six lessons with the operator and had accrued a total flight experience of 7.6 hours.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N224TA
Model/Series:	172 S	Aircraft Category:	Airplane
Year of Manufacture:	2002	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	172S9224
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	January 29, 2019 Annual	Certified Max Gross Wt.:	2550 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	5660 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	C91A installed, not activated	Engine Model/Series:	IO-360-L2A
Registered Owner:		Rated Power:	180 Horsepower
Operator:		Operating Certificate(s) Held:	Pilot school (141)

The four-seat, high-wing, fixed tricycle landing gear airplane was manufactured in 2002. It was

powered by a Lycoming IO-360, 180-horsepower engine equipped with a two-blade, fixed-pitch McCauley propeller. Review of the maintenance records revealed that the airplane's most recent annual inspection was completed on January 29, 2019. At that time, the airframe had accrued 5,660 total hours since new and the engine had accrued 3,358 hours since new.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	OWD, 49 ft msl	Distance from Accident Site:	11 Nautical Miles
Observation Time:	12:53 Local	Direction from Accident Site:	10°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:		Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.4 inches Hg	Temperature/Dew Point:	4°C / -7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Norwood, MA (OWD)	Type of Flight Plan Filed:	None
Destination:	Mansfield, MA (1B9)	Type of Clearance:	None
Departure Time:	11:25 Local	Type of Airspace:	

The accident site was located about 11 miles south of OWD. The 1253 recorded weather at OWD included wind variable at 3 knots, 10 miles visibility, clear sky, temperature 4°C, dew point -7°C, and an altimeter setting of 30.41 inches of mercury.

Airport Information

Airport:	Mansfield Municipal Airport 1B9	Runway Surface Type:	Asphalt
Airport Elevation:	121 ft msl	Runway Surface Condition:	Dry
Runway Used:	32	IFR Approach:	None
Runway Length/Width:	3503 ft / 75 ft	VFR Approach/Landing:	Go around

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	42.004444,-71.199722

The wreckage came to rest nose down in grass oriented on a magnetic heading about 270°; no debris path was observed. Fuel had leaked out of both wings and into the grass. Both wings exhibited leading edge impact damage. The cockpit was crushed, but both front seatbelts remained intact and were unlatched by rescue personnel. The flaps and ailerons remained attached to their respective wings and measurement of the flap actuator corresponded to a flaps-retracted position. The rudder and elevator remained attached to the empennage and measurement of the elevator trim actuator corresponded to a 5° tab-up (nose-down) trim position. Control continuity was confirmed from all flight control surfaces to the cockpit controls. The right aileron cable had separated and both cable ends exhibited broomstraw separation consistent with overstress.

The engine had separated from the airframe. The propeller remained attached to the engine; one blade remained undamaged and was bent slightly forward. The other blade was bent aft and exhibited chordwise scratches. The propeller and rear accessories were removed from the engine. The top spark plugs were removed and their electrodes were intact and light gray in color. The crankshaft was rotated via an accessory drive gear. Crankshaft, camshaft, and valve train continuity were confirmed and thumb compression was obtained on all cylinders. Fuel was found in the engine-driven fuel pump, fuel servo, flow divider, and in the fuel lines. The fuel inlet screen of the fuel servo and oil suction screen were absent of debris. Both magnetos produced spark at all leads when rotated by hand.

Medical and Pathological Information

The Massachusetts Office of the Chief Medical Examiner, Boston, Massachusetts, performed autopsies on both pilots. The cause of death for both pilots was blunt force injuries.

Toxicology testing performed on both pilots by the FAA Forensic Sciences Laboratory was negative for drugs and alcohol.

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Craig Souza; FAA/FSDO; Burlington, MA Mike Childers; Lycoming Engines; Williamsport, PA Ricardo Asensio; Textron Aviation; Wichita, KS
Original Publish Date:	November 6, 2019
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=99012

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](#).