



Aviation Investigation Final Report

Location:	Santa Fe, New Mexico	Accident Number:	CEN18LA077
Date & Time:	January 15, 2018, 19:35 Local	Registration:	N787SB
Aircraft:	BRYK STEVEN L VELOCITY XL RG	Aircraft Damage:	Substantial
Defining Event:	Structural icing	Injuries:	1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was conducting a cross-country flight in night, visual meteorological conditions when he inadvertently entered an area of instrument meteorological conditions (IMC) and icing, and the airplane subsequently began accruing ice. The experimental airplane was not equipped for flight in known icing conditions. The pilot reported to an air traffic controller that the airplane had entered IMC and had accumulated icing. The pilot then saw a 1-ft-diameter, gelatinous supercooled water mass on the windshield, and 5 seconds later, the entire windshield became crystalized with ice. Several seconds later, the airplane entered an uncommanded dive. The pilot was able to recover from the dive, but he was unable to maintain altitude and declared an emergency with air traffic control. Subsequently, he conducted a forced landing on rough terrain, which resulted in substantial damage to the fuselage and left elevator.

Ice accumulation was observed on the airframe at the accident site, and several pieces of ice were observed along the wreckage debris path. The observed ice accumulation would have precluded smooth airflow over the wing during the flight and resulted in degraded performance.

Meteorological data indicated that the airplane flew into an area of unforecast icing conditions. It is likely the airplane entered supercooled liquid water clouds, which resulted in a sudden accretion of airframe ice. Supplemental satellite weather data indicated a local potential for icing at the accident site; however, without any corroborating pilot reports of icing, an advisory was not issued for the area around the accident site. The pilot stated that he did not review weather data before departure or while en route; however, even if he had he reviewed weather data, it would not have shown that icing conditions were present or forecast.

Probable Cause and Findings

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

The airplane's inadvertent encounter with unforecasted icing conditions during cruise flight, which resulted in the accumulation of airframe icing, the airplane's inability to maintain altitude, and a subsequent forced landing on rough terrain.

Findings

Environmental issues	Snow/ice - Effect on equipment
Environmental issues	Snow/ice - Ability to respond/compensate
Aircraft	Altitude - Attain/maintain not possible

Factual Information

History of Flight

Enroute-cruise	VFR encounter with IMC
Enroute-cruise	Structural icing (Defining event)
Enroute-descent	Off-field or emergency landing

On January 15, 2018, about 1935 mountain standard time, an experimental Velocity XL-RG airplane, N787SB, was substantially damaged during an accident near Santa Fe, New Mexico. The pilot sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal cross-country flight.

The pilot departed from Rosecrans Memorial Airport (STJ), St. Joseph, Missouri, earlier in the day and landed at Liberal Mid-America Regional Airport (LBL), Liberal, Kansas, between 1515-1530 to refuel. The pilot stated that he was "extremely cold" upon landing at LBL because the airplane had inadequate cabin heat during cold weather operations. The pilot immediately went inside the fixed based operator (FBO) facility to warmup for several minutes next to a space heater. After warming up, he used the FBO's courtesy car to drive into town to purchase some food. The pilot stated that he normally avoided flying over mountainous terrain at night, especially during the winter months due to his concerns about airframe icing. The pilot inquired about local motel room availability and nightly rates; however, he eventually decided to depart LBL for Santa Fe Municipal Airport (SAF), Santa Fe, New Mexico, after he compared the cost difference to hangar the airplane overnight at the two airports. The pilot stated that he was traveling on a tight budget and noted that his focus on keeping costs low had likely contributed, in part, to his "making bad decisions" before the flight. He further suggested that his being physically cold likely contributed to his poor decision making before the flight; specifically, that he did not review any weather data before departure.

The airplane was topped-off with fuel and a half quart of oil was added to the engine before the flight. The pilot stated that the engine started normally, and that he did not observe any airframe ice while he taxied to the runway. The flight departed LBL about 1732. The pilot established contact with air traffic control (ATC) after takeoff and requested visual flight rules (VFR) flight following to SAF. The pilot stated that he did not ask the air traffic controllers about the weather conditions ahead of the airplane, despite having available time while en route toward SAF.

The pilot does not recall any significant details of the flight until the airplane entered instrument meteorological conditions (IMC) during cruise flight. The pilot reported that he would normally have diverted toward visual meteorological conditions (VMC) after inadvertently entering IMC; however, he believed that his being extremely cold, due to the inadequate cabin heat, had negatively affected his judgment and decision making. He recalled that the airplane began accruing ice less than 5 minutes after the airplane entered IMC. The experimental airplane was not equipped for flight in known icing conditions. He initially saw a 1 ft diameter "gelatinous supercooled water mass" on the windshield, and then entire windshield crystalized with ice about 5 seconds later. The pilot stated that the airplane

entered an uncommanded dive within a few seconds of the crystalized windshield ice. The pilot was able to recover from the dive after the airplane descended between 500 and 1,000 ft. The pilot reported that he declared an icing emergency with the air traffic controller and his inability to maintain altitude. The pilot does not recall the final sequence of events before the forced landing, and his next memory is following the accident when emergency first responders were approaching the accident site.

According to recorded ATC data, at 1922:46, the pilot told the controller "I believe I've got icing, and I am IMC, uh, can I have vectors please?" The airplane was in cruise flight at 8,800 ft mean sea level (msl) and 26 miles east-southeast of the accident site when the pilot first reported that the airplane had entered IMC and was in icing conditions. After confirming that the airplane had encountered IMC, the controller asked the pilot if he was capable of and qualified to receive an instrument flight rules (IFR) clearance. After the pilot replied in the affirmative, the controller cleared the flight to SAF via radar vectors and to climb-to-maintain 10,000 ft mean sea level (msl). At 1928:20, the accident pilot told the controller that he was unable to maintain altitude. The airplane had descended to 7,500 ft msl and was about 11 miles southeast of the accident site. At 1931:01, the pilot declared an emergency when located about 7 miles south-southeast of the crash site at 7,100 ft msl. The pilot subsequently transmitted that he was attempting to maintain altitude at 1931:41, 1932:02, and 1933:17. The final transmission by the pilot, recorded at 1933:17, was "I can hear you, sierra bravo, attempting to maintain altitude." At that point the airplane had descended to 6,800 ft msl and was 2 miles south-southeast of the crash site. At 1933:44, the final radar return was recorded about 1 mile south of the crash site at 300 ft above ground level (agl).

The wreckage was examined the morning after the accident by Federal Aviation Administration (FAA) inspectors. The FAA inspectors stated that the airplane had landed in rough terrain about 8 miles southeast of SAF. The fuselage and left elevator were substantially damaged during the forced landing. There were various degrees of ice accumulation observed on the airframe. Additionally, there were several pieces of ice located along the wreckage debris path. The FAA inspectors reported that flight control continuity was confirmed, the landing gear was found fully retracted, and that the composite propeller had fragmented during impact with terrain.

Postaccident review of meteorological data revealed a frontal boundary extended from central Colorado south over Santa Fe, New Mexico, then southwest into southern New Mexico, and then southeast into western Texas. The accident site was located east of the frontal boundary in the colder airmass. Weather station models near the accident site revealed surface temperatures at or below freezing, temperature-dew point spreads of 5° F or less, a gusting southeast wind of 10 to 27 knots, and an overcast ceiling at 2,000 ft agl.

Meteorological data obtained from a sounding model indicated there was a conditionally unstable atmosphere from the surface through 7,250 ft msl, followed by a stable atmosphere from 7,250 through 12,000 ft msl, with a possibility of clouds between 8,000 through 10,000 ft msl, and light to moderate rime icing between 7,000 and 9,000 ft msl. There was a possibility of low-level wind shear between the surface and 9,000 ft msl, and a high probability of clear-air turbulence between the surface and 11,500 ft msl. Satellite infrared imagery indicated there was cloud cover over the accident site with cloud-top heights near 16,000 ft msl. The available meteorological data was consistent with the pilot's observation of supercooled liquid water clouds with icing and IMC.

An Airmen's Meteorological Information (AIRMET) Sierra advisory was valid for the accident site at the accident time. AIRMET Sierra warned of IFR conditions due to precipitation and mist and mountain obscuration conditions due to clouds, precipitation, and mist. An AIRMET Zulu (icing) was issued for the northeast corner of New Mexico, but it was not forecast for the accident site. There were no convective or non-convective Significant Meteorological Information (SIGMET) advisories valid at the time of the accident for the accident site. There were two pilot reports (PIREP) issued within 150 miles of the accident site during the two hours before and after the accident. The first PIREP was issued at 1741 near Albuquerque, New Mexico, for moderate turbulence between 7,000 and 8,000 ft msl, but it did not mention airframe icing. The second PIREP was issued at 1823 near Clovis, New Mexico, which indicated there was no airframe icing at 9,000 ft msl.

National Weather Service Forecast Icing Potential (FIP) and Current Icing Potential (CIP) products are intended to be supplemental to other icing advisories (AIRMET and SIGMET) that have been issued. At 2000, the FIP data indicated that over the accident site there was a 40% to 80% probability of trace to moderate icing at 8,000 and 9,000 ft msl, and no potential for supercooled large droplet (SLD). The CIP data indicated that over the accident site there was a 30% to 50% probability of trace to light icing at 8,000 and 9,000 ft msl, and an unknown chance of SLD.

FAA Pilot Handbook of Aeronautical Knowledge states that an accumulation of airframe ice disrupts the smooth airflow over the wing and causes the boundary layer to separate at an angle of attack that is lower than that of the critical angle of attack. Additionally, the airplane performance is diminished as a result of the disruption of smooth airflow over the wing.

Pilot Information

Certificate:	Private	Age:	60, Male
Airplane Rating(s):	Single-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:	No
Medical Certification:	Class 3 Without waivers/limitations	Last FAA Medical Exam:	May 3, 2017
Occupational Pilot:	No	Last Flight Review or Equivalent:	August 1, 2017
Flight Time:	(Estimated) 1500 hours (Total, all aircraft), 150 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	BRYK STEVEN L	Registration:	N787SB
Model/Series:	VELOCITY XL RG NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:	2003	Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	3RX097
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	August 1, 2017 Condition	Certified Max Gross Wt.:	2900 lbs
Time Since Last Inspection:	25 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	600 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	Installed	Engine Model/Series:	IO-540-K1G5D
Registered Owner:	On file	Rated Power:	300 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night/dark
Observation Facility, Elevation:	SAF,6349 ft msl	Distance from Accident Site:	7 Nautical Miles
Observation Time:	19:53 Local	Direction from Accident Site:	310°
Lowest Cloud Condition:		Visibility	10 miles
Lowest Ceiling:	Overcast / 2000 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	21 knots / 27 knots	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	130°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.32 inches Hg	Temperature/Dew Point:	-3°C / -6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Liberal, KS (LBL)	Type of Flight Plan Filed:	VFR/IFR
Destination:	Santa Fe, NM (SAF)	Type of Clearance:	IFR;VFR flight following
Departure Time:	18:32 Local	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious	Latitude, Longitude:	35.543056,-105.983055(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Ken Hand; Federal Aviation Administration, ABQ FSDO; Albuquerque, NM
Original Publish Date:	May 5, 2021
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96623

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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](#).