Aviation Investigation Final Report

Location:	Jackson, Ohio	**Accident Number:**	IAD03FA050
Date & Time:	April 26, 2003, 16:30 Local	**Registration:**	N523BL
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

Witnesses heard the pilot announce over the UNICOM frequency that he would be performing a simulated engine failure after takeoff from runway 01, returning to land on runway 19. Several witnesses observed the airplane depart from runway 01, and enter a "nose-high" climb attitude, until the airplane "stalled," and descended straight-down. One witness observed the airplane enter a stall, and then a continual right bank turn until it impacted trees. Examination of the airplane revealed no mechanical deficiencies. According to a pilot who flew with the instructor on the morning of the accident, one of the maneuvers which the instructor emphasized was an emergency landing after takeoff. The pilot stated that they practiced this maneuver twice; once at an altitude of 900 feet, and once at 1,000 feet. After the instructor pulled the power back at the desired altitude, the pilot would pitch the airplane for the "best glide speed," or 80 knots, and bank the airplane "real hard," into a 45-degree bank to return to the airport. Examination of the Beechcraft Pilot Proficiency Program Flight Instructor's Teaching Guide stated that a turn back after power loss on takeoff, should be performed at a minimum altitude of 1,200 feet AGL, and 1.7 to 1.9 nm upwind from the start of a climb. A review of FAA-H-8083-3, Airplane Flying Handbook, revealed: "...If an actual engine failure should occur immediately after takeoff and before a safe maneuvering altitude is attained, it is usually inadvisable to attempt to turn back to the field from where the takeoff was made. Instead, it is safer to immediately establish the proper glide attitude, and select a field directly ahead or slightly to either side of the takeoff path."

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight instructor's improper decision to turn back to the airport at an insufficient altitude after takeoff and his failure to maintain adequate airspeed, during a simulated engine failure.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. EMERGENCY PROCEDURE - SIMULATED - PILOT IN COMMAND(CFI)
2. (C) PLANNING/DECISION - IMPROPER - PILOT IN COMMAND(CFI)
3. (C) AIRSPEED - INADEQUATE - PILOT IN COMMAND(CFI)
4. STALL/SPIN - INADVERTENT - PILOT IN COMMAND(CFI)

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. OBJECT - TREE(S)

Factual Information

HISTORY OF FLIGHT

On April 26, 2003, about 1630 eastern daylight time, a Beech A36, N523BL, was substantially damaged when it impacted trees during a descent after takeoff from James A. Rhodes Airport (I43), Jackson, Ohio. The certified flight instructor and the private pilot were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the instructional flight conducted under 14 CFR Part 91.

The accident flight occurred during a Beechcraft Pilot Proficiency Program (BPPP), being conducted over a 3-day period at Port Columbus International Airport (CMH), Columbus, Ohio. According to the president of the program, the purpose of the program was to pair pilot/owners of Beechcraft airplanes with instructors employed by BPPP, for the purpose of ground and flight training.

The private pilot had attended an all-day ground school the day prior to the accident, and was scheduled for a flight period from 1300-1700, with the instructor, on the afternoon of April 26. At the completion of the flight, the pilot was to receive his biennial flight review.

Several witnesses observed the airplane in the traffic pattern at Jackson. One witness reported that a pilot from the accident airplane announced over the UNICOM frequency that he was inbound to the airport on the GPS Runway 01 approach. The witness observed the airplane touchdown "smoothly" and back-taxi to runway 01. The pilot then announced over the Unicom that he would perform a takeoff from runway 01, northbound. The airplane departed the runway, then performed a 180-degree turn to land on runway 19. The airplane taxied to the approach end of runway 01, and a pilot announced over the Unicom that they would be performing a "simulated emergency landing" after takeoff.

The witness observed the "smooth, level takeoff," and noted that the engine was "really humming," and appeared to be at "full power." The airplane was in a "nose-up" attitude during the climb, and reached an altitude of about 1,200-1,300 feet [AGL] before it pitched down and impacted trees.

A second witness, who was a flight instructor at the airport, was located in the terminal building when he first observed the airplane back taxiing on runway 01. The airplane made a "normal" takeoff from runway 01, then returned to land on runway 19. The airplane again back-taxied to runway 01 and the witness keyed the Unicom microphone to inform the pilot of wind conditions from the north-northeast, at 3-5 knots. The pilot thanked the witness for reporting the winds and stated that he intended to take off from runway 01, and "do a simulated return to land on one nine."

The witness observed the airplane depart, then turned his attention away from it. When the witness looked back at the airplane, it was about 200 feet above the tree line, "descending vertically and rotating."

A third witness, who observed the airplane during its second takeoff climb, stated that it appeared the airplane "entered a stall," and its nose "dropped" into a continual right bank turn until it impacted trees. The witness also reported the engine was "solid-sounding" and he heard no interruption of power.

The accident occurred during the hours of daylight at 39 degrees, 07 minutes north latitude, and 77 degrees, 34 minutes west longitude.

PERSONNEL INFORMATION

The pilot/owner of the airplane held a private pilot certificate with ratings for airplane single engine land and instrument airplane. Examination of his logbook revealed he had 405.4 hours of total flight experience, of which, 327.5 hours were in make and model. The pilot's most recent Federal Aviation Administration (FAA) third class medical certificate was issued on July 29, 2002.

The flight instructor held an airline transport pilot certificate, and was a certified instrument flight instructor for single and multi engine land. According to the latest flight instructor history form provided by the BPPP, the pilot had 7,300 hours of total flight experience, of which, 500 to 800 hours were in a similar make and model airplane. He also reported 3,000 hours of instruction time. The flight instructor's most recent FAA second class medical certificate was issued on April 12, 2002.

AIRCRAFT INFORMATION

According to fuel records provided by a fixed base operator at Port Columbus Airport, the airplane was refueled on April 26, 2003, with 12 gallons of 100 low lead aviation fuel.

Examination of the airplane logbooks revealed the last annual inspection was completed on August 21, 2002, at a tachometer time of 912 hours.

METEOROLOGICAL INFORMATION

Weather, reported at Tri-State Airport/Milton J. Ferguson Field (HTS), Huntington, West Virginia, 40 miles south of Jackson, at 1551, included light and variable winds at 3 knots, 10 miles visibility, a broken cloud layer at 4,400 feet, another broken cloud layer at 4,900 feet, temperature 63 degrees Fahrenheit, dew point 52 degrees Fahrenheit, and barometric pressure of 29.76 inches Hg.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in a densely wooded area, about 1 mile north of the departure end of runway 01, on the extended runway centerline. The initial impact point was a tree-strike about 15 feet above the ground, on a 35-foot tall tree. At the base of the tree was a 12-foot section of the leading edge of the right wing. Two additional tree strikes were noted prior to the main wreckage; however, no other trees in the surrounding area were disturbed. The broken ends of the tree strikes exhibited 45-degree cuts and some paint transfer. The impact angle through the trees was estimated to be about 60-degrees.

The wreckage path was oriented on a heading of 252 degrees magnetic and extended about 20 feet from the initial impact point to the main wreckage. The airplane came to rest upright, on a heading of 005 degrees magnetic, with all components accounted for in the immediate vicinity of the wreckage.

The main fuselage remained intact; however, severe aft crushing was noted in the cockpit area, exposing internal wiring and the right side of the instrument panel. The instrument panel was displaced into the engine firewall, and the engine had partially separated from the firewall, coming to rest on a heading of 090 degrees magnetic. The three-bladed propeller remained attached to the engine at the propeller hub. Two of the blades exhibited slight torsional bending, and one blade was bent and folded under the engine. Each of the blades exhibited chordwise scratching.

The rear portion of the right wing remained attached to the fuselage at the wing root, and the forward section of the wing was crushed aft to the main spar.

The left wing remained attached to the fuselage at the wing root and impact damage was noted on the leading edge.

The empennage remained attached to the fuselage; however, a tear was noted in the empennage section, just aft of the rear cabin seats, which encircled most of the empennage. Both the rudder and horizontal stabilizer remained intact and attached to the vertical stabilizer at their attachment points.

All flight controls remained attached at their respective attachment points and flight control continuity was confirmed from the flight controls to the cockpit. The landing gear and flaps were observed in the retracted positions, and measurements taken of their respective actuators confirmed the position.

Both fuel tanks were breached; however, the fuel caps were secured to the tanks. A slight odor of fuel was present at the scene, and emergency personnel observed fuel on the ground in the vicinity of the right wing. The fuel selector exhibited impact damage, and its position could not be determined. The fuel screen was absent of debris. Fuel was observed in the fuel line leading to the fuel distributor. The fuel was absent of debris and appeared blue in color.

The engine was removed from the airplane and the propeller was rotated manually at the propeller hub. Thumb compression was obtained on all cylinders and valve train continuity was confirmed to the rear accessory drive section.

The top spark plugs were removed and examination of their electrodes revealed they were intact and appeared light gray in color.

The right magneto was intact, and when manually rotated, sparks were observed on all towers. The left magneto was impact damaged, and did not produce spark when rotated.

The fuel pump rotated freely, and the drive shaft was intact.

The internal portion of the outer casing of the vacuum pump exhibited rotational scoring. Internal examination of the pump revealed that the vanes were impact damaged.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by personnel of the Office of the Chief Medical Examiner, Chapel Hill, North Carolina.

Toxicological testing was conducted on the pilot at the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma.

ADDITIONAL INFORMATION

According to a pilot who flew with the instructor on the morning of the accident, one of the maneuvers which the instructor emphasized was an emergency landing after takeoff. The pilot stated that they practiced this maneuver twice; once at an altitude of 900 feet, and once at 1,000 feet. After the instructor pulled the power back at the desired altitude, the pilot would pitch the airplane for the "best glide speed," or 80 knots, and bank the airplane "real hard," into a 45-degree bank to return to the airport.

The Flight Instructor's In-flight Teaching Guide for the BPPP was found in the airplane. Listed under the MANUEVER section, ABNORMAL and EMERGENCY PROCEDURE, it states:

"Simulated Engine Failures - Bonanza: Perform at least one as circumstances permit
- On Takeoff
- After Liftoff
- Climb/cruise
- Maneuvering (stalls, slow flight etc.)
- During instrument operations"

Additionally, the EXPANDED NOTES section of the Flight Instructors Teaching Guide states,

"ABNORMAL & EMERGENCY PROCEDURES: TURN BACK AFTER POWER LOSS ON TAKEOFF IN SINGLE ENGINE AIRPLANE.
- Emphasize climb out at Vy with full power. Altitude gives the most options.
- Minimum altitude - 1200' above airport elevation.
- Aircraft will be 1.7 to 1.9 nm upwind from start of climb
- After failure, lower nose to establish glide AND look for suitable landing site. This forces a decision and creates a delay which is more realistic."

According to the Beechcraft Bonanza Pilot's Operating Handbook, Section III, EMERGENCY PROCEDURES,

"If engine failure occurs immediately after takeoff, landing straight ahead is usually advisable."

A review of FAA-H-8083-3, Airplane Flying Handbook, revealed:

"...If an actual engine failure should occur immediately after takeoff and before a safe maneuvering altitude is attained, it is usually inadvisable to attempt to turn back to the field from where the takeoff was made. Instead, it is safer to immediately establish the proper glide attitude, and select a field directly ahead or slightly to either side of the takeoff path."

On May 5, 2003, the airplane wreckage was released to a representative of the owner's insurance company.

Flight instructor Information

Certificate:	Airline transport; Flight instructor	**Age:**	49,Male
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**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 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 12, 2002
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	7300 hours (Total, all aircraft), 650 hours (Total, this make and model)		

Pilot Information

Certificate:	Private	**Age:**	45,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:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	July 29, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	June 10, 2001
Flight Time:	405 hours (Total, all aircraft), 319 hours (Total, this make and model), 365 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N523BL
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	E-3194
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 21, 2002 Annual	**Certified Max Gross Wt.:**	3650 lbs
Time Since Last Inspection:	65.5 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	977.5 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550
Registered Owner:	Wesley Vance	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HTS,828 ft msl	**Distance from Accident Site:**	37 Nautical Miles
Observation Time:	15:51 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 4400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.76 inches Hg	**Temperature/Dew Point:**	17°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Jackson, OH (I43)	**Type of Flight Plan Filed:**	None
Destination:	Jackson, OH (I43)	**Type of Clearance:**	None
Departure Time:	16:29 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	James Rhodes Airport I43	**Runway Surface Type:**	Asphalt
Airport Elevation:	726 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	01	**IFR Approach:**	None
Runway Length/Width:	5201 ft / 75 ft	**VFR Approach/Landing:**	Simulated forced landing

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:**	39.003334,-82.576942

Administrative Information

Investigator In Charge (IIC):	Andrews, Jill
Additional Participating Persons:	Jim Jackson; FAA/FSDO; Cincinnati, OH Brian Cassidy; Raytheon Aircraft Company; Wichita, KS Kris Wetherell ; Teledyne Continental Motors; Vernon, CT
Original Publish Date:	April 28, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=56889