Aviation Investigation Final Report

Location:	Purcellville, Virginia	**Accident Number:**	ERA21FA148
Date & Time:	March 4, 2021, 15:10 Local	**Registration:**	N67013
Aircraft:	Beech C23	**Aircraft Damage:**	Substantial
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was attempting to depart from a 1,900-ft-long turf runway, and customarily would depart toward the south as the runway sloped downhill in that direction (a total elevation change of about 50 feet). A witness described that, during the takeoff, the airplane was departing with a tailwind. The wind conditions at the closest weather reporting station about 13 nautical miles away indicated that a right quartering tailwind likely prevailed, with a right crosswind component of 21 knots and a tailwind component of 12 knots, gusting to 14 knots. The airplane subsequently impacted the tops of trees about 300 feet beyond and to the left of the runway departure end, and continued about 300 feet farther before coming to rest. Postaccident examination of the wreckage revealed no evidence of any preaccident mechanical malfunctions or failures with the airplane or engine that would have precluded normal operation.

The takeoff performance chart for the airplane indicated that a ground roll of 1,236 ft was required on a grass surface, and 2,068 ft was needed to clear a 50-ft obstacle. The chart did not contain a correction factor for a takeoff with a tailwind, which would require a longer ground roll and takeoff distance. With the available runway distance of 1,900 ft, the pilot would have been operating the airplane near the limits of its performance capability before accounting for the additional distance required due to the prevailing tailwind. Given this information, it is likely that the pilot's decision to depart in the gusting tailwind conditions resulted in an inflight collision with trees during the initial climb.

Probable Cause and Findings

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

The pilot's improper decision to depart from the short turf runway with a tailwind.

Findings

Personnel issues	Decision making/judgment - Pilot
Environmental issues	Tailwind - Decision related to condition
Aircraft	Takeoff distance - Attain/maintain not possible

Factual Information

History of Flight

Initial climb	Controlled flight into terr/obj (CFIT) (Defining event)

On March 4, 2021, about 1510 eastern standard time, a Beech C-23, N67013, was substantially damaged when it was involved in an accident near Purcellville, Virginia. The pilot was fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

The pilot was departing from runway 19 at Krens Farm Airport (14VA), Hillsboro, Virginia. A witness reported hearing the airplane take off and looked back to watch it depart. When she saw the airplane, it was “tilted to the left” as it descended into the trees. She heard the engine the entire time and stated that it made “traditional engine noises.” In addition, she noted that relative to the airplane’s takeoff direction, a tailwind prevailed at the time of the accident. The pilot’s son reported that his father always took off from runway 19 because of the slope of the runway.

Pilot Information

Certificate:	Private	**Age:**	77,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	September 25, 2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	4000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N67013
Model/Series:	C23 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	M-2229
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 12, 2020 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	2.3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	11968.9 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C91A installed, not activated	**Engine Model/Series:**	O-360-A4K
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	JYO,389 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	14:55 Local	**Direction from Accident Site:**	136°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	24 knots / 29 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	11°C / -3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Purcellville, VA	**Type of Flight Plan Filed:**	None
Destination:	Weyers Cave, VA (SHD)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

The 1455 recorded weather observation at Leesburg Executive Airport (JYO), Leesburg, Virginia, located about 13 miles southeast of the accident location, included wind from 310° at 24 knots gusting to 29 knots.

Interpolation of the crosswind component chart revealed that there was about a 21-knot right crosswind and a tailwind component of 12 knots gusting to 14 knots at the time of the accident.

Airport Information

Airport:	KRENS FARM 14VA	**Runway Surface Type:**	Grass/turf
Airport Elevation:	750 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:	19	**IFR Approach:**	None
Runway Length/Width:	1900 ft / 50 ft	**VFR Approach/Landing:**	None

14VA was located 2 miles northwest of Hillsboro, Virginia. It had one turf runway designated as 01/19, which was 1,900 ft long by 50 ft wide. The elevation at the approach end of runway 19 was 749 ft. The highest point on the runway was 756 ft, 400 ft from the runway 19 threshold. The elevation at the departure end of runway 19 was 690 ft. The airport was equipped with two windsocks: one about 500 ft from the departure end of runway 19 and one past the departure end of runway 19.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	39.23045,-77.74829

The airplane struck several trees beginning about 326 feet southeast of the departure end of runway 19 at an elevation of about 690 ft mean sea level. (see Figure 1.) From the area of the initial tree strikes, there was a debris field that was 306 ft long, oriented along a 128° magnetic heading. The main wreckage, comprised of the fuselage and right wing, came to rest in a heavily wooded area at the end of the debris field. There was no post impact fire and an odor of 100LL aviation fuel was noted at the site. All major components of the airplane were located in the vicinity of the main wreckage.

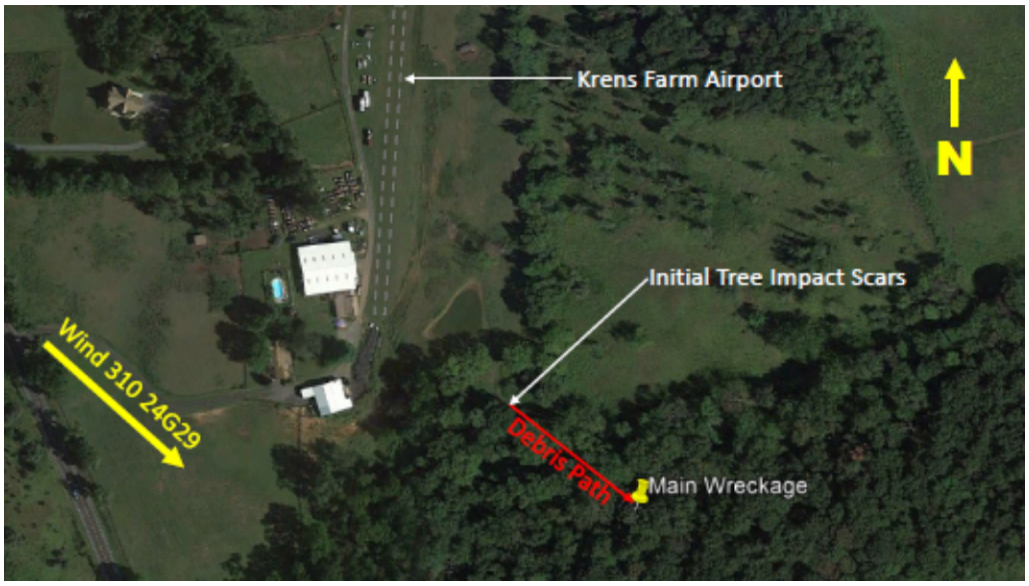

Figure 1 - Accident site diagram depicting runway (dashed white lines), the initial tree impact scars, the debris path, and the main wreckage of the airplane. Also annotated is the reported wind direction and velocity at JYO.

The left wing was impact-separated at the wing root and located about 40 ft prior to the main wreckage. The outboard approximate 5 ft leading edge of the left wing was impact-damaged and crushed aft. The rudder was impact separated from the vertical stabilizer and the vertical stabilizer was impact-separated from the empennage and located about 20 ft prior to the main wreckage. The leading edge of the vertical stabilizer exhibited impact damage. The horizontal stabilator remained attached to the empennage. The right wing was impact-separated and remained attached to the fuselage through cables. Flight control continuity was established to all flight control surfaces from the flight controls in the cockpit.

The engine was removed from the airframe for further examination. Crankshaft and valvetrain continuity were confirmed by rotating the propeller hub by hand. Thumb compression and suction were observed on all cylinders. The spark plugs were removed and examined. The Nos. 2 and 4 spark plugs were oil soaked. All other spark plugs were light gray in color and in new condition. Spark was observed on all towers of the left and right magneto when the input shaft was rotated. There were no anomalies noted with the engine that would have precluded normal operation prior to the accident.

The fixed-pitch propeller remained attached to the engine. Both propeller blades remained attached to the propeller hub. One blade was bent aft about 45° and exhibited leading edge gouging and chordwise scratching. The other propeller blade was bent slightly aft and exhibited chordwise scratching, leading edge gouging, and tip tearing.

Additional Information

The “Take-off Distance – Grass Surface” performance chart in the airplane’s pilot operating handbook was interpolated for the associated conditions of 11°C and 750 ft elevation. The estimated ground roll with a 0 knot wind component was 1,236 ft, and the distance to clear a 50 ft obstacle was 2,068 ft. The takeoff distance performance chart did not include a tailwind component multiplier penalty.

Administrative Information

Investigator In Charge (IIC):	Kemner, Heidi
Additional Participating Persons:	David Reese; FAA/FSDO; Dulles, VA Ryan Enders; Lycoming Engines; Williamsport, PA Peter Basile; Textron Aviation; Wichita, KS
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