



National Transportation Safety Board Aviation Accident Final Report

Location:	Washington, IN	Accident Number:	CHI07FA052
Date & Time:	01/02/2007, 1400 CST	Registration:	N678DC
Aircraft:	Beech 58	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airplane impacted trees and terrain while attempting to return to the departure airport after takeoff. The pilot of another airplane who witnessed the takeoff reported that the accident airplane's takeoff appeared "normal." After takeoff, he noticed the accident airplane about 1.5 miles from the departure airport. It appeared to be in a 45 to 60-degree bank turn back towards the airport, below the level of a tree line. The accident airplane subsequently struck the tree line and came to rest in an agricultural field. The post accident inspection did not reveal any anomalies associated with a pre-impact failure of the flight control system. In addition, examination of both engines did not reveal any failures or malfunctions consistent with a loss of engine power prior to the accident. Examination of the left alternator indicated that it was unable to provide the rated electrical power. Examination of the right alternator did not reveal any anomalies, and the unit appeared to be functional. According to an acquaintance of the pilot, the accident airplane was en route to a maintenance facility for a routine annual inspection. He noted that the left alternator appeared to be inoperative prior to the accident flight and that the mechanic had been advised to look at it during the inspection. He knew of no other problems with the airplane prior to the accident flight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain clearance from trees and terrain while attempting to return to the departure airport for undetermined reasons after takeoff. The intervening tree line was a contributing factor.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: MANEUVERING

Findings

1. (C) CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
2. (F) OBJECT - TREE(S)
3. ELECTRICAL SYSTEM,ALTERNATOR - FAILURE

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings

4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On January 2, 2007, about 1400 central standard time, a Beech Model 58 Baron, N678DC, piloted by a private pilot, was destroyed during an in-flight collision with trees and terrain while maneuvering near Washington, Indiana. The flight was being conducted under 14 CFR Part 91 without a flight plan. Visual meteorological conditions prevailed at the time of the accident. The pilot sustained fatal injuries. The flight departed Daviess County Airport (DCY), Washington, Indiana, about 1345. The intended destination was Ohio County Airport (7K4), Hartford, Kentucky.

An acquaintance of the pilot reported he intended to follow the accident airplane to 7K4 in a Cessna 182. He noted the accident airplane was to be left there for an annual inspection. He and the accident pilot were planning on returning to DCY in the Cessna 182. He reported that the accident airplane's takeoff was "normal." He stated that after he took off in the 182, he next saw the accident airplane in-flight approximately 2 miles south of the airport. He noted that it was in a 45 to 60 degree bank turn and appeared to be below the tree line. He noted: "I then saw a spray, maybe fuel, and then saw that the plane had stopped. . . . As I flew over the scene I realized that there was a crash so I decided to come back to the [departure] airport."

Two individuals who were working on the roof of a hangar under construction at the airport witnessed the accident flight. One noted that he observed the airplane about 2 miles south of the airport in a "steep left hand turn descending below the tree line." The other witness reported that he heard the airplane's engines "really rev up" before it descended below tree level.

The mechanic intending to perform the annual inspection reported that the pilot's acquaintance had called to inform him that the left alternator was inoperative. The mechanic stated he was also told that the right alternator out light was illuminated, but that the right alternator was working as evidenced by the load meter indication. The mechanic noted that he added those items to the discrepancy sheets and intended to look at the alternators during the annual inspection.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with single and multi-engine land airplane ratings. He was issued a third-class airman medical certificate on March 15, 2006, with a limitation that corrective lenses be worn.

The pilot's logbooks were reviewed. The most recent logbook entry was dated July 14, 2006. As of the final entry, the accident pilot had accumulated 991.0 hours total flight time. Total multi-engine flight time was listed as 587.7 hours.

Log entries for flights in Beech Model 58 airplanes totaled 572.3 hours. Of that time, 87.2 hours were logged as dual instruction received, and 442.9 hours as pilot-in-command. Entries totaling 42.2 hours did not contain a corresponding notation for either dual received or pilot-in-command.

According to the logbook, the pilot's most recent flight qualifying for a flight review was his multi-engine practical test, which was completed on September 8, 1994. There were no subsequent entries for flight reviews in the logbook. The most recent entry that included dual

instruction was dated June 20, 2001. This entry included the notation "C-182 [Check] Out Satisfactory."

The application for insurance on the accident airplane, dated October 30, 2006, noted a flight review date of February 4, 2006, for the pilot. The pilot's logbook contained an entry dated February 4, 2006, for a flight of 1.9 hours in the accident airplane. The entry did not contain any supplementary comments or endorsements.

The acquaintance of the pilot stated that the accident pilot had flown the accident airplane as recently as December 5, 2006. However, he was not sure of other flights in the Cessna 182 during that time frame.

AIRCRAFT INFORMATION

The accident airplane was a 1987 Beechcraft Model 58 Baron, serial number TH-1517. It was a six-place, twin-engine airplane, with retractable tricycle landing gear. The airplane was powered by two 300-horsepower Continental IO-550-C (6) engines.

Maintenance records indicated that the most recent annual inspection was completed on January 25, 2006. At the time of the inspection, the airframe had accumulated 2,438 hours total time. The left engine (serial number 676313) and right engine (serial number 676314) had each accumulated 618 hours since overhaul. The record also noted that the left alternator was replaced on October 13, 2005, at 2,415 hours.

METEOROLOGICAL CONDITIONS

Weather conditions recorded by the Lawrenceville-Vincennes International Airport (LWV) Automated Surface Observing System, at 1353, were: Winds from 160 degrees at 6 knots; 10 miles visibility; clear skies; temperature and dew point 7 degrees and 0 degrees Celsius, respectively; altimeter 30.37 inches of mercury. LWV was located approximately 23 miles west of DCY.

WRECKAGE AND IMPACT INFORMATION

The accident airplane impacted trees and an agricultural field approximately 1.5 miles south of the departure airport. The elevation of the accident site was approximately 512 feet mean sea level (msl).

The initial tree strike was located 1.44 nautical miles (nm) south of the DCY runway 36 threshold, and the fuselage came to rest 1.35 nm south of the airport.

The debris path, from the initial tree strike to the main wreckage, was approximately 764 feet long and was oriented on a 053-degree magnetic bearing. Initial ground impact was 539 feet from the tree strike. The tree line was approximately 50 feet high. Several tree limbs, which exhibited fresh breaks, were observed on the ground between the tree line and initial ground impact.

The ground impact scar was approximately 51 feet long by 4 feet wide. Both propeller assemblies had separated from the engines and were located within the impact scar.

The left wing was fragmented. The inboard portion of the left wing, including the left engine and main landing gear, came to rest about 11 feet beyond the ground impact scar. The flap remained attached to the aft spar. The left flap jack screw position was consistent with a flaps-

up configuration. Debris associated with the outboard left wing was located at the site. The left aileron had separated and was located in the debris path.

The empennage was separated from the fuselage and came to rest approximately 50 feet from the left wing section. The elevators and rudder remained attached to the horizontal and vertical stabilizers, respectively.

The main wreckage consisted of the fuselage, right wing and right engine. The forward fuselage and right wing remained attached. They came to rest on an approximate magnetic heading of 100 degrees. The aft fuselage was separated at a point near the trailing edge of the wing. The aft fuselage was rotated 180 degrees relative to the forward fuselage/right wing orientation, and was lying on its right side. The roof and left side of the forward fuselage were separated, exposing the cockpit and cabin area. The right wing exhibited leading edge crushing damage. The right flap and aileron remained attached to the wing. The right flap was up.

Flight control continuity was established within the right wing, aft fuselage, and empennage sections. Breaks in the flight control cables were consistent with tensile overload failures. The elevator control bell crank and control rods, and the left aileron bell crank had separated from the airframe. Appearance of the fracture surfaces was consistent with overload failures.

The right main landing gear was extended approximately 20 percent. Continuity between the right main landing gear and the gear motor was confirmed. The position of the gear motor actuator corresponded with the observed position of the right main landing gear. The left main landing gear and surrounding structure had separated from the airframe. The nose landing linkage was damaged allowing the landing gear assembly to rotate on the trunion pivot.

The left engine remained with the left wing. The propeller attachment flange was intact and the propeller bolts remained in the flange. Engine continuity was confirmed via crankshaft rotation. Compression was observed on all cylinders, with the exception of the #4 cylinder. The #4 cylinder was damaged in a manner consistent with impact forces. The piston in that cylinder moved as the crankshaft was rotated. The magnetos produced spark across all leads. The upper spark plugs were removed. Their appearance was consistent with normal wear. The fuel flow divider was disassembled. Fluid consistent in appearance and odor to aviation fuel was observed. The diaphragm was intact and the screen was unobstructed.

The left 3-bladed propeller assembly had separated from the engine and was located in the debris field. Two attachment holes on the propeller hub had sheared out. In addition, one of the bushings had sheared out of the flange. One blade was fractured near mid-span. A second blade was fractured near the tip. The separated blade sections were recovered from the debris field and all blades were accounted for in their entirety. All blades exhibited bending, twisting toward low pitch, and chordwise scratches. One of the blades exhibited leading edge gouges.

The right engine remained attached to the airframe. The engine mount was deformed, which caused the engine to be rotated downward. The propeller flange was intact. The propeller mounting bolts remained with the propeller flange. Engine continuity was confirmed via crankshaft rotation. Compression was observed on all cylinders, except cylinder #3. Cylinder #3 exhibited low compression in comparison to the other cylinders. The #3 piston moved properly during crankshaft rotation. No other anomalies were observed. The magnetos produced spark across all leads. Appearance of the upper spark plugs was consistent with normal wear. The right engine fuel flow divider was disassembled. It contained a fluid

consistent in appearance and odor to aviation fuel. The diaphragm and screen were intact.

The right 3-bladed propeller assembly had separated from the engine and was located in the debris field. Two attachment holes and one bushing on the propeller hub had sheared out. One blade was fractured near the root. The separated blade section was recovered from the debris field. All blades were accounted for in their entirety. All blades exhibited bending, twisting toward low pitch, and chordwise scratches. Two of the blades exhibited leading edge gouges.

Examination of the engines and propeller assemblies did not reveal any anomalies associated with a pre-impact failure or malfunction.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed on January 3, 2007, in Washington, Indiana.

The Federal Aviation Administration (FAA) Civil Aerospace Medical Institute (CAMI) toxicology report stated:

0.038 (ug/ml, ug/g) Diphenhydramine detected in blood;

Diphenhydramine present in urine.

Diphenhydramine is an over-the-counter antihistamine with sedative effects, often used to treat allergy symptoms.

TESTS AND RESEARCH

The left and right alternators were tested under the direct supervision of the NTSB. Both units were run on a test bench. The output of the left alternator was less than 10 amps. Disassembly of the unit revealed that the insulation at one diode on the negative plate was damaged, exposing the lead. This diode did not exhibit continuity when tested. No other defects were observed relative to the left alternator. Testing of the right alternator revealed that the unit was functional. The unit was disassembled and no defects were observed.

ADDITIONAL INFORMATION

The airplane manufacturer provided information regarding the design and capability of the electrical system. The airplane was equipped with two 100-amp, 28-volt alternators, and two 25 amp-hour, 12-volt lead acid batteries. System status was provided to the pilot by two load meters, one corresponding to each alternator circuit, and one voltmeter that provided overall system voltage.

Two red annunciator lights, labeled Left Altr and Right Altr, provided under-voltage and over-voltage indications. The respective annunciator was designed to flash when the alternator control unit detected an over-voltage and disconnected the alternator unit from the system. The annunciator was also designed to flash when the control unit detected an under-voltage condition. The unit normally provided an under-voltage indication beginning at approximately 12.3 volts, which was approximately one-half the nominal alternator output. The alternator was designed to disconnect due to an under-voltage condition when insufficient voltage remained to power the alternator control relay, which normally occurred about 7 volts. When an alternator switch was placed in the off position, the corresponding annunciator light was designed to steadily illuminate.

An electrical load analysis for the accident airplane in the as-delivered configuration indicated a battery duration of 30.63 minutes when beginning with a fully charged battery, with the cabin heater off. The duration was calculated to be 19.96 minutes with the cabin heater on. Duration was estimated at approximately one-half those values in the event the battery was initially charged at 50-percent of capacity.

FAA records indicated that additional avionics equipment was installed after delivery. The additional equipment included a multi-function display, a Stormscope, and a weather radar unit.

The Federal Aviation Administration and Raytheon Aircraft Company were parties to the investigation.

Pilot Information

Certificate:	Private	Age:	64, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	03/01/2006
Occupational Pilot:		Last Flight Review or Equivalent:	02/01/2006
Flight Time:	991 hours (Total, all aircraft), 572 hours (Total, this make and model), 719 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Beech	Registration:	N678DC
Model/Series:	58	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	TH-1517
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	01/01/2006, Annual	Certified Max Gross Wt.:	5400 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:	2438 Hours	Engine Manufacturer:	Continental
ELT:	Installed, not activated	Engine Model/Series:	IO-550-C (6)
Registered Owner:	K & K Industries Inc.	Rated Power:	300 hp
Operator:	On file	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	LWV, 430 ft msl	Observation Time:	1353 CST
Distance from Accident Site:	23 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	280°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	7°C / 0°C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	6 knots, 160°	Visibility (RVR):	
Altimeter Setting:	30.37 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Washington, IN (DCY)	Type of Flight Plan Filed:	None
Destination:	Hartford, KY (7K4)	Type of Clearance:	None
Departure Time:	1345 CST	Type of Airspace:	

Airport Information

Airport:	Daviess County (DCY)	Runway Surface Type:	Asphalt
Airport Elevation:	473 ft	Runway Surface Condition:	Dry
Runway Used:	36	IFR Approach:	None
Runway Length/Width:	4621 ft / 75 ft	VFR Approach/Landing:	Precautionary Landing; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal		

Administrative Information

Investigator In Charge (IIC):	Tim Sorensen	Adopted Date:	03/31/2008
Additional Participating Persons:	Daniel M Keen; FAA-Indianapolis FSDO; Indianapolis, IN Mike Gibbons; Raytheon Aircraft Company; Wichita, KS		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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