



Aviation Investigation Final Report

Location:	McAllen, Texas	Accident Number:	CEN15FA362
Date & Time:	August 17, 2015, 18:50 Local	Registration:	N26ZA
Aircraft:	ZENAIR LTD CH 2000	Aircraft Damage:	Destroyed
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

According to communications with a tower air traffic controller, the flight instructor and student pilot planned on completing four or five takeoffs and landings. The first takeoff attempt was aborted for unknown reasons, and the airplane was taxied back to the beginning of the runway for another takeoff attempt. About eight minutes later, the airplane departed. The tower controller later stated that the made a right turn after departure; the airplane's airspeed appeared low when a wing dropped and the airplane descended straight down. Two other witnesses stated that the airplane appeared to be stopped in the air before it dropped. The airplane impacted in a nose-low and left-wing-low attitude. One propeller blade exhibited damage that was indicative of the propeller turning at impact. A postimpact fire ensued and consumed a majority of the airplane. A postaccident examination did not reveal any preimpact mechanical malfunctions or failures with the airframe or engine that would have precluded normal operation.

A gust front and rain shower were passing through the area about the time of the accident, and the wind conditions were changing. The recorded wind at the time of the accident was from the east at 19 knots, gusting to 25 knots. The gust front likely produced low-level wind shear across the region. The accident is consistent with an aerodynamic stall in gusting wind conditions, which resulted in a loss of control and impact with terrain.

A medical evaluation of the flight instructor revealed that he sustained fractures of both feet, which is indicative of him manipulating the rudder pedals during impact, thus he was likely the pilot flying at the time of the accident.

Probable Cause and Findings

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

The flight instructor's loss of airplane control while departing in gusting wind conditions that were conducive to low-level wind shear.

Findings

Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	Angle of attack - Not attained/maintained
Aircraft	Airspeed - Not attained/maintained
Environmental issues	Gusts - Effect on operation
Environmental issues	Windshear - Effect on operation

Factual Information

History of Flight

Initial climb

Loss of control in flight (Defining event)

On August 17, 2015, about 1850 central daylight time, a Zenair LTD CH 2000 airplane, N26ZA, impacted terrain after departure from the McAllen Miller International Airport (MFE), McAllen, Texas. The flight instructor and student pilot were fatally injured and the airplane was destroyed. The airplane was registered to a private individual and operated by McAllen Aviation under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan was filed. The local flight was originating at the time of the accident.

A review of the air traffic control communications prior to accident revealed that the flight instructor intended to complete 4 to 5 landings in the traffic pattern. The pilot was cleared for takeoff and then aborted the takeoff attempt about 90 seconds later. The pilot could not clear the runway in time and an incoming airplane was instructed to go around. The pilot taxied back to the departure runway and a few minutes later he stated they were ready for departure again. The controller issued a takeoff clearance and instructed him to make right traffic patterns. About two minutes after being cleared for takeoff the pilot transmitted that the next landing would be a full stop. The tower controller advised the pilot that a helicopter was one mile south of his position and inbound for landing. Shortly after, the controller observed the airplane in a descent into terrain. The controller stated that the airplane appeared to have very low airspeed when it made a hard right turn, winged over, and descended straight down.

Witnesses to the accident described the wind as "strong" and was gusting when they observed the airplane after departure. The airplane made a right turn and then appeared to be "stopped in the air" before it descended to the ground.

The operator's chief flight instructor flew the airplane for 1.7 hours on the morning of the accident. He stated that the purpose of the flights was to determine if the airplane was worthy of being converted into an instrument flight rules (IFR) training airplane. He gave the airplane very high marks and did not notice any abnormalities. He was also told by one of his hangar tenants that the wind gusts were very strong about the time of the accident.

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	32
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:	No
Instructor Rating(s):	Airplane single-engine; Instrument airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	January 6, 2015
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	887 hours (Total, all aircraft), 334 hours (Pilot In Command, all aircraft)		

Student pilot Information

Certificate:		Age:	42, Male
Airplane Rating(s):		Seat Occupied:	Left
Other Aircraft Rating(s):		Restraint Used:	
Instrument Rating(s):		Second Pilot Present:	No
Instructor Rating(s):		Toxicology Performed:	Yes
Medical Certification:		Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:			

The flight instructor, age 32, held a commercial pilot certificate with ratings for airplane single engine land, multi-engine land, and instrument airplane. He also held a flight instructor certificate for airplane single engine and instrument airplane. The pilot was issued a first class medical certificate on January 6, 2015, with no limitations. On his last application for a medical certificate, he reported his flight experience included 840 total flight hours with 50 hours in preceding six months. According to the pilot's professional résumé and information from the airplane owner, he had accumulated 896 total flight hours.

The student pilot, age 42, was a Mexican national and had Transportation Security Administration (TSA) approval for flight training. The flight school reported that the student pilot had completed three training flights since June 17, 2013, for a total of 4.1 flight hours. He also competed one discovery flight with a different flight school in 2011.

Aircraft and Owner/Operator Information

Aircraft Make:	ZENAIR LTD	Registration:	N26ZA
Model/Series:	CH 2000	Aircraft Category:	Airplane
Year of Manufacture:	1997	Amateur Built:	
Airworthiness Certificate:	Utility	Serial Number:	20-0026
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	March 10, 2015 Annual	Certified Max Gross Wt.:	1606 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	1639 Hrs as of last inspection	Engine Manufacturer:	LYCOMING
ELT:	C91A installed, not activated	Engine Model/Series:	O-235-N2C
Registered Owner:	On file	Rated Power:	116 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

The Zenair CH 2000 was a two-place, low-wing, fixed tricycle landing gear airplane manufactured in 1997, serial number 20-0026. The airplane featured two side-by-side, independently adjustable seats and dual flight controls yokes. The airplane was equipped with a 116-horsepower Lycoming O-235-N2C engine which drove a two-bladed, fixed pitch metal Sensenich propeller.

The airplane was equipped with two wing fuel tanks which held 14 gallons each for a total of 28 gallons.

A review of the airplane maintenance logbooks revealed that an annual inspection was completed on March 10, 2015, with a tachometer time of 1,639.1 hours. During the inspection, the applicable FAA airworthiness directives were checked for completion. On August 13, 2015, two engine spark plugs were serviced and reinstalled.

The airplane was sold by the listed registered owner on August 8, 2015. The updated registration paperwork was never sent to the FAA.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KMFE, 100 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	18:53 Local	Direction from Accident Site:	330°
Lowest Cloud Condition:	Scattered / 8500 ft AGL	Visibility	8 miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	19 knots / 25 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	80°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.8 inches Hg	Temperature/Dew Point:	35°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	McAllen, TX (MFE)	Type of Flight Plan Filed:	None
Destination:	McAllen, TX (MFE)	Type of Clearance:	None
Departure Time:	18:50 Local	Type of Airspace:	

At 1853, the automated weather observation at MFE reported wind from 080 degrees at 19 knots, gusting to 25 knots, 8 miles visibility, clouds scattered at 8,500 ft, temperature 95° F, dew point 72°F, and barometric pressure 29.81 inches of mercury.

A review of the air traffic control communications revealed that the tower controller gave multiple wind reports prior to the accident. About 15 minutes prior – wind from 080 degrees at 6 knots. About 6 minutes prior – wind from 070 degrees at 7 knots. About 4 minutes prior – wind from 050 degrees at 10 knots. About 2 minutes prior – wind variable from 060 to 100 degrees at 10 knots, gusting to 15 knots.

An outflow boundary (gust front) was present near MFE at the time of the accident which was capable of producing low-level wind shear across the region.

Airport Information

Airport:	MCALLEN MILLER INTL MFE	Runway Surface Type:	Asphalt
Airport Elevation:	107 ft msl	Runway Surface Condition:	Unknown
Runway Used:	31	IFR Approach:	None
Runway Length/Width:	7120 ft / 150 ft	VFR Approach/Landing:	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	On-ground
Total Injuries:	2 Fatal	Latitude, Longitude:	26.164443,-98.232498(est)

The accident site was located about 0.2 miles south of the departure end of runway 13 at MFE at 95 ft mean sea level. The accident area consisted of thick brush and shrubs. The ground immediately surrounding the accident and toward the west was burned by a postimpact fire.

The airplane impacted terrain on a heading of 140 degrees in a nose low and left wing low attitude. The airplane remained mostly intact and the debris field was consolidated to the immediate wreckage area with no ground impact marks noted around the wreckage. The engine compartment, cockpit, fuselage and empennage were mostly consumed by fire. The empennage was distorted and twisted toward the right wing. Both wings remained attached to the fuselage and the wings roots exhibited thermal damage. The right wing leading edge was crushed aft. The right wing's trailing edge, including the flap and aileron, were partially consumed by fire. Both ailerons were extended down and traveled freely when moved by hand. The flaps were found in the extended position, but free to move, since the flap chain drive had separated in overload. The left wing sustained leading edge damage which was crushed aft on the bottom side. The left flap and aileron remained intact and exhibited impact damage. The leading edges of both wings exhibited accordion style crushing. The nose gear was folded under the fuselage. The main landing gear was detached from the fuselage and bent aft under the fuselage. Both seat belt buckles remained clasped and the belts were consumed by fire. The left and right fuel tanks were breached and thermally damaged. The flight control cables were continuous from the cockpit controls to the aileron, rudder, and elevator attachment points.

The engine remained attached to the firewall and sustained thermal and impact damage. The engine cowl was consumed by fire. The propeller separated at the crankshaft flange and came to rest in front of the engine. One propeller blade, which was partially embedded in the ground, was bent aft about midspan, and the tip was relatively straight. This blade was also twisted and exhibited chordwise scratching and damage. The other propeller blade was bent slight after near the blade root and was otherwise unremarkable.

During the recovery process, the engine was mechanically separated from the firewall and taken to a hangar for a postaccident examination. The engine crankcase did not display the stamped engine serial number, the right half of the crankcase displayed a case match number of 3712, and the left half case match number was ground off. The examination revealed the crankshaft flange was bent. The engine starter, starter ring gear support, right magneto, and alternator were impact damaged. The carburetor induction air box was crushed by impact forces. The engine driven fuel pump, the vacuum pump, and all fluid carrying lines were thermally damaged. The engine wiring and induction tube interconnects were mostly consumed by fire. The No. 1 top spark plug was impact damaged.

The engine accessories and top spark plugs were removed in order to manually rotate the crankshaft.

Continuity was verified to the crankshaft, camshaft and valve train. Suction and compression was verified in all cylinders. The oil suction screen was removed and examined and was free of particulates. The inlet fuel screen was removed and examined and was free of particulates.

The carburetor had sustained thermal exposure, but was secure on its mount. The carburetor inlet screen was removed and was free of particulates. The carburetor bowl was examined and the left side metal float was dislodged from the actuator arm and was resting in the float chamber. The left side float displayed hydraulic deformation. The right metal float was secure and unremarkable. The carburetor contained a one piece venturi.

The right magneto was examined and an attempt to obtain spark from any terminal was unsuccessful when the magneto was rotated using a hand held drill. The magneto was opened and the internal components were melted. The left magneto was removed from its mount and an attempt to rotate the shaft was unsuccessful due to internal thermal damage.

The examination did not reveal any preimpact mechanical malfunctions or failures with the airframe or engine that would have precluded normal operation.

Remnants of a GoPro camera were found in the wreckage and were mostly consumed by fire. The extensive damage did not allow for data recovery.

Medical and Pathological Information

An autopsy was completed on the flight instructor on August 18, 2015, by Valley Forensics, P.L.L.C, Edinburg, Texas, and the cause of death was due to multiple traumatic injuries with thermal burns. The autopsy report noted that both feet sustained fractures. The Bioaeronautical Research Laboratory at the FAA's Civil Aerospace Medical Institute completed a Final Forensic Toxicology Fatal Accident Report which was negative for tested drugs and other substances.

An autopsy was completed on the student pilot on August 18, 2015, by Valley Forensics, P.L.L.C, Edinburg, Texas, and the cause of death was due to multiple traumatic injuries with thermal burns. The Bioaeronautical Research Laboratory at the FAA's Civil Aerospace Medical Institute completed a Final Forensic Toxicology Fatal Accident Report which was negative for tested drugs and other substances.

Tests and Research

Airframe Throttle Control Assembly

The airframe throttle control assembly was removed from the airplane and sent to the NTSB Materials Laboratory, Washington, DC, for examination. The examination revealed that the control assembly was discolored and oxidized consistent with exposure to a fire. The surface of the aluminum alloy housing

also was wrinkled consistent with exposure to high heat. The control cable had been cut during removal from the airplane. The cable was bent about 90 degrees at the output end of the input tube, and the spiral wrap around the cable housing wires was fractured and displaced at the location of the bend. The input rod was also bent slightly where it intersected the lock screw opening. The lock mechanism had a gap between the lock screw and the lock bushings consistent with an unlocked position. The cable was straight in the segment within the input tube between the input rod and the cable housing. The assembly was examined using X-ray computed tomography (CT) which confirmed that it was unlocked. Then the input rod was manipulated by hand; initially the input knob was pushed inward (toward the panel as installed on the airplane), and the rod moved slightly under hand forces. Next the input knob was pulled in the opposite direction, and the input rod slid completely out of the assembly with minimal hand forces.

Additional Information

Witness Statement

A witness who interacted with the flight instructor on August 14, 2015, stated that he was performing maintenance on another airplane in an adjacent hangar. The flight instructor asked the witness to move his vehicles out of the way because he was going to start the accident airplane and troubleshoot a throttle issue. He recalled that the engine was running about 2,000 RPM and the throttle cable was getting stuck so the engine RPM could not be properly controlled. Other than the unexpected high RPM, the engine sounded normal with abnormalities noted. The witness told the flight instructor to inform the airplane owner of the throttle issues. The witness saw the flight instructor 2 to 3 times that day between 1200 and 2000. The airplane owner was also present during some of that time and introduced himself to the witness. He did not speak to the owner about the throttle issue.

Fuel

Fuel receipts revealed the last time the accident airplane was refueled was August 13, 2015 with 12.9 gallons of 100 low lead aviation fuel. The owner reported that the airplane was flown two times after the refueling for a total of 1.7 hours, not including the accident flight.

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Frank Fortmann; FAA; San Antonio, TX John Butler; Lycoming; Arlington, TX
Original Publish Date:	September 22, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91805

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).