



Aviation Investigation Factual Report

Location:	Sevierville, Tennessee	Accident Number:	ERA16FA188
Date & Time:	May 19, 2016, 11:39 Local	Registration:	N2967B
Aircraft:	Beech D35	Aircraft Damage:	Substantial
Defining Event:	Landing gear not configured	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On May 19, 2016, about 1139 eastern daylight time, a Beech D35, N2967B, was substantially damaged when it impacted terrain during an aborted landing, following a gear-up touchdown, at Gatlinburg-Pigeon Forge Airport (GKT) Sevierville, Tennessee. The private pilot was fatally injured. The airplane was registered to a private individual and operated by the pilot under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight that departed from GKT about 1102.

Review of video recordings obtained from security cameras at GKT revealed that the airplane taxied out for departure about 1057. The airplane took off from runway 10 about 1102. About 1138, the airplane approached the runway and touched down with the landing gear up and the wing flaps down. The airplane appeared to skip slightly, became airborne, and climbed slowly with visible oscillations in pitch and roll until it was about 25 ft above the runway surface where it flew out of view of the camera.

According to witnesses, the pilot had departed and flown around the area for about 30 minutes before returning to land on runway 10 at GKT. During the landing, the airplane touched down with the landing gear in the up position; the propeller struck the ground; and the airplane skidded along the ground on its belly. Then, the engine was heard to "rev up," and the airplane lifted off. It appeared to be "very unstable in ground effect" and then pitched up, rolled to the left, and impacted terrain.

Pilot Information

Certificate:	Private	Age:	62, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Unknown
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	March 24, 2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	November 25, 2005
Flight Time:	(Estimated) 210 hours (Total, all aircraft), 3 hours (Total, this make and model), 157 hours (Pilot In Command, all aircraft)		

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with an airplane single-engine land rating. His most recent FAA third-class medical certificate was issued on March 24, 2015.

According to pilot records, the pilot had accrued about 210 total hours of flight experience, 157 hours of which were as pilot-in-command. He had received 3.1 hours of flight instruction in the accident airplane in April 2015, but no record of a complex or high-performance endorsement was found. His most recent flight review endorsement was dated November 25, 2005.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N2967B
Model/Series:	D35 NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:	1953	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	D-3608
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	November 1, 2015 Annual	Certified Max Gross Wt.:	2727 lbs
Time Since Last Inspection:	8 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	6029.8 Hrs as of last inspection	Engine Manufacturer:	Continental
ELT:	C91 installed, not activated	Engine Model/Series:	E-185-11
Registered Owner:	On file	Rated Power:	205 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

The airplane was a complex, high-performance, low-wing, single-engine airplane of conventional metal construction. It was equipped with retractable tricycle-type landing gear and wing flaps, and it was powered by a 205-horsepower, air-cooled, 6-cylinder, horizontally-opposed, Continental E-185-11 engine driving a Hartzell 2-bladed, variable-pitch, constant-speed propeller.

According to FAA and airplane maintenance records, the airplane was manufactured in 1953. The airplane's most recent annual inspection was completed on November 1, 2015. At the time of the inspection, the airplane had accrued about 6,029.8 total hours of operation.

Landing Gear System

When retracted, the airplane's landing gear was fully enclosed by the landing gear doors. The landing gear system was electrically operated. Power for retraction was transmitted through push-pull rods from arms on the gearbox to the "A" frame assemblies at each wheel. Landing gear limit switches were located above the gearbox and were actuated by the main wheel retraction arms. Automatic locking was provided in the down position when the gear was extended. The landing gear was operated by a using the landing gear position switch, which could be identified by sight or touch as a small wheel on a flat surface switch, located on the right inboard lower portion of the instrument panel.

A landing gear warning chime was activated by two switches connected in series; one above the gearbox, which was activated by an angle on the landing gear actuator spider, and the other on the throttle control at the carburetor end. The landing gear warning chime would annunciate when the throttle was reduced, and the landing gear was not fully extended.

Landing gear position lights were installed to indicate the position of the landing gear. When the red

landing gear position light was illuminated, the landing gear was fully retracted. When the green landing gear position light was illuminated, the landing gear was fully extended. When neither light was illuminated, the landing gear was in an intermediate position. Position of the landing gear could also be visually confirmed by use of a mechanical landing gear position indicator which was just above the floor, in front of and between the pilot's and copilot's seats.

An emergency landing gear extension hand crank was provided for the manual extension of the landing gear in case of a malfunction. The hand crank was located between the front seats. It was operated by placing the landing gear circuit breaker in the "OFF" position, then placing the landing gear position switch in the down position, removing the safety strap, moving the handle down into the cranking position, and turning the handle clockwise.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	GKT, 1014 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	11:35 Local	Direction from Accident Site:	270°
Lowest Cloud Condition:	Few / 2700 ft AGL	Visibility	10 miles
Lowest Ceiling:	Overcast / 3500 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	6 knots / None	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	80°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sevierville, TN (GKT)	Type of Flight Plan Filed:	None
Destination:	Sevierville, TN (GKT)	Type of Clearance:	None
Departure Time:	11:02 Local	Type of Airspace:	Class G

At 1135, the reported weather at GKT included wind 080°; at 6 knots, visibility 10 miles, few clouds at 2,700 ft, an overcast ceiling at 3,500 ft, temperature 18°C, dew point 11°C, and an altimeter setting of 30.09 inches of mercury.

Airport Information

Airport:	Gatlinburg-Pigeon Forge GKT	Runway Surface Type:	Asphalt
Airport Elevation:	1014 ft msl	Runway Surface Condition:	Dry
Runway Used:	10	IFR Approach:	None
Runway Length/Width:	5506 ft / 75 ft	VFR Approach/Landing:	Touch and go; Traffic pattern

GKT is owned by Sevier County and is located 2 miles southeast of Sevierville, Tennessee. It is

classified by the FAA as a publicly-owned, uncontrolled, public airport. The airport elevation was 1,014 ft above mean sea level. Runway 10 was asphalt, in good condition, and measured 5,506-ft-long by 75-ft-wide with a 0.1% gradient.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	35.857498,-83.519721

Examination of runway 10 revealed propeller strike marks on the runway pavement in three different areas on the runway. The first set of propeller strikes began about 1,535 ft from the runway threshold and continued for about 51 ft. The second set of propeller strikes began about 1,714 ft from the runway threshold and continued for about 41 ft. The third set of propeller strikes began about 1,798 ft from the runway threshold and continued for about 45 ft. Examination of the propeller strike marks indicated that they were oriented mostly perpendicular to the runway's centerline markings and appeared to coincide with the airplane's flight path along the runway (see figure 1).



Figure 1 – Aerial image of runway 10 with the propeller strike marks and final wreckage positions annotated.

The wreckage was located about 450 ft beyond the departure end of runway 10 and left (northeast) of the extended centerline. The fuselage came to rest upright on a 195° magnetic heading, and the damage to the airplane was consistent with ground impact in a nose-low and right-wing-low attitude. The fuselage, wings, and empennage all exhibited areas of crush and compression damage, and most of the airplane's cabin section was consumed by fire. The cockpit door had separated during the impact sequence, and its latching mechanism was found in the closed and latched position.

The right wingtip fuel tank had separated from the right wing, and the outboard section of the right wing was bent downward and folded under the inboard section. The outboard 3 ft of the left wing were separated from the left wing. The wing flaps were in the up (retracted) position, and the pitot tube was free of obstructions.

The left and right main fuel tank caps were found in place and secured. The right main fuel tank was breached, and the left main fuel tank contained fuel. The fuel selector valve was in the left main tank

position. Fuel was present in the tank selector valve, the fuel strainer, and the pressure carburetor. The wingtip fuel tanks were breached and did not contain any fuel.

Control continuity was established from the control wheel and rudder pedals to the flight control surfaces. The throttle control, propeller control, and mixture control were all in the full forward (maximum) positions.

Examination of the landing gear system revealed that the emergency landing gear extension hand crank was stowed in the safety strap. The landing gear doors were closed; all three landing gear were in their retracted positions in the gear wells; and the push-pull rods from the gearbox to the "A" frame assemblies at the wheels were retracted.

The propeller remained attached to the crankshaft and displayed impact damage, along with tip curling, S-bending, leading edge gouging, and chordwise scratching of the two propeller blades. One blade displayed a ground down area at the tip, and the other blade displayed about a 2-inch crack that emanated from the blade tip. The propeller governor remained attached to its mounting point and displayed impact and thermal damage. There were no preimpact anomalies noted with the governor.

The engine remained partially attached to the airframe through cables, hoses, and wires, and it displayed impact and thermal damage. All four engine mounts were broken.

The induction system remained attached to the engine and displayed thermal damage that was concentrated to the rearward portions of the induction system. The exhaust system remained attached to the engine and displayed impact damage in the form of bending and crushing as well as some thermal damage. There were no preimpact anomalies noted with either the induction or exhaust system.

The left and right magnetos remained attached to their mounting locations and displayed significant thermal damage. Both magnetos were removed, and their drive shafts were rotated. The magnetos did not produce a spark on any of the posts. The magnetos were disassembled, and it was noted that several of their internal components had melted. No preimpact failures or anomalies were found that would have precluded normal operation of the magnetos.

The ignition harness remained attached to the magnetos and to the spark plugs. The ignition harness displayed a significant amount of thermal damage towards the rearward portions of the harness. The harness also displayed impact damage, and some of the ignition leads were torn. There were no preimpact anomalies noted with the ignition harness. All the spark plugs remained installed in their cylinders and displayed varying degrees of impact and thermal damage. The spark plugs were removed, and all the spark plugs displayed normal operating and wear signatures according to Champion Aviation Service Manual AV6-R.

The fuel pump remained attached to its mounting point and displayed a significant amount of impact and thermal damage. There were no preimpact anomalies noted with the pump. The pressure carburetor remained attached to its mounting point and displayed very minor impact damage. The carburetor was removed and visually inspected. The mixture and the throttle control arms operated normally, and the rod ends remained attached to their control arms. The fuel inlet screen was removed, and several pieces of black contaminants were noted within the screen that were consistent with rubber; however, the

screen was not blocked.

The oil sump displayed a significant amount of impact damage and some thermal damage. There were no preimpact anomalies noted with the oil sump. The oil filter remained attached to the oil filter adapter and displayed a significant amount of thermal damage and some impact damage. The oil filter housing was cut open, and the filter pleats were removed. The filter pleats displayed thermal damage. There were no metallic contaminants noted within the filter pleats. The oil cooler displayed impact and thermal damage. There were no preimpact anomalies noted with the oil cooler.

All the cylinders remained attached to their cylinder bays and displayed varying degrees of impact and thermal damage. The internal portions of the cylinders, the piston heads, and the valve heads were inspected using a lighted borescope. All displayed normal operating and combustion signatures, and no anomalies were noted. During crankshaft rotation, all the valves operated normally; thumb compression and suction were produced on all six cylinders; and continuity between the crankshaft, camshaft, connecting rods, and associated components was confirmed. All the rocker arms were also intact, operated normally during crankshaft rotation, and displayed normal operating and lubrication signatures. There were no anomalies noted with the crankshaft or the rocker arms.

The accessory drive gears were observed after the accessories were removed. The accessory drive gears displayed normal operating signatures.

The crankcase remained intact and displayed impact damage. The accessory case displayed significant impact damage to the bottom left side of the case. There were no preimpact anomalies noted.

The starter remained attached to its mounting point and displayed impact and thermal damage. The alternator displayed a significant amount of thermal and impact damage. There were no preimpact anomalies noted with the starter or the alternator.

The vacuum pump remained attached to its mounting point and displayed thermal damage. There were no preimpact anomalies noted with the vacuum pump.

Medical and Pathological Information

The Knox County Regional Forensic Center, Knoxville, Tennessee, performed an autopsy on the pilot and determined that the cause of death was massive blunt trauma to the chest.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing. The results were negative for carbon monoxide. The drugs carvedilol, used to treat hypertension, glipizide, used to treat type 2 diabetes, losartan, used to treat of hypertension, and salicylate, used to treat mild pain, were detected. None of these drugs are generally considered to be impairing.

Additional Information

Complex Airplane Endorsement

According to 14 CFR 61.31(e), no person may act as pilot-in-command of a complex airplane (an airplane with a retractable landing gear, flaps, and a controllable pitch propeller) unless that person has received and logged ground and flight training from an authorized instructor in a complex airplane, or in a flight simulator or flight training device that is representative of a complex airplane, and has been found proficient in the operation and systems of the airplane; and received a one-time endorsement in the pilot's logbook from an authorized instructor who certifies the person is proficient to operate a complex airplane.

High-Performance Endorsement

According to 14 CFR 61.31(f), no person may act as pilot-in-command of a high-performance airplane (an airplane with an engine of more than 200 horsepower), unless the person has received and logged ground and flight training from an authorized instructor in a high-performance airplane, or in a flight simulator or flight training device that is representative of a high-performance airplane, and has been found proficient in the operation and systems of the airplane; and received a one-time endorsement in the pilot's logbook from an authorized instructor who certifies the person is proficient to operate a high-performance airplane.

Flight Review

According to 14 CFR 61.56(a), no person may act as pilot-in-command of an aircraft unless, in the last 24 months, that person has accomplished a flight review given in an aircraft for which that pilot is rated by an authorized instructor.

Preventing Landing Gear Mishaps

According to the FAA Pamphlet "On Landings Part III" (FAA-P-8740-50), landing gear mishaps can be prevented by establishing a set routine and sticking with it.

The pamphlet provides the following suggestions:

- Have the landing gear down and checked before you are on downwind, or in any event, by the time you are abeam the runway numbers.
- Always use your before-landing checklist and gas-undercarriage-mixture-prop (GUMP) check.
- When lowering the landing gear, always check the landing gear indicator for down and locked position and make it a habit to physically touch the gear indicators and say out loud "gear down," or "down and locked," or "three in the green."

- Use your checklist on every landing. Put the landing gear down at a standardized point every time, and always recheck for three green on short final.

Before Landing Checklist

During examination of the wreckage, a fire-damaged, closed Beechcraft Bonanza D35 Pilot's Operating Handbook and Airplane Flight Manual (POH/AFM) was found behind the pilot's and copilot's seats in the cabin, an area that was out of reach from the pilot's seat.

The POH/AFM contained a Before Landing Checklist that included the following step:

"Landing Gear – DOWN and CHECK. (Maximum extension speed 110kts/127mph)".

No checklists were discovered near the pilot's seat.

Administrative Information

Investigator In Charge (IIC):	Gunther, Todd
Additional Participating Persons:	Aaron Devogel; FAA FSDO; Nashville, TN Jan R Smith; Textron Aviation; Wichita, KS Kurt Gibson; Continental Motors Inc.; Mobile, AL
Report Date:	October 5, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=93207

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).