Aviation Investigation Final Report

Location:	Centerville, Tennessee	**Accident Number:**	MIA02FA148
Date & Time:	August 11, 2002, 16:40 Local	**Registration:**	N24041
Aircraft:	Beech C23	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The single-engine airplane impacted an 80-foot tree after the pilot lost control shortly after takeoff. The airplane impacted trees with little to no forward speed in a nose low pitch attitude. A number of tree limbs were freshly cut by the propeller. The private pilot flew the airplane for approximately 40 minutes prior to departing on the accident flight. The accident flight included approximately 300 pounds of fuel on board, 100 pounds of ballast weight in the baggage area, a 359-pound passenger in the rear seat, a 170-pound front seat passenger, and the 170-pound pilot. This brought the gross weight of the airplane to approximately 200 pounds in excess of its maximum gross weight limitations. The calculated center of gravity (CG) was less than one inch from its most aft CG limit. No pre-accident anomalies with the engine or airframe were noted that would have contributed to the accident. The 145-hour pilot obtained a check out in the accident airplane three days prior to the accident. This was the first flight in the accident airplane since the checkout. The checkout lasted approximately one hour and included a questionnaire and a weight and balance calculation and discussion.

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 airspeed which resulted in an inadvertent stall shortly after takeoff. A contributing factor was the pilot's decision to takeoff in an over gross weight condition and his lack of familiarity with the aircraft.

Findings

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

Findings
1. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
2. STALL - ENCOUNTERED - PILOT IN COMMAND
3. (F) AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
4. (F) LACK OF FAMILIARITY WITH AIRCRAFT - PILOT IN COMMAND

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

Findings
5. OBJECT - TREE(S)

Factual Information

HISTORY OF FLIGHT

On August 11, 2002, about 1640 central daylight time, a Beech C23 single-engine airplane, N24041, was destroyed when it impacted a tree and terrain shortly after takeoff from the Centerville Municipal Airport (GHM), Centerville, Tennessee. The private pilot and his two passengers were fatally injured. The airplane was registered to and operated by Tullahoma Aviation Inc., of Tullahoma, Tennessee, under the provisions of 14 CFR Part 91. Visual meteorological conditions prevailed and a flight plan was not filed for the local personal flight. The flight departed GHM shortly before the accident.

The pilot rented the airplane and had departed from Tullahoma about 1515, with a female passenger. The flight landed about 40 minutes later at Centerville. The pilot shut down the engine, and both occupants exited the airplane. The female departed the area. According to witnesses, the pilot and two male passengers boarded the airplane, and the flight departed to the north. The airplane was observed at a low altitude in a left turn. The airplane then entered a nose-low attitude, impacted a tree, and then the ground. A post-crash fire erupted.

The burnt remains of the wreckage were located at 35 degrees 51.015 minutes north latitude and 87 degrees 25.771 minutes west longitude, approximately 0.8 nautical miles north-northeast of the departure end of GHM.

PERSONNEL INFORMATION

The pilot was issued a second-class medical certificate on May 29, 2002, with no limitations. According to that medical certificate application, the pilot accumulated 145 hours total flight time, of which 80 hours were accumulated within the previous six months. The pilot's logbooks were not located during the course of the investigation.

According to Tullahoma Aviation personnel, the pilot had received a checkout (lasting approximately one hour) in the accident airplane three days prior to the accident flight. The Tullahoma Aviation personnel added that this was the pilot's first trip in the accident airplane since the checkout. The pilot listed a total of 141 hours on Tullahoma Aviation's rental agreement checkout form.

AIRCRAFT INFORMATION

According to the Tullahoma Aviation personnel, the aircraft maintenance records were kept in the aircraft and are presumed destroyed. A student at Tullahoma Aviation made copies of some of the maintenance record entries in preparation for a check ride and provided them to

the NTSB investigator-in-charge. According to the maintenance record copies, the aircraft underwent its last annual inspection on June 6, 2002, at an aircraft total time of 5,559.56 hours. As of August 5, 2002, the airplane had accumulated a total of 5,628.04 hours.

The pilot, who weighed 170 pounds (according to his medical certificate), was sitting in the left front seat. One male passenger weighing about 170 pounds (according to a witness) was sitting in the right front seat, and a male passenger, weighing 359 pounds (according to the autopsy report) was seated in the rear seat. The owner of the airplane told investigators that two 50-pound bags of gravel, used to balance the airplane when there were only two occupants in the front seats, were in the baggage compartment. The owner also told investigators that the airplane was full of fuel when it departed Tullahoma, and there should have been about 300 pounds of fuel onboard the airplane at the time of the accident.

Using the aforementioned information and weight and balance information provided by the owner, investigators calculated weight and balance information for the accident flight. The calculated weight of the airplane at the time of the accident was 2,657 pounds, with a center of gravity between 116.77 and 117.67 inches aft of datum. The maximum takeoff and landing gross weight for the accident airplane was 2,450 pounds, with an aft center of gravity limit of 118.3 inches aft of datum.

METEOROLOGICAL INFORMATION

At 1653, the closest weather observation facility located in Nashville, Tennessee (approximately 41 miles northeast of the accident site), reported the wind from 010 degrees at 7 knots, visibility 7 statute miles, a few clouds at 7,500 feet and scattered clouds at 25,000 feet, temperature 88 degrees Fahrenheit, dew point 66 degrees Fahrenheit, and an altimeter setting of 30.11 inches of mercury.

The GHM airport elevation was 768 feet msl, and the computed density altitude at the time of the accident was 2,662 feet.

WRECKAGE AND IMPACT INFORMATION

The aircraft came to rest in a forested area with closely spaced trees. The airplane impacted an 80-foot tree and came to rest in an upright position at the tree's base. No visible damage to the trees in the area was noted, with the exception of those trees that closely surrounded the wreckage. A post-impact fire ensued, destroying the aircraft.

The left wing separated from the fuselage and was fragmented. One three-foot section of the left wing was located in the tree, while the majority of the left wing was found on top of the left half of the horizontal stabilator. The wing sustained a large amount of post-impact fire damage. The left aileron was separated from the wing, exhibited impact damage on its outboard end, and was partially consumed by the fire. The aileron hinges remained attached to the aileron and had portions of the wing still attached to the hinges. The aileron pushrod

end remained attached to the aileron, but the remainder of the pushrod separated from the rod end. The left aileron bell crank was located in the wreckage. The bell crank had separated from the wing, but the aileron pushrod remained attached to the bell crank. One of the left aileron control cables remained attached to the bell crank, while the remaining control cable bell crank attachment arm was found fractured. The other aileron control cable was located in the wreckage, with the fractured bell crank attachment arm attached. The left flap was separated from its wing and sustained fire damage. The left main landing gear remained attached to the main wing spar.

The right wing remained attached to the airplane but was later removed for transport to a hangar for further examination. The post-impact fire consumed the right wingtip and a majority of the inboard portion of the wing. The leading edge displayed a large impact mark (approximately 2 feet in length) near its mid-span. The impact mark exhibited chord-wise crushing in the aft and downward direction. The right flap was separated from the wing and consumed by the post-impact fire. The right aileron remained attached to the wing, and its pushrod, bell crank, and cables remained intact and attached. The right main landing gear separated from the wing spar.

The post-impact fire consumed the fuselage. The forward terminating ends of both elevator control cables remained attached to the control column. Both aileron cables remained attached to the aileron control column chain. Both forward ends of the rudder control cables were located in the cockpit remains and their terminating ends were intact. The manual flap actuator handle was in the retracted position. The fuel selector handle was selected to the right fuel tank position. A substantial amount of gravel was located within the fuselage remains, and was confirmed to be the two fifty-pound ballast weights (originally contained in two canvas bags) utilized in the rear of the airplane.

The empennage remained attached to the aft fuselage. The horizontal stabilator remained intact, but exhibited a large amount of fire consumption damage. The left half of the stabilator sustained an impact mark with chord-wise crushing approximately one foot inboard of the fiberglass tip attach point. The stabilator trim tab remained attached to the stabilator, and its actuator measured 1.25 inches, which according to the manufacturer, corresponded to approximately 3 degrees tab down. Both stabilator control cables remained attached to the stabilator control arm. A majority of the vertical stabilizer and rudder were consumed by the fire, leaving approximately eight inches of rudder attached by its lower hinge point and approximately 2.5 feet of the vertical stabilizer attached to the empennage. The right rudder control cable remained attached to the rudder bell crank, while the left rudder control cable was separated from the bell crank. The cable end was found in the wreckage and was intact.

The engine remained attached to the firewall but sustained some post-impact fire damage. The fire consumed the carburetor and fuel pump, and only a few internal components were identifiable. The magnetos were in place and secured to the engine accessory section; however, the fire damage precluded a timing or functional check. The sparkplugs were removed for examination. All of the electrode gap settings were "normal" according to the

engine manufacturer, and the plug coloration varied between gray, brown, and black with mostly moderate wear noted. The engine crankshaft was rotated manually and continuity of the crankshaft, camshaft, valve train, and accessory drives was established. Each cylinder produced thumb compression while the crankshaft was rotated. A lighted bore scope was utilized to inspect the internal power section and top end components. No anomalies were noted.

The propeller remained attached to the engine. One blade was bent aft against the side of the engine, while approximately 13 inches of the other blade was partially consumed by the fire. Several tree limbs, approximately 2 to 5 inches in diameter were found freshly cut along a diagonal plane at the accident site.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted on the pilot by the Tennessee Department of Health's Office of the Chief Medical Examination. No medical issues were noted that would have prevented the pilot's ability to fly the accident airplane. Toxicological tests conducted on the pilot revealed no ethanol or drugs were found. The toxicological tests were positive for 0.59 ug/ml of cyanide in the pilot's blood.

ADDITIONAL INFORMATION

According to Tullahoma Aviation Inc., when the pilot was checked out in the accident airplane he was given a questionnaire that included a weight and balance computation and discussion.

The wreckage was released to the owner on August 13, 2002.

Pilot Information

Certificate:	Private	**Age:**	21,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 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	May 29, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	August 23, 2001
Flight Time:	145 hours (Total, all aircraft), 2 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N24041
Model/Series:	C23	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	M-1930
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 6, 2002 Annual	**Certified Max Gross Wt.:**	2450 lbs
Time Since Last Inspection:	68.48 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5628.04 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	O-360-A4K
Registered Owner:	Tullahoma Aviation Inc.	**Rated Power:**	180 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:	BNA,599 ft msl	**Distance from Accident Site:**	41 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	65°
Lowest Cloud Condition:	Few / 7500 ft AGL	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	31°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Centerville, TN (GHM)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	16:40 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Centerville Municipal Airport GHM	**Runway Surface Type:**	
Airport Elevation:	768 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	35.850276,-87.429443

Administrative Information

Investigator In Charge (IIC):	Yurman, Alan J.
Additional Participating Persons:	Hal Cutter; Federal Aviation Administration; Nashville, TN Robert L Ramey; Raytheon Aircraft Company; Wichita, KS Edward G Rogalski; Textron Lycoming ; Bellview, FL
Original Publish Date:	December 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=55467