Aviation Investigation Final Report

Location:	Sioux Falls, South Dakota	**Accident Number:**	CEN19LA049
Date & Time:	December 25, 2018, 17:03 Local	**Registration:**	N6745V
Aircraft:	Beech 58	**Aircraft Damage:**	Destroyed
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and passenger were on a cross-country flight and an instrument flight rules approach in instrument meteorological conditions. According to air traffic control transcripts, an air traffic controller at the destination airport cleared the flight for the RNAV approach for runway 33. According to ADS-B flight track data, the airplane then turned toward the final approach path just inside the initial approach fix at 3,100 ft mean sea level (msl) and 156 knots calibrated airspeed (KCAS). Subsequently, the airplane proceeded west of the final approach centerline, turned back through the centerline to the east, and then back to the west, resembling s-turns through the extended centerline. During the s-turns across the extended centerline, the controller cleared the airplane to land. Two minutes later, the airplane was about 3,000 ft msl and 78 KCAS, and then began to rapidly descend.

According to a witness and video footage of the accident, the airplane descended in a steep, nose-down attitude. The witness added that it appeared that he then “saw airplane try to pull out of a dive” just before it impacted the ground.

The airplane impacted trees and a building and then came to rest in a residential neighborhood about 200 ft south of the last radar location. The airplane was massively fragmented and a postimpact fire ensued. Impact and fire damage precluded a thorough examination and functional testing of the related airplane systems. Examination of both engines and propeller assemblies revealed signatures consistent with symmetric power development at the time of the accident.

According to a family member of the pilot, 3 months before the accident, the pilot was en route at altitude when the airplane suddenly nosed over. According to a work order, 3 weeks before the accident, the autopilot was removed and repaired. The repair station owner reported that, after a flight 3 days before the accident, the pilot told him that he had no issues with the airplane and that the flight was uneventful.

A review of the airplane's flight track showed the pilot making S-turns across the approach course, which is consistent with the pilot hand-flying the approach, not a coupled autopilot approach. Therefore, it is unlikely that the pilot was flying the instrument approach using the autopilot system. Further, although the autopilot system could not be functionally tested due to impact and fire damage, it is unlikely that the autopilot system played a role in the accident if it was not in use.

Therefore, based on the radar data, it is likely that the pilot failed to maintain adequate airspeed during the final approach, which resulted in the exceedance of the airplane's critical angle of attack and a subsequent aerodynamic stall. Given the witness account and surveillance video, it is likely the pilot was attempting to recover from the stall but did not have adequate altitude to do so.

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 adequate airspeed during the instrument approach which led to an aerodynamic stall.

Findings

Aircraft	Airspeed - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Aircraft	Angle of attack - Not attained/maintained

Factual Information

History of Flight

Approach-IFR final approach	Aerodynamic stall/spin (Defining event)

On December 25, 2018, about 1703 central standard time, a Beech 58P airplane, N6745V, was destroyed when it was involved in an accident in Sioux Falls, South Dakota. A post impact fire ensued. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to air traffic control (ATC) and automatic dependent surveillance-broadcast (ADS-B) information, the flight departed Gerald R. Ford International Airport (GRR), Grand Rapids, Michigan, about 1407 and was en route to Marv Skie-Lincoln County Airport (Y14), Tea, South Dakota. The pilot had filed an instrument flight rules (IFR) flight plan, and instrument meteorological conditions prevailed during the last portion of the flight. Y14 did not have instrument approach capability.

According to ATC transcripts, about 1647:41, the pilot confirmed that he had the most recent weather information and stated that he would "need to make an approach [into Sioux Falls Regional Airport (FSD), Sioux Falls, South Dakota] and break off"; the pilot initially intended to fly to Y14. The controller asked the pilot if he wanted the RNAV approach for runway 33 or the ILS approach for runway 3, and the pilot replied that he wanted the RNAV 33 approach. The controller cleared the flight to GIWFI initial approach fix (IAF) and told the pilot to expect the RNAV 33 approach. At 1651:50 the controller reported that the cloud ceiling was 800 ft above ground level (agl) and overcast and told the pilot he was just going to have to fly the approach into FSD. The pilot acknowledged the transmission. According to ADS-B flight track data, the airplane continued to descend and leveled off at 3,100 ft msl about 1656:46 at 169 knots calibrated airspeed (KCAS). At 1657:10, the controller told the pilot to cross the GIWFI IAF at 3,100 ft mean sea level (msl) and cleared the flight for the RNAV 33 approach.

At 1659:41, the airplane was at 3,100 ft msl and 156 KCAS as it turned toward the final approach path just inside the GIWFI IAF. The airplane then began to slow in airspeed and proceeded west of the final approach centerline, turned back through the extended centerline to the east, and then made a left turn back through the centerline to the west. (See figure 1 for plotted radar data showing the airplane's flightpath in relation to the IAF and final approach path.) At 1701:26, as the airplane crossed the approach path back to the east, the controller cleared the airplane to land on runway 33; the airplane began to descend at 1703:10. At 1703:16, the airplane was at 3,000 ft msl about 78 KCAS. Shortly thereafter, the airplane began to rapidly descend, turning sharply left until the data ended at 1703:31. At 1703:33, the controller issued a low-altitude alert and advised the pilot to check the airplane's altitude immediately. No other recorded communications were received from the pilot.

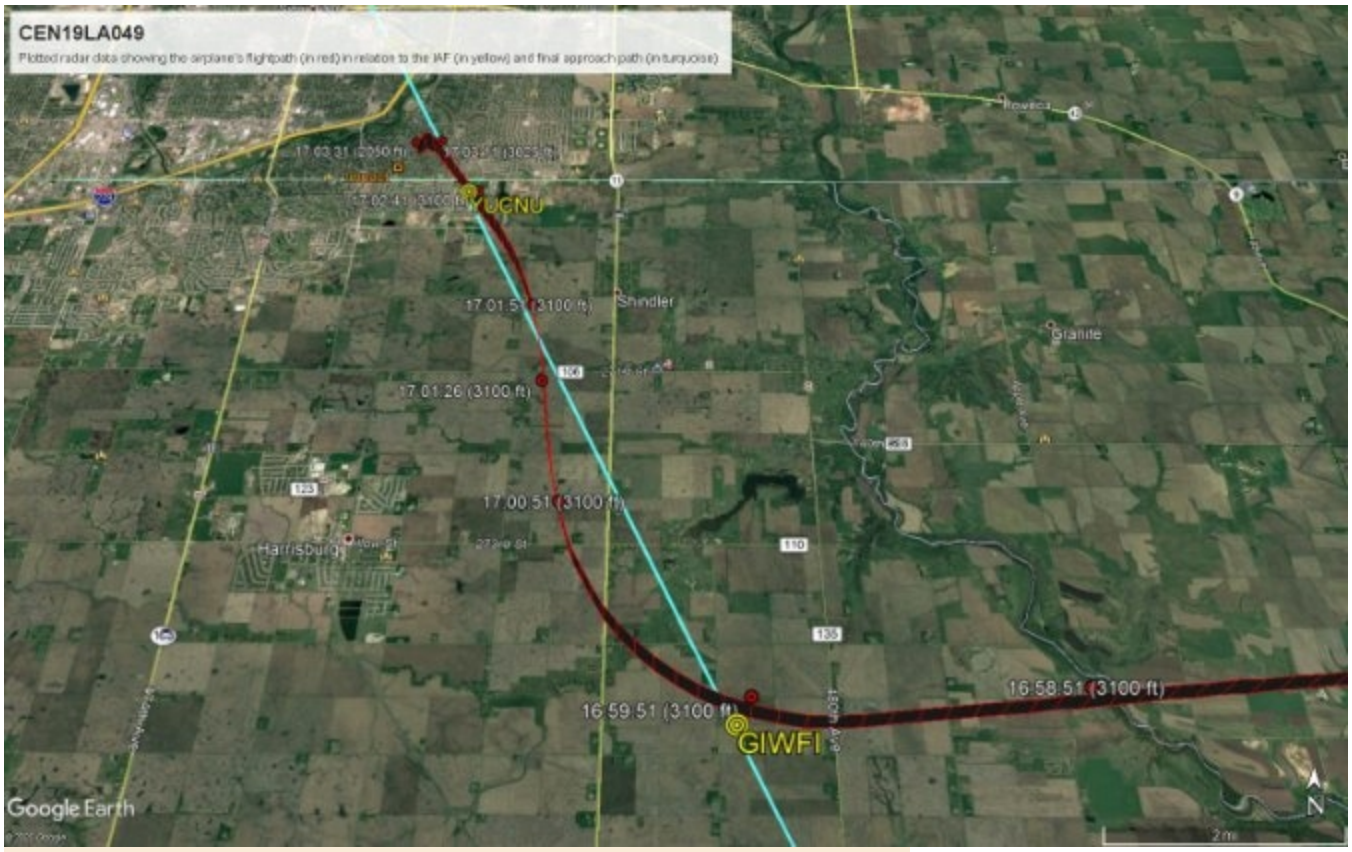

Figure 1. Plotted radar data showing the airplane's flightpath (in red) in relation to the IAF (in yellow) and final approach path (in turquoise).

Due to the government furlough, neither the National Transportation Safety Board, nor the Federal Aviation Administration responded to the accident site. The on-scene documentation for this accident was conducted by the Sioux Falls Police Department.

A witness located about a block from the accident site heard the airplane and then observed the airplane "pop out of the clouds about 1,000 ft agl [above ground level]." He added that the airplane was heading straight down and that "he then saw the airplane try to pull out of the dive" before it impacted the ground and that the engines sounded "okay."

Video footage taken from a security camera located about 1/2 mile northeast of the accident location showed an airplane descend at a steep angle. The airplane remained in the camera's view for about 2 seconds before it disappeared behind the trees. About 2 seconds later, a smoke plume and fireball were visible.

Pilot Information

Certificate:	Private	**Age:**	68,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
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:**	May 17, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 21, 2016
Flight Time:	(Estimated) 2448.5 hours (Total, all aircraft), 588.2 hours (Total, this make and model), 6.4 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Burnt remains of the pilot's flight logbook, dated between February 19, 2012, and December 22, 2018, were located in the wreckage of the airplane. The last completed logged entry in the logbook that was visible was dated December 22, 2018, in the accident airplane, for a 2.3-hour flight from Y14 to GRR. The last logged instrument proficiency check was completed on December 11, 2017. The last logged flight review was completed on November 21, 2016.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N6745V
Model/Series:	58 P	**Aircraft Category:**	Airplane
Year of Manufacture:	1980	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	TJ-272
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	February 15, 2018 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	5585.7 Hrs as of last inspection	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520-WB
Registered Owner:		**Rated Power:**	325 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

According to a family member of the pilot, about 3 months before the accident, the pilot was en route at

altitude when the airplane experienced a sudden nose-over event. A work order dated December 4, 2018, showed that several avionics components had been removed and repaired. The repair station owner who performed the repair work reported that the pilot flew the airplane following the repair work and the pilot reported to him that everything was working perfectly. He spoke with the pilot following the flight on December 22, 2018, and the pilot reported that “there were no issues with the airplane and that the flight was uneventful.”

The maintenance records were not located during the investigation. Copies of the last annual inspection were provided by the insurance company. The last annual inspection was completed on February 15, 2018. The airframe total time was recorded as 5,585.7.

According to the Pilot’s Operating Handbook for the Beechcraft Baron 58P, the airspeed markings for the full flap operating range were between 78 and 143 knots indicated airspeed (KIAS) and the normal operating range was between 84 and 196 KIAS. Investigators were not able to establish the airplane's weight at the time of the accident and therefore, it was not possible to determine the airplane's actual stall speed at the time of the accident..

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	FSD,1427 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	16:56 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	40°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.23 inches Hg	**Temperature/Dew Point:**	-1°C / -3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Grand Rapids, MI (GRR)	**Type of Flight Plan Filed:**	IFR
Destination:	Tea, SD (Y14)	**Type of Clearance:**	IFR
Departure Time:	15:07 Local	**Type of Airspace:**	Class D

The closest official weather observation station was Joe Foss Field Airport (FSD), Sioux Falls, South Dakota, located 8 miles north of Y14 and 5 miles north of the accident site. The following conditions were reported at the time of the accident: FSD weather observation at 1656, wind from 040° at 8 knots, visibility 10 miles or more, ceiling overcast at 800 ft agl, temperature -1° Celsius (C), dew point temperature -3° C, altimeter 30.24 inches of mercury (Hg).

The terminal aerodrome forecast (TAF) available before the accident flight was issued at 0755, and it

was updated at 1127. The 0755 TAF showed that IFR conditions were expected to improve to visual flight rules conditions by the time of the accident, wind from 070° at 5 knots, visibility greater than 6 miles, and ceiling broken at 6,000 ft agl. An updated forecast issued at 1127 reported that conditions were expected to improve to minimum visual flight rules (MVFR) conditions, wind from 060° at 5 knots, visibility greater than 6 miles, and a broken ceiling at 1,000 ft agl. However, the forecasts did not correspond to the weather conditions FSD reported at 1656 (7 minutes before the accident), at which time IFR not MVFR conditions prevailed.

The United States Naval Observatory reported that the sun set in Sioux Falls at 1656 and that the end of evening civil twilight was 1728. At the time of the accident, the sun was 2° below the horizon at an azimuth of 239°..

Airport Information

Airport:	Joe Foss Field Airport KFSD	**Runway Surface Type:**	
Airport Elevation:	1429 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	RNAV
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	43.501945,-96.700836(est)

The initial impact point was located in trees and along the back of a structure in a residential area. All major components of the airplane were located at the accident scene. Both engines, the wings, and the empennage separated during the impact sequence and were located within the debris field.

The fuselage was fragmented and exhibited postimpact fire damaged. Both wings were fragmented and exhibited postimpact fire damage. Both flap actuators were extended 5 inches consistent with 20° of flaps. The aileron flight control cables were impact damaged and separated. Damage to the flight control cables was consistent overload separation due to impact forces.

The empennage was fragmented due to impact forces and exhibited postimpact fire damage. The vertical stabilizer and exhibited impact damage at the root. The rudder had separated from the vertical stabilizer

and exhibited impact damage. The horizontal stabilizer exhibited impact and fire damage. The left elevator remained partially attached, and the right elevator had separated; both elevators exhibited impact and fire damage. The rudder and elevator control cables exhibited impact damage and had separated due to impact forces.

Both engines exhibited impact damage and had separated from the airframe. Examination of both engines revealed no preaccident mechanical malfunctions or failures that would have precluded normal operation.

Both propeller assemblies remained attached to their respective engines. The propeller blades for the right engine exhibited chordwise scratching, bending, and leading edge damage. The propeller blades for the left engine exhibited chordwise scratches across the cambered surface and leading edge damage..

Medical and Pathological Information

An autopsy of the pilot was performed by the Sanford Health Pathology Clinic on December 26, 2018, as authorized by the Minnehaha County Coroner's office. The autopsy concluded that the cause of death was multiple blunt force injuries.

Toxicology testing of the pilot's tissue and fluid samples performed at the FAA Forensic Sciences Laboratory, Oklahoma City, Oklahoma, were negative for all tests conducted.

Administrative Information

Investigator In Charge (IIC):	Rodi, Jennifer		
Additional Participating Persons:	Barry I Dunmire; Federal Aviation Administration; Rapid City, SD Henry Soderlund; Textron Aviation; Wichita, KS Mike Council; Continental Motors; Mobile, AL		
Original Publish Date:	December 3, 2020	**Investigation Class:**	2
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98803		