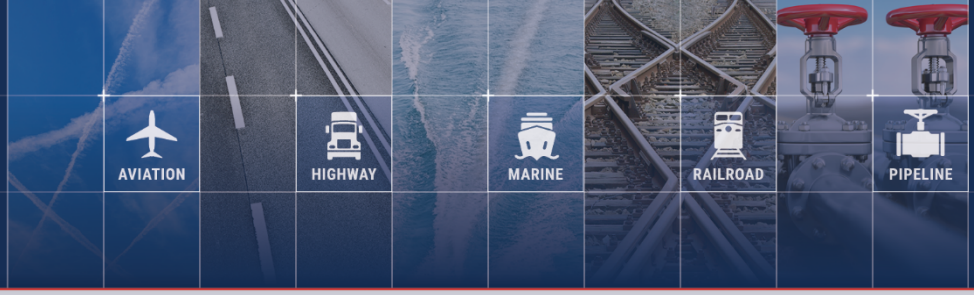

Aviation Investigation Final Report

Location:	Lake in the Hills, Illinois	**Accident Number:**	CEN12FA271
Date & Time:	May 3, 2012, 15:15 Local	**Registration:**	N176Q
Aircraft:	Beech S35	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The commercial pilot and a flight instructor were in the traffic pattern conducting touch-and-go takeoffs and landings on runway 26. A witness reported seeing the airplane in a steep bank as it turned from the base leg of the traffic pattern to the final approach leg. The ground scars and damage to the airplane were consistent with an aerodynamic stall/spin at the time of impact. The wind at the time of the accident was reported from 220 degrees between 11 and 22 knots. The wind encountered on the left base turn to final could result in overshooting the final approach path. Most likely, the pilot was attempting to compensate for overshooting the final approach path and increased the bank angle to bring the airplane back on course. No preaccident mechanical malfunctions or failures were found that would have precluded normal operation. Investigators were unable to determine who was flying the airplane at the time of the accident; however, the commercial pilot did not hold a current medical certificate and thus was ineligible to have been acting as pilot-in-command.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's excessive bank angle while on approach to land, which resulted in an inadvertent aerodynamic stall and spin.

Findings

Personnel issues	Aircraft control - Not specified
Aircraft	Lateral/bank control - Incorrect use/operation

Factual Information

History of Flight

Approach-VFR pattern base	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On May 3, 2012, about 1515 central daylight time, a Beech S35, N176Q, was substantially damaged when it impacted a spent quarry, just east of Lake in the Hills Airport (3CK), Lake in the Hills, Illinois. The commercial certificated pilot and certified flight instructor (CFI) were fatally injured. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan. The local flight originated from 3CK.

The commercial pilot and CFI met at 1130 the morning of the accident at 3CK and flew with a third pilot, in the accident airplane, to DuPage Airport (DPA) West Chicago, Illinois, to pick up another airplane. The commercial pilot and CFI then followed the third pilot to Burlington Municipal Airport (BUU), Burlington, Wisconsin, where the third pilot dropped off the other airplane. The three pilots returned to 3CK. The CFI flew from the left seat for all three flights.

The third pilot reported that after lunch the commercial pilot and CFI returned to the accident airplane with the intention of conducting a local flight. He remarked that the winds at the time were reported as 220 degrees at 11 knots gusting to 22 knots.

The Federal Aviation Administration (FAA) took witness statements from several individuals. These witnesses reported seeing the airplane low to the ground. One witness reported seeing the airplane in the traffic pattern for runway 26, conducting touch-and-go operations. This witness also stated that the airplane was in a very steep turn from the base leg to the final approach leg. Several witnesses stated that the engine was running and sounded normal prior to the airplane impacting the ground.

PERSONNEL INFORMATION

Pilot

The pilot, age 82, held a commercial pilot certificate with airplane single engine land and instrument ratings. The pilot applied for a third class airman medical certificate on February 17, 2012. The certificate was not issued, awaiting additional medical information in order to determine eligibility. Previously, the pilot had been issued a special issuance third-class airman

medical certificate which was not valid for any class after January 31, 2012.

A review of the pilot's flight logbook indicated that he had logged no less than 2,065 hours total time. He had successfully completed the requirements of a flight review on April 5, 2011, in the accident airplane. On his most recent application for airman medical certification, he reported a total time of 18,077 hours; 30 hours of which had been logged in the previous 6 months.

CFI

The CFI, age 62, held a commercial pilot certificate with airplane single and multiengine land, instrument, and glider ratings. He also held a flight instructor certificate with airplane single and multiengine, and instrument ratings. He was issued a first class airman medical certificate without limitations on November 30, 2011.

The CFI's flight logbook was not made available for review. On his most recent airman medical certificate application, dated November 30, 2011, the CFI reported his total flight time as 7,785 hours.

AIRCRAFT INFORMATION

The accident airplane, a Beech S35 (serial number D-7427), was manufactured in 1964. It was registered with the FAA on a standard airworthiness certificate for utility operations. A Teledyne Continental Motors IO-520-BB (6) engine rated at 285 horsepower at 2,700 rpm powered the airplane. The engine was equipped with a 3-blade, McCauley propeller.

The airplane was registered to and operated by a private individual, and was maintained under an annual inspection program. A review of the maintenance records indicated that an annual inspection had been completed on June 1, 2011, at an airframe total time of 4,067 hours.

METEOROLOGICAL INFORMATION

The closest official weather observation station was DuPage Airport (DPA), West Chicago, Illinois, located 18 nautical miles south of the accident site. The routine aviation weather report for DPA, issued at 1452, reported wind 200 degrees at 13 knots, visibility 10 miles, sky condition few clouds at 3,600 feet, temperature 28 degrees Celsius (C), dew point temperature 18 degrees C, altimeter 29.85 inches.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in a spent rock quarry. The terrain was uneven, soft, and muddy. The main wreckage included the left and right wing, the fuselage, empennage, and engine and propeller assembly. The wreckage came to rest on a magnetic heading of 075 degrees.

A large ground scar was located approximately 5 feet forward of the main wreckage. The ground scar consisted of three distinct sections but was continuous. The first portion of the ground scar was 1 foot wide and 17 feet long. The ground scar contained paint chips along the entire span, consistent with paint from the leading edge of the wing. This ground scar terminated at a large circular ground scar which was approximately 11 feet long, 5 feet wide, and 6 to 8 inches deep. Broken Plexiglas and torn sheet metal were both found within the second ground scar, which was filled with water. The third portion of the ground scar continued from the east end of the center ground scar and was approximately 12 inches wide and 22 feet long. Red, white, and blue paint chips were found within the ground scar consistent with the leading-edge of the wing.

The fuselage included the instrument panel and cabin area. The instrument panel was crushed and fragmented. Both forward seats had dislodged from their seat tracks. The landing gear handle was in the down position. The fuel selector valve was selected for the right fuel tank. The Kollsman window on the altimeter was set at 29.84.

The right wing included the right flap, right aileron, and right landing gear assembly. The right wing remained attached to the fuselage. The right wing flap appeared to be up or retracted. Both the right wing flap and right aileron remained attached to the right wing. The control cables were continuous from the right aileron control inboard to the fuselage. The right main landing gear was down and embedded in the mud directly beneath the right wing. The leading edge was crushed aft.

The left wing included the left flap, left aileron, and left landing gear assembly. The left wing remained attached to the fuselage. The wing flaps appeared to be up or retracted. The outboard 5 feet of the wing separated partially and the fuel tank was compromised. The left aileron remained attached to the separated portion of the left wing. The control cables were continuous from the aileron control inboard to the fuselage. The leading edge of the left wing was crushed aft and fragmented. The left main landing gear was down and embedded in the mud directly beneath the left wing.

The empennage included the left and right ruddervators which remained attached to the fuselage. The rudder controls were continuous from the control arms forward to the cabin. The elevator cables were continuous from the aft control arm forward to the first turnbuckle where one cable separated at the turnbuckle bracket. The cables were continuous from the turnbuckle forward to the cabin area.

The engine and propeller assembly remained partially attached to the forward portion of the fuselage. The propeller remained attached to the engine at the propeller flange. All three propeller blades were bent aft, twisted, and exhibited leading edge polishing. The propeller spinner remained attached and exhibited rotational crushing.

MEDICAL AND PATHOLOGICAL INFORMATION

Pilot

An autopsy was performed by the McHenry County Coroner's Office on May 4, 2012, as authorized by the McHenry County Coroner's office. The autopsy concluded that the cause of death was multiple blunt force trauma and the report listed the specific injuries.

The FAA's Civil Aerospace Medical Institute (CAMI), Oklahoma City, Oklahoma, performed toxicological tests on specimens that were collected during the autopsy (CAMI Reference #201200083001). Results were negative for carbon monoxide, cyanide, and ethanol. Testing revealed carvedilol in the urine and blood, enalapril in the urine, 0.036 ug/mL zolpidem in the blood and urine, 0.183 ug/mL of Sertraline in the blood, sertraline in the urine, metabolites of sertraline in the blood and urine. Carvedilol and enalapril are used to treat high blood pressure, zolpidem is used for the treatment of insomnia, and sertraline is an antidepressant.

CFI

An autopsy was performed by the McHenry County Coroner's Office on May 4, 2012, as authorized by the McHenry County Coroner's office. The autopsy concluded that the cause of death was multiple blunt and sharp force traumas and the report listed the specific injuries.

The FAA's CAMI, Oklahoma City, Oklahoma, performed toxicological tests on specimens that were collected during the autopsy (CAMI Reference #201200083002). Results were negative for carbon monoxide, cyanide, and ethanol. Testing of the blood revealed ranitidine and testing of the urine revealed naproxen and ranitidine. Naproxen is a nonnarcotic analgesic and anti-inflammatory agent. Ranitidine is an anti-histamine used in the treatment of gastric acid secretion.

TESTS AND RESEARCH

The wreckage was recovered to a secure hanger in Poplar Grove, Illinois.

The valve covers, fuel nozzles, and upper bank of spark plugs were removed from the engine. The spark plugs exhibited signatures consistent with normal operation as compared to the Champion spark plug chart. The fuel nozzles were free of contamination. The engine was rotated through by hand at the propeller. Air movement was noted at the spark plug orifice on all six cylinders. Rocker arm movement and accessory housing movement were noted. The fuel pump rotated freely by hand with no hesitation. Both magnetos were rotated by hand and exhibited a spark at the end of each lead. Examination of the fuel manifold revealed no anomalies

ADDITIONAL INFORMATION

Overshooting finals

The FAA's "Airplane Flying Handbook," 2004 (FAA-H-8083-3A) states:

Normally, it is recommended that the angle of bank not exceed a medium bank because the steeper the angle of bank, the higher the airspeed at which the airplane stalls. Since the base-to final turn is made at a relatively low altitude, it is important that a stall not occur at this point. If an extremely steep bank is needed to prevent overshooting the proper final approach path, it is advisable to discontinue the approach, go around, and plan to start the turn earlier on the next approach rather than risk a hazardous situation.

Accelerated Stalls

The FAA's "Airplane Flying Handbook," 2004 states:

The airplane will, however, stall at a higher indicated airspeed when excessive maneuvering loads are imposed by steep turns, pull-ups, or other abrupt changes in its flightpath. Stalls entered from such flight situations are called "accelerated maneuver stalls," a term, which has no reference to the airspeeds involved.

Stalls which result from abrupt maneuvers tend to be more rapid, or severe, than the unaccelerated stalls, and because they occur at higher-than-normal airspeeds, and/or may occur at lower than anticipated pitch attitudes, they may be unexpected by an inexperienced pilot.

Pilot Information

Certificate:	Commercial	**Age:**	82,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	None None	**Last FAA Medical Exam:**	February 17, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 5, 2011
Flight Time:	18077 hours (Total, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	65,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	November 30, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	7785 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N176Q
Model/Series:	S35	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	D-7427
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 1, 2011 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4067 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:		**Engine Model/Series:**	IO-520-BB-(6)
Registered Owner:	On file	**Rated Power:**	285 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KDPA,758 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	14:52 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Few / 3600 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.85 inches Hg	**Temperature/Dew Point:**	28°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lake in the Hills, IL	**Type of Flight Plan Filed:**	None
Destination:	Lake in the Hills, IL	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

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:**	42.2075,-88.308891

Administrative Information

Investigator In Charge (IIC):	Rodi, Jennifer
Additional Participating Persons:	Edward Dabrowski; FAA Flight Standards District Office; West Chicago, IL Carolyn Remol; FAA Flight Standards District Office; West Chicago, IL Paul Yoos; Hawker Beechcraft Corportation; Wichita, KS Rodney Martinez; Continental Motors, Inc; Mobile, AL
Original Publish Date:	January 15, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=83551