Aviation Investigation Final Report

Location:	Elizabethton, Tennessee	**Accident Number:**	MIA07FA137
Date & Time:	September 1, 2007, 10:33 Local	**Registration:**	N326DK
Aircraft:	Beech A36	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The Beech A36 airplane was approximately 0.95 inch aft of the aft center of gravity (CG) limit at the start of the flight, which was destined for an airport approximately 20 nautical miles north-northeast of the departure airport. Mountainous terrain at an elevation of 4,321 feet mean sea level (msl) was noted between the departure and destination airports. The flight departed from runway 06, and by witness accounts the airplane became airborne 2/3 down the 4,529 foot-long runway, and was noted to be only 75 to 100 feet above ground level (agl) at a point approximately 1,500 feet past the departure end of the runway. Witnesses also reported the airplane was flying slow in a steep climb attitude with the landing gear retracted, and there was no unusual engine sounds heard. The flight continued on a northeasterly heading, where another witness located in mountainous terrain about 1 mile southwest of the crash site location noted the airplane flying only 2-3 times the height of the tree tops, or an estimated 200 to 250 feet agl. That witness reported the engine sounded like it was a larger engine, and he did not hear any missing or sputtering from it. The airplane impacted up sloping terrain during daylight hours at an elevation of 3,400 feet msl, approximately 5.38 miles northeast from the departure end of runway 06. There were no known witnesses to the crash. Impact and a postcrash fire destroyed the airplane. Examination of the airframe and flight controls revealed no evidence of preimpact failure or malfunction. Examination of the engine, engine systems, and propeller also revealed no evidence of preimpact failure or malfunction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The poor in-flight planning by the pilot-in-command for flying towards rising terrain with inadequate clearance.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: CLIMB

Findings
1. (C) IN-FLIGHT PLANNING/DECISION - POOR - PILOT IN COMMAND
2. TERRAIN CONDITION - MOUNTAINOUS/HILLY
3. (C) CLEARANCE - INADEQUATE - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On September 1, 2007, about 1033 eastern daylight time, a Beech A36, N326DK, registered to and operated by a private individual, impacted up sloping terrain of Holston Mountain, Elizabethton, Tennessee. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 personal flight from Elizabethton Municipal Airport (0A9), Elizabethton, Tennessee, to Virginia Highlands Airport (VJ1), Abingdon, Virginia. The airplane was destroyed and the commercial-certificated pilot and four passengers were killed. The flight originated about 1029, from 0A9.

Witnesses reported that the airplane landed at 0A9 on runway 06 at approximately 1001, taxied to the south side of the airport, and without securing the engine, boarded 2 waiting passengers. The airplane was then observed taxiing towards the approach end of runway 24, but turned around and taxied to the approach end of runway 06, due to an airplane that was being towed on the taxiway at that time. No engine run-up was heard before takeoff.

The destination airport is located approximately 20 nautical miles north-northeast from the departure airport, with mountainous terrain at an elevation of 4,321 feet mean sea level (msl) located between the two airports. In addition, two towers with heights of 4,424 and 4,632 feet msl were noted at points nearly aligned between the airports.

The pilot began the takeoff roll from runway 06 with all available runway, and a pilot-rated witness located on the north side of the airport reported the airplane became airborne when it was 2/3 down the runway. The witness reported the airplane did not appear to be climbing very well and continued on the runway heading for approximately 1 mile.

Another pilot-rated witness who was located approximately 1,500 feet east-northeast from the departure end of runway 06 reported that the airplane flew 200 yards behind his house between 75 and 100 feet above ground level (agl), or "exceptionally low." The airplane was in a steep climb attitude, flying slow with what he thought was the landing gear retracted; there was nothing unusual from the engine.

A witness located in mountainous terrain about 1 mile southwest from the accident site reported hearing the airplane for 10-15 seconds, and observed it for 2 seconds when it flew past a clearing in trees. He estimated the airplane was flying in a north-northeasterly direction, and was flying 2-3 times the height of the tree tops, or an estimated altitude of 200-250 feet agl. He associated the sound from the engine to be from a larger engine. He did not see any smoke trailing the airplane, did not hear any missing or sputtering sounds from the engine, and did not hear the impact.

There were no known witnesses to the crash; the pilot did not establish contact with any FAA air traffic control facility during the accident flight.

A search for the airplane began at approximately 1520; the wreckage was visually spotted from the air at approximately 1846. Ground personnel arrived on scene at approximately 0009, on September 2, 2007.

PERSONNEL INFORMATION

The pilot, age 50, held a commercial pilot certificate with airplane single engine land, and instrument airplane ratings,,last issued November 28, 2005, and a second-class medical certificate issued on July 24, 2006, with no limitations. NTSB review of copies of excerpts of his pilot logbook revealed he logged total flight hours of approximately 1,924 hours, and during the last 90 days he logged approximately 47 hours, which were in the accident airplane.

AIRCRAFT INFORMATION

The airplane was manufactured by Beech Aircraft Company in 1987, as model A36, and designated serial number E-2377. It was powered by a Teledyne Continental IO-550-B 300-horsepower engine and equipped with a Hartzell model PHC-C3YF-1RF constant speed propeller that was installed in accordance with supplemental type certificate (STC) SA450CH. A total of five seats including the pilot's seat were installed; the sixth seat had been removed. With respect to the fuel system, the airplane was equipped with one 40-gallon fuel tank located in each wing, and a 15-gallon fuel tank installed at each wingtip in accordance with Supplemental Type Certificate (STC) SA153EA. The total usable fuel capacity was 104 gallons.

The STC (SA153EA) allows operation of the airplane for takeoff and landing up to a maximum weight of 3,833 pounds.

The airplane was last inspected in accordance with an annual inspection on October 9, 2006. At the time of the annual inspection, the airframe total time and engine time since major overhaul were 2,736.4 and 911.3 hours, respectively. The hour meter was not identified at the crash site; however, the hour meter reading/airframe total time the day before the accident was 2,877.2 hours. The latest entry concerning weight and balance was dated February 9, 2007, which indicated the empty weight was listed as 2598.89 pounds, and the empty weight moment was 80.54.

The airplane type certificate data sheet and the Airplane Flight Manual Supplement (AFMS) associated with STC SA153EA indicates the aft center of gravity (CG) limit is +87.7 inches aft of datum.

METEOROLOGICAL INFORMATION

An automated weather observation station (AWOS) report taken at 0A9 at 0956, or approximately 37 minutes before the accident, indicated the wind was from 090 degrees at 3 knots, the visibility was 9 miles, and clear skies existed. The temperature and dew point were 23 and 18 degrees Celsius, respectively, and the altimeter setting was 30.13 inHg. A AWOS report taken at 0A9 at 1056, or approximately 23 minutes after the accident, indicated the wind was from 070 degrees at 8 knots, the visibility was 9 miles, and clear skies existed. The temperature and dew point were 24 and 18 degrees Celsius, respectively, and the altimeter setting was 30.15 inHg.

COMMUNICATIONS

The airport common traffic advisory frequency (CTAF) at 0A9 was not recorded; there was no report by the pilot of any discrepancy after takeoff.

AIRPORT INFORMATION

The Elizabethton Municipal Airport (0A9) has one asphalt runway designated 6/24, which is 4,529 feet long and 70 feet wide. The elevation is 1,593 feet above mean sea level (msl). A note on FAA Form 5010-1 titled "Airport Master Record" for 0A9 indicates "[runway] 24 preferred unless wind requires otherwise."

WRECKAGE AND IMPACT INFORMATION

The airplane crashed in a wooded and mountainous area; the main wreckage was located approximately 5.38 miles northeast from the departure end of runway 06. The crash site elevation was 3,400 feet msl. The initial impact point occurred on 27-degree up sloping terrain of a natural drainage ravine of Holston Mountain. The energy path thru the trees was oriented on a magnetic heading of 020 degrees. Damage to trees along the energy path was noted; the descent angle thru the trees was noted to be 4 degrees. The left and right fuel tip tanks were located along the energy path. The fuselage came to rest upright heading 320 degrees down slope of the initial impact point. Fire damage was noted to trees near the main wreckage impact point and where the wreckage came to rest. A 2 to 3 inch diameter tree limb near the resting point of the main wreckage exhibited a 45-degree cut consistent with propeller contact.

Examination of the wreckage revealed the cockpit, cabin, and inboard sections of both wings were consumed by the post crash fire. Remnants of a laptop computer, tape measure, and folder material were found in the wreckage. The engine separated from the airframe but found in close proximity to the resting point of the main wreckage, while the propeller remained secured to the engine. The resting position of one propeller blade was adjacent to the ground where molten aluminum was noted. No evidence of preimpact failure or malfunction was noted to the airframe or flight control systems for roll, pitch, or yaw.

Examination of the extensively heat damaged engine and engine system components revealed no evidence of preimpact mechanical malfunction. The lubricating, fuel, ignition, power

section, and engine accessories were examined; heat damage precluded bench testing of any components.

Examination of the heat damaged three-bladed propeller revealed the full length of two blades remained attached to the propeller hub, while only a short stub of the butt end of the remaining blade remained attached to the propeller hub. The two full-length blades exhibited heat damage, and both were bent forward. One full-length blade exhibited a 90-degree smooth radius forward bend beginning approximately 1/4 span of the blade. The blade also exhibited deep gouges on the leading edge of the blade approximately 10 inches from the butt end of the blade and also arching gouges on the cambered side of the blade. The pitch change pin was fractured. The second full-length blade exhibited a 45-degree smooth radius forward bend beginning approximately 1/4 span of the blade. The pitch change pin was fractured in 2 pieces. Examination of the remaining section of third propeller blade revealed the pitch change pin was bent, and the stub surface exhibited thermal damage. No determination was made as to the propeller blade angle at the moment of impact. The stub segment of propeller blade was retained for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations of the pilot and 4 passengers were performed by East Tennessee State University. The cause of death for all was listed as either "multiple blunt force injuries" or "blunt force injuries."

Forensic toxicology was performed on specimens from the pilot by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The toxicology report stated the results was negative for volatiles and tested drugs. Testing for carbon monoxide and cyanide was not performed.

TESTS AND RESEARCH

Examination of the stub section of propeller blade by the NTSB Materials Laboratory located in Washington, D.C., revealed that the features associated with the blade were typical of separation at a temperature within the melting range of the aluminum alloy.

The airplane was last fueled on August 31, 2007, while at New Tazewell Municipal Airport, Tazewell, Tennessee. A total of 86.7 gallons of 100 low-lead fuel were added. Since fueling and excluding the accident flight, the airplane was flown on 6 legs totaling approximately 343 nautical miles. Although no determination could be made as to the exact fuel load on board at the time of the accident, the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (POH/AFM) contains a limitation that each flight must have no less than 13 gallons in each fuel tank, or a total minimum of 26 gallons of fuel. At the time of manufacture, a placard stating such was installed on the fuel tank selector cover.

As previously reported, the gross weight for takeoff and landing must not exceed 3,833

pounds, and at that weight, the aft CG limit is +87.7 inches aft of datum.

Weight and balance calculations were performed using the latest empty weight of the airplane (2,598.89 pounds), the weight of the pilot per his last medical certificate (200 pounds), and the weights of the passengers based on information provided by their family (780 pounds total for all four). Additional items that were included in the weight and balance calculations include the estimated weights of files (70 pounds), one laptop computer (5 pounds), and a portable tape measure (4 pounds). The removal of the sixth passenger seat (16 pounds) was subtracted from the airplane's empty weight, while the weight of the minimum fuel load required for the flight by the POH/AFM (156 pounds) was added into the calculations. The weight and balance calculations indicated that the aircraft weight at the time of takeoff was approximately 3,798 pounds, and the CG was 88.65 inches aft of datum. Any fuel weight in the airplane's main fuel tanks above the minimum required for the flight would increase the gross weight but would move the CG forward.

Pilot Information

Certificate:	Commercial	**Age:**	50,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	July 1, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1924 hours (Total, all aircraft), 47 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N326DK
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	E-2377
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	October 1, 2006 Annual	**Certified Max Gross Wt.:**	3833 lbs
Time Since Last Inspection:	141 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2736.4 Hrs as of last inspection	**Engine Manufacturer:**	Teledyne Continental Motors
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-B
Registered Owner:	Victor J. Osborne, Jr.	**Rated Power:**	300 Horsepower
Operator:	Victor J. Osborne, Jr.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	0A9,1593 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	10:56 Local	**Direction from Accident Site:**	228°
Lowest Cloud Condition:	Clear	**Visibility**	9 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.14 inches Hg	**Temperature/Dew Point:**	24°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elizabethton, TN (0A9)	**Type of Flight Plan Filed:**	None
Destination:	Abingdon, VA (VJ1)	**Type of Clearance:**	None
Departure Time:	10:29 Local	**Type of Airspace:**	

Airport Information

Airport:	Elizabethton Municipal Airport 0A9	**Runway Surface Type:**	Asphalt
Airport Elevation:	1593 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	06	**IFR Approach:**	None
Runway Length/Width:	4529 ft / 70 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	4 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	36.433612,-82.102775

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Paul B Jones; FAA/FSDO; Nashville, TN Neil Sandvik; Hawker Beechcraft; Wichita, KS Rodney Martinez; Teledyne Continental Motors; Mobile, AL Thomas J McCreary; Hartzell Propeller, Inc.; Piqua, OH
Original Publish Date:	November 25, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=66564