Aviation Investigation Final Report

Location:	Little Rock, Arkansas	**Accident Number:**	CEN23FA113
Date & Time:	February 22, 2023, 11:56 Local	**Registration:**	N55PC
Aircraft:	Beech B200	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General aviation - Business		

Analysis

The pilot and four passengers were departing in the multi-engine turbopropeller-powered airplane when the accident occurred. Surveillance video indicated that the takeoff and initial climb appeared normal, however, the airplane than began to lose airspeed and altitude until the airplane entered a left roll and descended toward the ground. Just after the airplane went out of sight, the camera recorded a rising plume of smoke about 1 mile from of the departure end of the runway. Shortly after the plume of smoke appeared, the camera appeared to shake from wind, and recorded blowing debris and heavy rain on the ramp where the camera was located. Just before and during takeoff, the camera showed that the ramp was dry with no rain or noticeable wind.

No radio or distress calls were heard from the pilot. Several witnesses saw the airplane's takeoff and initial climb and they described the airplane as struggling to climb and reported that it entered a steep bank and descent toward the ground shortly after takeoff. The witnesses characterized the weather conditions as stormy and windy, with a weather front passing through the area.

The wreckage of the airplane was found amidst heavily wooded terrain adjacent to a factory about 1 mile south of the departure end of runway 18 and a post-impact fire consumed most of the airplane. Detailed examinations of the airframe, engines, flight controls, and propellers did not reveal any pre-impact mechanical anomalies that would have precluded normal operations. Both engines and propellers exhibited evidence of rotation at the time of impact, and several large diameter tree branches at the accident site were found cut consistent with propeller blade strikes, also indicating that the engines were producing power at the time of impact.

A performance study indicated that the airplane climbed to a maximum altitude of about 386 ft above ground level before it began to descend. Review of airplane performance from previous takeoffs from the same runway indicated that the airplane's climb performance during the accident initial climb takeoff was diminished. The reason for the diminished performance could not be determined.

Review of weather information indicated that the airplane departed about the time a line of extreme intensity precipitation was approaching, and weather reporting equipment at the airport indicated a wind shift associated with this oncoming line of precipitation. A wind shear alert was active in the control tower advising of 15 to 20 kt gains about 1 mile from the runway. Based on the observation weather data, it is likely that, during the initial climb, the airplane encountered wind with magnitudes between 20 and 30 kts that likely varied in direction about 50°, from a quartering headwind to a crosswind condition. In the minutes following the accident time, this wind continued to shift to a quartering tailwind condition for the departure runway and increased in magnitude to 30 to 40 kts. There was no evidence to suggest that the airplane encountered a microburst or downdraft.

Based on available information, the performance study could not conclude why the airplane had diminished performance during the initial climb after takeoff. Although there was diminished performance during the initial climb, it could not be attributed to a airframe, engine, or system anomaly. Although the weather was deteriorating at the time of the accident, and there were wind shifts in the area, a weather study determined that the wind shifts likely contributed to, but did not cause the accident.

The pilot's autopsy was limited by injury but identified severe coronary artery disease. Within the limits of the autopsy, there was no evidence that a medical event contributed to the accident. The pilot's toxicology testing detected a low level of ethanol in cavity blood only; however, the small amount of ethanol may have been produced postmortem. It is unlikely that the effects of ethanol contributed to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The loss of control during initial climb for undetermined reasons. Contributing to the accident were the sudden wind shifts during the initial climb.

Findings

Aircraft	(general) - Unknown/Not determined
Environmental issues	Sudden wind shift - Contributed to outcome

Factual Information

History of Flight

Initial climb	Unknown or undetermined
Initial climb	Loss of control in flight (Defining event)
Initial climb	Windshear or thunderstorm
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On February 22, 2023, about 1156 central standard time (CST), a Beech B200 airplane, N55PC, was destroyed when it was involved in an accident near Little Rock, Arkansas. The commercial pilot and four passengers sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 business flight.

The flight intended to transport Consulting Toxicology and Environmental Health (CTEH) emergency workers from Little Rock, Arkansas, to Columbus, Ohio, in response to an alloy plant explosion in Bedford, Ohio. The airplane was owned and operated by CTEH.

A review of radio transmissions revealed that, at 1151:16, the pilot contacted the ground controller at Bill and Hillary Clinton National Airport (LIT) and stated that he had the most recent weather information, which included a low-level wind shear (LLWS) advisory. At 11:51:33, the controller issued the pilot instructions to taxi to Runway 18 via taxiway A. At 1153:07 and again at 1153:21, the controller transmitted a LLWS advisory alert. At 1154:47, the pilot requested takeoff clearance from runway 18, and the tower controller cleared the pilot for takeoff. There were no other transmissions from the pilot after takeoff, and no distress calls were recorded from the pilot on any frequency. A tower controller saw the airplane depart from runway 18 and later saw smoke coming from about 1 mile south of the airport.

There were several eyewitnesses to the accident. One witness, an aircraft mechanic, saw the airplane take off from runway 18 “in a strong crosswind.” He saw the airplane climb out and it appeared that the airplane began to sink with the nose up. The airplane appeared to be struggling when the left wing dropped, and the airplane entered a steep dive. The witness described the weather conditions as “stormy.” Another witness was a commercial pilot and flight instructor seated in his office, which faced the runway. After taking off from runway 18, the airplane appeared to turn, and the bank angle increased to about 90°. He described the airplane as being “in a classic stall/spin scenario.” He saw the airplane’s bank angle continue to increase and the airplane entered a near-vertical descent until it disappeared behind a hangar followed by a plume of smoke. A third witness, who was a pilot located on the ramp, described the airplane’s takeoff as “smooth.” Once the airplane passed the end of the runway, the airplane stopped climbing and started to crab to the right, with a slight decrease in altitude.

It looked as though the airplane stopped moving and went into a nose-low attitude. The airplane descended straight toward the ground. The witness said that the weather conditions were “not ideal for flying since a cold front was passing through” the area.

A video surveillance camera, located on the ramp perpendicular to runway 18, showed the airplane take off from runway 18 and begin an initial climb to the south. The takeoff and initial climb appeared normal until the airplane entered a sudden left roll and rapid descent. Just after the airplane descended out of sight, the camera recorded a rising plume of smoke about 1 mile south of the departure end of runway 18. Shortly after the plume of smoke, the camera appeared to shake from wind, and recorded blowing debris and heavy rain on the ramp where the camera was located. Just before and during takeoff, the camera showed that the ramp was dry with no rain or noticeable wind. Another surveillance video showed the airplane impact the ground in a left-wing-low, nose-down attitude. The video also showed heavy rain and blowing debris near the area of the accident site.

The wreckage of the airplane was found amidst heavily wooded terrain adjacent to a factory about 1 mile south of the departure end of runway 18. (See Figure 1.)

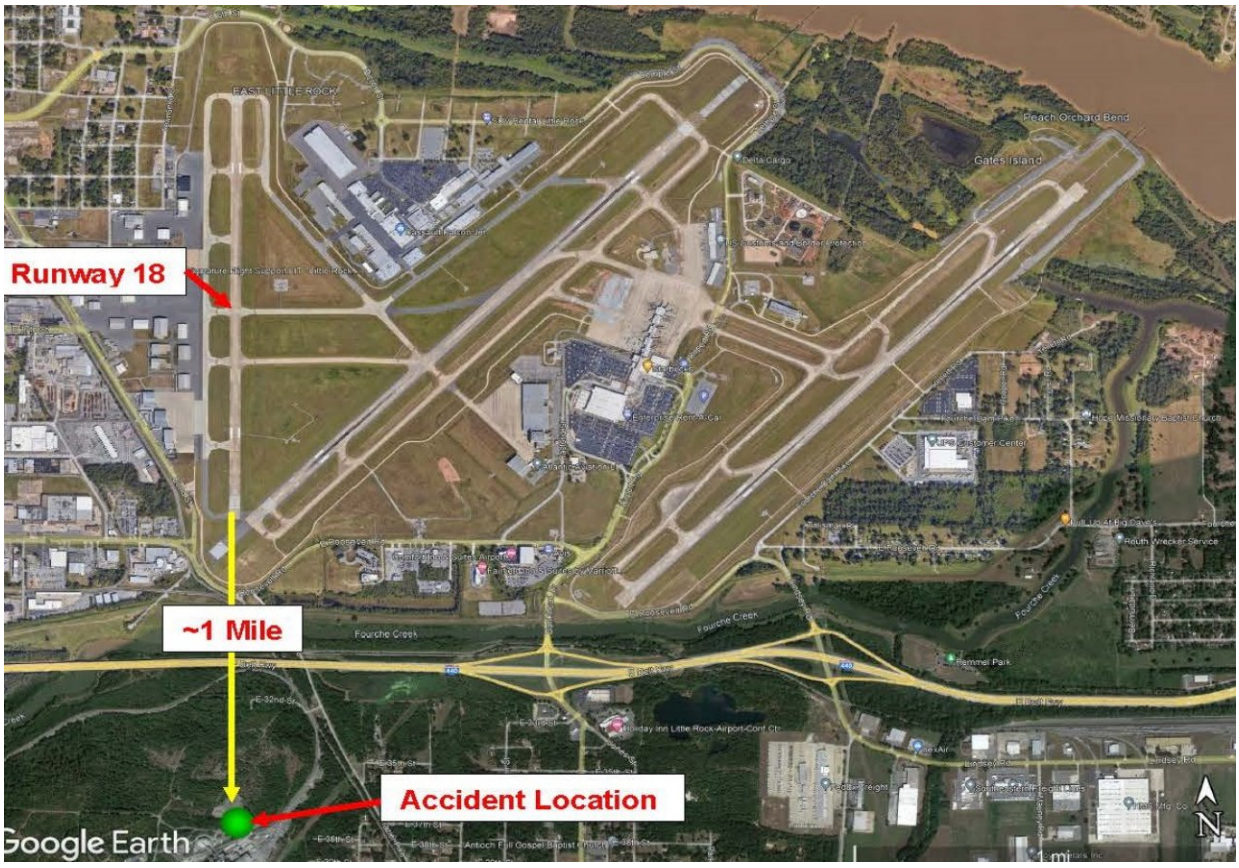

Figure 1. Accident location (green dot) in reference to runway 18 at LIT.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	64,Male
Airplane Rating(s):	Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	April 20, 2022
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 18, 2022
Flight Time:	(Estimated) 10196 hours (Total, all aircraft), 195 hours (Total, this make and model), 40 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N55PC
Model/Series:	B200	**Aircraft Category:**	Airplane
Year of Manufacture:	1983	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	BB-1170
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	July 22, 2022 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo prop
Airframe Total Time:	10784 Hrs at time of accident	**Engine Manufacturer:**	P&W
ELT:	C91 installed, not activated	**Engine Model/Series:**	PT6A-42 (Right)
Registered Owner:	On file	**Rated Power:**	850 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Information provided by the operator indicated that the airplane was about 300 pounds under its maximum gross takeoff weight at the time of takeoff. A review of the airplane's maintenance records did not show any uncorrected maintenance issues.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLIT,251 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	12:02 Local	**Direction from Accident Site:**	357°
Lowest Cloud Condition:	Scattered / 3600 ft AGL	**Visibility**	2 miles
Lowest Ceiling:	Overcast / 4700 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	22 knots / 40 knots	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	29.68 inches Hg	**Temperature/Dew Point:**	19°C / 13°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	Little Rock, AR (LIT)	**Type of Flight Plan Filed:**	IFR
Destination:	Columbus, OH (CMH)	**Type of Clearance:**	IFR
Departure Time:	11:55 Local	**Type of Airspace:**	Class C

A weather study was conducted for the accident flight. Weather reports from LIT were consistent with changing/deteriorating weather conditions from the time of taxi, takeoff, and the accident.

The 1153 automated observation included wind from 210° at 19 knots (kts) with gusts to 27 kts, 10 miles visibility, a broken ceiling at 4,800 ft above ground level (agl), overcast ceiling at 6,000 ft agl, temperature 24°C, dew point 14°C, and an altimeter setting of 29.62 inches of mercury. Remarks included a peak wind of 36 kts from 220°recorded at 1121.

The 1202 observation included wind from 300° at 22 kts gusting to 40 kts, visibility 2 miles in light rain, scattered clouds at 3,600 ft agl, overcast ceiling at 4,700 ft agl, temperature 19°C, dew point 13°C, and an altimeter setting of 29.68 inches of mercury. Remarks included a peak wind of 4 kts from 300°recorded at 1159, a wind shift at 1148, rain began at 1200, and rapidly rising atmospheric pressure.

Ten-second wind data from the Low-Level Windshear Alert System-Relocation/Sustainment (LLWAS-RS) at LIT for times surrounding the accident times were obtained from the Federal Aviation Administration (FAA). LLWAS-RS remote station No. 8 was located at a height of 80 ft agl about 2,500 ft northwest of the airplane's point of departure. The station observed wind from 237° at 18 kts at 1155:53. At 1156:23, it observed wind from 267° at 23 kts; and at 1156:53, the station recorded wind from 282° at 37 kts. Remote station No. 7 was located at a height of 120 ft agl about 3,500 ft south-southeast of the airplane's departure point and about 850 ft east of its ground track. At 1156:43, the station recorded wind from 221° at 13 kts, and about one minute later, recorded wind from 281° at 31 kts.

Information from the LIT air traffic control tower display indicated that windshear alerts were active at the time of the accident advising of 15 and 20 kt gains in speed on approach for runway 36 and the departure end of runway 18.

Weather radar imagery identified a line of extreme-intensity precipitation approaching LIT from the west during the period before the accident. (See Figure 2.) Velocity imagery depicted the accident location along a line of radial wind shift about the accident time.

Figure 2. Weather Radar Image. The accident site is depicted by a pink dot.

According to the National Weather Service, based on information gathered by radar, a wind shift occurred about 1 nautical mile to 1.10 nautical miles ahead of the 25dBz precipitation values in the vicinity of the accident site.

A SIGMET was active for the area of the accident site and advised of an area of thunderstorms with tops to 33,000 ft. The area was identified to be moving from 240° at 40 kts.

Airport Information

Airport:	Bill and Hillary Clinton International Airport LIT	**Runway Surface Type:**	
Airport Elevation:	266 ft msl	**Runway Surface Condition:**	
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:	4 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	34.708054,-92.237662(est)

The majority of the airplane was consumed by a post-impact fire. Several large tree branches (8 to 10 inches in diameter) were found completely cut at a 45° angle with paint transfers, consistent with propeller blade strikes. A detailed examination of the airframe was conducted at the accident site. All of the airplane structure and flight control surfaces were identified, and flight control continuity was confirmed. All cockpit instrumentation displayed extreme thermal damage, and functionality could not be verified. Other than severe impact and thermal damage, no pre-impact airframe anomalies were identified.

Both engine and propeller assemblies were recovered to a secure hangar at LIT. Detailed examinations of the engines did not reveal any pre-impact anomalies. Both left and right engines displayed symmetrical impact damage, including torsional twisting of the engine cases and rotational damage of their respective turbine and compressor sections, consistent with the engines producing power at the time of impact. No pre-impact anomalies were found with the engines.

Detailed examination of both propeller assemblies did not show any pre-impact anomalies. Both left and right propeller shafts showed torsional separations, consistent with powered rotation at impact. Disassembly of the left and right propeller hubs showed that the right and left propeller blades exhibited impact damage consistent with rotation. Signatures of power included tip fractures and forward bending in the thrust direction. No pre-impact anomalies were found with the propellers.

Medical and Pathological Information

The Arkansas State Crime Laboratory, Little Rock, Arkansas, performed an autopsy of the pilot. The cause of death was multiple traumatic injuries. The extent of the pilot's injuries limited autopsy examination for evidence of natural disease. The pilot's brain could not be examined.

Examination of the pilot's heart was limited by thermal injury, but identified coronary artery disease, including an area of plaque causing 90% narrowing of the proximal portion of the left anterior descending coronary artery.

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the pilot. This testing detected ethanol at 0.018 g/dL in cavity blood. Ethanol was not detected in liver or spleen tissue. Ethanol is the intoxicating alcohol in beer, wine, and liquor, but alcohol consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can sometimes be produced by microbes in a person's body after death. N-propanol and n-butanol, which are other alcohols that can be produced after death, were also detected in cavity blood. Naproxen, which is an anti-inflammatory medication available over the counter for control of pain and fever, was detected in cavity blood and liver tissue. Naproxen is not generally considered impairing. No other tested-for substances were detected.

Tests and Research

An aircraft performance study was conducted based on ADS-B data provided by the FAA, meteorological data from the NTSB meteorologist and from the National Oceanic and Atmospheric Administration (NOAA), videos from the airport and from a highway vehicle, and the Pilot's Operating Handbook (POH). The FAA also provided ADS-B data to compare the accident flight with two previous takeoffs from the same runway in the week before the accident, on February 15, 2023, and February 19, 2023.

Video of the accident takeoff indicated that the airplane became airborne within the first 2,500 ft of the runway, consistent with normal takeoff performance specified in the POH. The video showed the landing gear being retracted, but the flap position could not be determined. ADS-B data captured the airplane beginning at 1156:13, when the airplane was 237 ft above the runway and about 5,005 ft from the runway threshold. The data lasted 32 seconds, with the airplane's groundspeed decreasing for the duration of the recorded data. The airplane reached a peak altitude of 650 ft msl (386 ft above the runway) at 1156:25. The total energy calculated (kinetic plus potential) peaked at 1156:20, about 5 seconds before the airplane reached its peak altitude. A simplified mathematical model of the airplane was used to calculate thrust and horsepower; both thrust, and horsepower showed sharp decreases at 1156:20, consistent with a decrease in total energy. Each of the airplane's engines was rated at 850 shaft horsepower (hp) for a total of 1700 hp. The actual power delivered to the airframe will be less

than the total because the engines and propellers are not 100% efficient. During the accident takeoff, the maximum value calculated was only about 900 hp, and after 1156:20, the value was less than 400 hp. A profile view of the airplane's flight path can be seen in Figure 3 below.

Figure 3. Profile view of the accident takeoff with direction of flight denoted by white arrow.

During the previous takeoffs on February 15, 2023, and February 19, 2023, the airplane was able to both climb and accelerate. The hp calculated for the previous takeoffs was consistent with nominal values.

Assuming that the airplane's flaps were retracted during the accident takeoff, the hp calculated during the last 25 seconds of recorded data from the accident flight was about 20% of the hp calculated for the two previous takeoffs. With the flaps fully extended, the hp calculated during the accident takeoff was only about 56% of that calculated from the two previous takeoffs.

If the flaps were retracted during the accident takeoff, a lower wind speed and/or wind from the west would have resulted in calibrated airspeeds below the flaps-up, wings-level, idle-power stall speed of the airplane.

Administrative Information

Investigator In Charge (IIC):	Lemishko, Alexander
Additional Participating Persons:	Paul Centenaro; FAA FSDO; Little Rock, AR Ernest Hall; Textron Aviation; Wichita, KS Les Doud; Hartzell; Piqua, OH Nora Vallee; TSB of Canada Accredited Representative; Quebec Alexander Gauthier; P&W Canada Technical Advisor to TSB or Canada; Quebec Dominic Zagami; P&W Canada Field Representative; Little Rock, AR
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Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=106756

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