Aviation Investigation Final Report

Location:	Wentzville, Missouri	**Accident Number:**	CHI02FA033
Date & Time:	November 15, 2001, 18:45 Local	**Registration:**	N33ZA
Aircraft:	Zenair CH2000	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane was destroyed when it impacted the side of a ravine during a forced landing following a loss of engine power at night. Witnesses described the airplane in a steep descent angle prior to impacting the ground. One witness reported seeing the airplane flying in a westerly direction. The witness said that she, "... thought it was strange because there was no engine noise at all." She further stated that the airplane, "...was going steady and all of a sudden the plane just fell out of the sky. There was no gradual [descent] it just fell." Another witness reported that the airplane was at a low altitude with the engine "sputtering". The witness reported that just prior to impact he heard the airplane, "...go to full power." The pilot had accumulated 6.6 hours of flight time since receiving his private pilot certificate on August 27, 2001. The pilot purchased the airplane on November 9, 2001. Witness statements indicate that the pilot flew the airplane on November 11, 2001, and the airplane was fully fueled prior to that flight. No records of subsequent fueling of the airplane were found. A witness reported that, prior to the accident flight, he assisted the pilot in starting the engine because the airplane master switch had been left on. The witness reported that he also performed a pre-flight inspection of the airplane and noted that the left fuel tank contained less than 1/4 tank of fuel, and the right fuel tank had 3/4 tank of fuel. He said that he positioned the selector valve for the left tank and informed the pilot. An "Airplane Log" recovered from the accident scene contains an entry for a 2.3 hour flight on November 11, 2001. The entry lists an ending tachometer reading of 738.70 hours. The recording tachometer reading at the accident site was 739.9 hours. The fuel selector was found positioned for the right fuel tank. The fuel hoses leading from the fuel tanks to the selector valve were cut during the investigation and any remaining liquid collected. About one ounce of a blue colored liquid was drained from the fuel hose leading from the right fuel tank to the selector valve. No liquid was found within the fuel hose leading from the left fuel tank to the selector valve. No other anomalies were found, with respect to the airplane, engine or systems, that were determined to exist prior to impact.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The improper selection of the fuel selector which resulted in fuel starvation and subsequent engine failure. Factors were the unsuitable terrain for the forced landing encountered by the pilot and the night light condition.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: CRUISE

Findings
1. (C) FLUID,FUEL - STARVATION
2. (C) FUEL TANK SELECTOR POSITION - IMPROPER - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. (F) LIGHT CONDITION - NIGHT
4. (F) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - ENCOUNTERED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On November 15, 2001, about 1845 central standard time, a Zenair CH2000, N33ZA, piloted by a private pilot, was destroyed when it impacted terrain near Wentzville, Missouri. The pilot and his one passenger were fatally injured. The 14 CFR Part 91 personal flight was not on a flight plan and was operating in visual meteorological conditions. The local flight originated from the Creve Coeur Airport, Saint Louis, Missouri, about 1740.

The airplane impacted the west side of a ravine that runs along the west side of a highway. The airplane was resting on a slope of about 40 degrees. The latitude and longitude of the accident site were determined using a global positioning system (GPS) receiver as 38 degrees 48.673 minutes north, 90 degrees 48.618 minutes west. The GPS receiver displayed an altitude of 620 feet at the initial impact point.

Witnesses to the accident described the airplane in a steep descent angle prior to impacting the ground. One witness reported seeing the airplane flying in a westerly direction. The witness said that she, "... thought it was strange because there was no engine noise at all." She further stated that the airplane, "...was going steady and all of a sudden the plane just fell out of the sky. There was no gradual [descent] it just fell." Another witness reported that the airplane was at a low altitude with the engine "sputtering". The witness reported that just prior to impact he heard the airplane, "...go to full power."

PERSONNEL INFORMATION

The pilot held a private pilot certificate with an airplane single engine land rating. The certificate was issued on August 27, 2001. According to the pilot logbook, the pilot had accumulated 174.8 hours of total flight experience, and 82.3 hours in the same make and model airplane as the accident airplane. There were 6.6 hours logged since August 27, 2001. The most recent entry in the pilot logbook was dated November 3, 2001, and had no flight time recorded. The pilot also held a third class medical certificate issued on February 10, 2000.

AIRCRAFT INFORMATION

The airplane was a Zenair model CH2000, serial number 200033. The CH2000 is a two seat single engine low wing airplane powered by a 116 horsepower Textron-Lycoming O-235-N2C engine. According to the airplane mantenance records, the airplane received its most recent annual inspection on January 4, 2001. At the time of the inspection, the airplane and engine

had accumulated 651.7 hours total time in service. The recording tachometer reading at the accident site was 739.9 hours.

METEOROLOGICAL INFORMATION

A weather reporting station located about 12 nautical miles southeast of the accident site recorded the weather at 1754 as: Wind calm; Visibility 10 statute miles; Temperature 16 degrees Celsius; Dew point 12 degrees Celsius; Altimeter setting 30.13 inches of Mercury.

COMMUNICATIONS

There was no communication between the accident airplane and air traffic control. A pilot, who was flying in the vicinity of the Washigton Memorial Airport (M06), Washington, Missouri, between 1815 and 1900, reported that he was monitoring the common traffic advisory frequency and heard a single "Mayday". He said that the voice he heard, "... sounded to be of a middle-aged man, with no urgency in his voice." No other communications were reported.

WRECKAGE AND IMPACT INFORMATION

All components of the airframe were located within the immediate area of the accident scene. The main landing gear and the nose wheel were located at the bottom of the ravine. The wings and tail surfaces remained attached to the remainder of the fuselage. The fuselage was crushed forward. The cockpit was crushed and the instrument panel was destroyed. The engine was separated from the firewall. The propeller was broken loose from the crankshaft flange and was found buried in the initial impact crater. The propeller exhibited chordwise scratches and nicks in the leading edges of the blades. Both wing panels exhibited crushing along their entire length. The ailerons and flaps remained attached to the wings. Both fuel tanks were ruptured. The outboard end of the right fuel tank was found within the remains of the wing about 18 inches outboard of the remainder of the tank. The left fuel tank was found within the wing structure and was crushed. The fuel selector was found positioned for the right fuel tank. The fuel hoses leading from the fuel tanks to the selector valve were cut during the investigation and any remaining liquid collected. About one ounce of a blue colored liquid was drained from the fuel hose leading from the right fuel tank to the selector valve. No liquid was found within the fuel hose leading from the left fuel tank to the selector valve.

The aircraft control system was examined. The aileron balance cable was intact from the right aileron bellcrank through the fuselage to the left aileron bellcrank. The left aileron control cable was intact from the bellcrank to the torque tube in the fuselage. The right aileron cable was separated at a point about 8 inches outboard of the torque tube in the fuselage. The separation exhibited signatures consistent with overload failure. The flap jackscrew was separated from the aircraft. The flap position was not determined. All of the control cables

from the tail surfaces were intact from the tail to the cockpit area. The electric stabilator trim motor was found intact and it remained attached.

The engine was cut loose from the firewall and moved to a level area for examination. All of the pushrods and tubes were accounted for. About one half of the crankshaft propeller flange was separated from the crankshaft. The front of the crankcase was damaged and the oil slinger was impacted into the case. The vacuum pump housing was fractured at the flange. The vacuum pump was removed and a tool inserted into the vacuum pump drive to attempt to rotate the engine. The engine was initially rotated about 5 degrees but could not be rotated further. The left magneto remained attached to the engine. The left magneto was removed and was found to produce a spark when rotated by hand. The right magneto was broken into several pieces. The remains of the right magneto were removed from the accessory case section. The engine driven fuel pump was broken loose from its mounting flange. The rocker box covers were removed and the rocker arms, valve springs, valve stems and retainers examined with no anomalies found. A borescope was used to examine the interior of the cylinders and the valve heads and no anomalies were noted. The carburetor was broken loose from the intake system at the carburetor flange. The carburetor fuel bowl was removed and some fuel was found inside. The metal floats were impacted inward on the outboard sides.

No other anomalies were found, with respect to the airplane, engine or systems, that were determined to exist prior to impact.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the St. Charles County Medical Examiner's Office on November 16, 2001. A Final Forensic Toxicology Fatal Accident Report, prepared by the Federal Aviation Administration, lists negative results for all tests performed.

TESTS AND RESEARCH

According to a statement from the previous owner of the airplane, the pilot purchased the airplane on November 9, 2001. Witness statements indicate that the pilot flew the airplane on November 11, 2001. According to the statements, the airplane was fully fueled prior to the November 11th flight. No records of subsequent fueling of the airplane were found. A witness reported that, prior to the accident flight, he assisted the pilot in starting the engine because the airplane master switch had been left on. The witness reported that he also performed a pre-flight inspection of the airplane and noted that the left fuel tank contained less than 1/4 tank of fuel and the right fuel tank had 3/4 tank of fuel. He said that he positioned the selector valve for the left tank and informed the pilot. An "Airplane Log" recovered from the accident scene contains an entry for a 2.3 hour flight on November 11, 2001. The entry lists an ending tachometer reading of 738.70 hours. The recording tachometer reading at the accident site was 739.9 hours.

Pilot Information

Certificate:	Private	**Age:**	52,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	February 10, 2000
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	175 hours (Total, all aircraft), 82 hours (Total, this make and model), 12 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Zenair	**Registration:**	N33ZA
Model/Series:	CH2000	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	200033
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	January 4, 2001 Annual	**Certified Max Gross Wt.:**	1606 lbs
Time Since Last Inspection:	88.2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	739.9 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	O-235-N2C
Registered Owner:	Mark Ghafoori	**Rated Power:**	116 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	SUS,463 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	17:54 Local	**Direction from Accident Site:**	135°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	0 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	16°C / 12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Saint Louis, MO (1H0)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	17:40 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	38.809509,-90.849578(est)

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Greg Erikson; Textron Lycoming; Wayne, IL June Tonsing; FAA-St. Louis, Missouri-FSDO; St. Ann, MO
Original Publish Date:	April 1, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=53829