



Aviation Investigation Final Report

Location:	Dulles, Virginia	Incident Number:	ERA24LA094
Date & Time:	January 19, 2024, 12:47 Local	Registration:	N1983X
Aircraft:	Cessna 208	Aircraft Damage:	Minor
Defining Event:	Structural icing	Injuries:	7 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Scheduled		

Analysis

During initial climb, the flight crew began to feel a vibration and loss of engine power. They declared an emergency and turned back toward the departure airport. Upon realizing they would not be able to return to the departure airport, they landed on a road, resulting in minor damage to the airplane.

Postincident examination of the airframe and engine found no preincident mechanical malfunctions or failures that would have precluded normal operations. Postincident photographs taken of the airplane by first responders shortly after the incident show contamination buildup on some of the airplane’s lift-generating surfaces (that is, the wings and horizontal and vertical stabilizers).

Weather before and around the time of the incident included light snow and below freezing temperatures. When the flight crew checked the airplane for contamination during their preflight inspection, they did not observe any ice or snow accumulation, but the airplane appeared wet. Neither crewmember performed a tactile check of the airplane’s lift generating surfaces, and the captain chose not to deice the airplane. He reported that the company had deicing services available and that it would normally be applied at the gate. Company procedures stated that the only acceptable deice fluid was Type 1.

The operator’s standard operating procedures dictated that a visual contamination check was required to be performed within five minutes before takeoff. The same guidance left the decision to perform a tactile check of the airplane’s lift-generating surfaces to the captain. This directly contradicted the airplane manufacturer’s guidance, which stated that a tactile check must be completed when the outside air temperature is below 10°C. The second-in-command (SIC) reported that before entering the runway, they looked out at the wing and did not observe

any contamination, stating that it was “just wet.” Due to contradictory guidance on when a tactile versus visual check must be performed, it is likely the crew believed they had completed an appropriate contamination check before departing.

Based on the weather conditions at the time, reports that another airplane—which had been on the ground for a similar amount of time—was observed with ice accumulation, and the failure of the crew to perform a tactile contamination check within 5 minutes before takeoff; it is likely that ice had accumulated on the airframe before takeoff. Based on the taxi time of about 6 minutes and a holdover time of 11 minutes, it is also likely that had the crew chose to deice, any accumulated ice would have been removed, and the airplane subsequently would not have accumulated additional ice.

Review of ADS-B data showed that during initial climb the airplane’s groundspeed (after accounting for the prevailing 8 knot headwind component) decreased below the stall speeds listed in the airplane pilot’s operating handbook. The vibration the crew felt was likely the beginning stages of an aerodynamic stall that was likely exacerbated by the degraded performance associated with structural icing.

Probable Cause and Findings

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

The pilot-in-command’s approach to the critical angle of attack during initial climb, which resulted in a vibration the flight crew improperly identified as an engine issue and resulted in the subsequent off-airport landing. Contributing to the accident was the operator’s inadequate and contradictory guidance for flight crews operating in winter conditions. Also contributing was the pilot-in-command’s decision not to perform a tactile check or deice, which resulted in taking off with ice contamination.

Findings

Aircraft	Airspeed - Not attained/maintained
Personnel issues	Aircraft control - Flight crew
Organizational issues	Adequacy of policy/proc - Operator
Personnel issues	(general) - Flight crew
Aircraft	(general) - Inadequate inspection
Environmental issues	Conducive to structural icing - Effect on equipment
Environmental issues	Low temperature - Effect on equipment

Factual Information

History of Flight

Prior to flight	Structural icing
Initial climb	Structural icing (Defining event)
Emergency descent	Off-field or emergency landing
Landing-landing roll	Collision with terr/obj (non-CFIT)

On January 19, 2024, at 1247 eastern standard time, Southern Airways Express flight 246, a Cessna 208B airplane, N1983X, was involved in an incident near Dulles, Virginia. The two commercial pilots and five passengers were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 135 scheduled domestic passenger flight from Washington Dulles International Airport (IAD), Dulles, Virginia, to Lancaster Airport (LNS), Lancaster, Pennsylvania.

The incident flight was the second flight of the day for the pilots; they flew the airplane into IAD from Dubois Regional Airport (DUJ), Dubois, Pennsylvania, about an hour before the incident. The pilot-in-command (PIC) stated that when he and the SIC performed a preflight inspection of the airplane at IAD, there was no ice or snow on it, so he decided not to deice the airplane. The SIC stated, "It started snowing basically right about the time that we did our startup. And it may have been snowing lightly before that, but I really didn't notice the snow until we were actually on startup." Review of surveillance video from IAD showed that neither member of the flight crew performed a tactile inspection of the airplane's lift-generating surfaces.

The SIC stated that before entering the runway for takeoff, the flight crew performed a visual contamination check of the wing. At that time, there was no accumulation; it was "just wet." The SIC further reported that as engine power was increased for takeoff, she checked the engine instruments and "everything was in the green."

The SIC reported that the flight proceeded normally until about 400 ft agl, when the engine started vibrating "like a flat tire." The PIC, who was the pilot flying, stated that the vibration was accompanied by a loss of engine power, so he began a turn to return to IAD. The SIC then declared an emergency. In the turn, the flight crew realized that they would not be able to reach a runway, saw a highway in front of them with a break between traffic, and decided to land on the highway.

After the PIC landed the airplane on the highway, due to a slight turn in the road, the airplane contacted the right guard rail during the landing roll-out, resulting in minor damage to the

airplane. After communicating with the IAD air traffic control tower regarding their position and the disposition of their passengers, the pilots and passengers egressed the airplane.

Review of ADS-B data indicated that the airplane began taxiing on the terminal ramp for takeoff about 1239. The takeoff roll commenced at 1244:30. The airplane became airborne at 1245:06. At 1246:09, the airplane reached a pressure altitude of 900 ft and a ground speed of 94 kts. At 1246:38, the airplane continued to climb to 1,100 ft but had decelerated to a ground speed of 72 kts. At 1246:50, the airplane was at 1,100 ft but had decelerated to 40 kts ground speed. At 1246:58, the airplane had descended to 900 ft and its ground speed was 91 kts. The last ADS-B data point, at 1247:14, showed that the airplane was at a pressure altitude of 400 ft with a ground speed of 47 kts near a roadway just outside the IAD airport perimeter.

Co-pilot Information

Certificate:	Commercial; Flight instructor	Age:	54,Female
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	December 11, 2023
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	September 2, 2023
Flight Time:	830 hours (Total, all aircraft), 202 hours (Total, this make and model), 550 hours (Pilot In Command, all aircraft), 167 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Commercial	Age:	27,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	August 24, 2023
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	November 5, 2023
Flight Time:	1586 hours (Total, all aircraft), 554 hours (Total, this make and model), 1212 hours (Pilot In Command, all aircraft), 324 hours (Last 90 days, all aircraft), 118 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Left
Other Aircraft Rating(s):	Restraint Used:	3-point
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

Passenger Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Right
Other Aircraft Rating(s):	Restraint Used:	3-point
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

Passenger Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Left
Other Aircraft Rating(s):	Restraint Used:	3-point
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

Passenger Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Rear
Other Aircraft Rating(s):	Restraint Used:	
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

Passenger Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Right
Other Aircraft Rating(s):	Restraint Used:	3-point
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

At the time of the incident, the PIC was current in the 208 and had accumulated 287.3 hours of PIC flight time in the airplane type.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N1983X
Model/Series:	208 B	Aircraft Category:	Airplane
Year of Manufacture:	2003	Amateur Built:	
Airworthiness Certificate:	Commuter	Serial Number:	208B1013
Landing Gear Type:	Tricycle	Seats:	12
Date/Type of Last Inspection:	December 31, 2023 AAIP	Certified Max Gross Wt.:	9097 lbs
Time Since Last Inspection:	55 Hrs	Engines:	1 Turbo prop
Airframe Total Time:	28443 Hrs at time of accident	Engine Manufacturer:	Pratt & Whitney Canada
ELT:	C91A installed, not activated	Engine Model/Series:	PT6A-114A
Registered Owner:	SOUTHERN AIRWAYS PACIFIC LLC	Rated Power:	675 Horsepower
Operator:	SOUTHERN AIRWAYS LLC	Operating Certificate(s) Held:	Commuter air carrier (135)
Operator Does Business As:	Southern Airways Express	Operator Designator Code:	FDY

The pilot's operating handbook (POH) for the Cessna 208B stated the following regarding visual and tactile checks of the wing:

If the OAT is below 10°C (50°F) a tactile check of the wing leading edge and upper surface per Section 4 of the Pilot Operating Handbook (POH) is required in addition to a visual inspection. During ground icing conditions, takeoff must be accomplished within 5 minutes of completing the tactile inspection unless the airplane is operated per FAR 135.227(b)(3).

Ground icing conditions are defined as:

1. The Outside Air Temperature (OAT) is 2°C (36°F) or below and visible moisture is present (i.e. rain, drizzle, sleet, snow, fog, water is present on the wing, etc.), or
2. The OAT is 5°C (40°F) or below and conditions are conducive to active frost formation (e.g. clear night with a dew point temperature/OAT difference of 3°C (5°F) or less). Takeoff is prohibited if frost, ice or snow may reasonably be expected to adhere to the airplane between the tactile check and takeoff (e.g. snow near freezing temperature with no deicing/anti-ice fluid application).

The incident airplane was equipped with wing, wing strut, and horizontal and vertical stabilizer leading edge deicing boots, as well as propeller heat. The airplane was rated for flight into icing conditions

The PIC reported that during the incident flight, the flight crew took off with 20° of flaps set. A review of the POH stall speed table showed the indicated airspeed for a stall at the incident weight and 20° of flaps was between 53 and 54 kts, depending on the center of gravity. The SIC reported that they retracted the flaps to the Up position between 400 and 500 ft msl. The POH stall speed table showed the indicated airspeed for a stall at the incident weight and flaps up was 63 kts. The POH also stated, “Even small amounts of snow, ice or frost contamination may cause a potentially dangerous degradation of aircraft performance and unexpected flight characteristics.”

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	IAD,312 ft msl	Distance from Accident Site:	3 Nautical Miles
Observation Time:	12:44 Local	Direction from Accident Site:	80°
Lowest Cloud Condition:		Visibility	1 miles
Lowest Ceiling:	Broken / 900 ft AGL	Visibility (RVR):	6000 ft
Wind Speed/Gusts:	10 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	330°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	29.77 inches Hg	Temperature/Dew Point:	-1°C / -4°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Dulles, VA	Type of Flight Plan Filed:	IFR
Destination:	Lancaster, PA (LNS)	Type of Clearance:	IFR
Departure Time:		Type of Airspace:	Class B

The meteorological aerodrome report (METAR) for IAD began reporting light snow and below freezing temperatures starting at 1117 and continued to report these conditions through the time of the incident. The gate agent for the flight reported that the captain chose not to deice the airplane. She also reported that she noticed ice had formed on another airplane that had been on the ground for a shorter amount of time than the incident airplane, and that it was snowing heavily while the airplanes were on the ground.

FAA guidance on holdover times for the 2023-2024 winter season stated that the holdover time for Type I fluid on critical aircraft surfaces composed predominately of aluminum was 11 to 18 minutes with light snow and an outside air temperature of -3°C or above.

About the time of the accident the reported wind was 330° (true) at 10 knots. This would have resulted in quartering right headwind during the takeoff with a headwind component of about 8 knots.

Airport Information

Airport:	Washington Dulles International IAD	Runway Surface Type:	Concrete
Airport Elevation:	312 ft msl	Runway Surface Condition:	Slush covered;Snow
Runway Used:	30	IFR Approach:	None
Runway Length/Width:	10050 ft / 150 ft	VFR Approach/Landing:	Forced landing

The PIC reported that the airplane operator had deice capabilities available at IAD. He further stated that deice at IAD was normally performed at the gate.

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Minor
Passenger Injuries:	5 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	7 None	Latitude, Longitude:	38.94532,-77.51919(est)

Postincident photographs taken of the airplane by first responders shortly after the incident showed contamination buildup on some of the airplane’s lift-generating surfaces.

Postincident examination of the turboprop engine revealed no indications of preimpact external or internal damage that would have precluded normal operation. A test cell run was performed, and power levels were found to meet the engine overhaul manual performance specifications with no fluctuations in engine speed or torque during testing. The propeller blades showed evidence of power at impact, including gouges on the leading edge, material missing from the blade tips, and blade bending opposite the direction of rotation. A propeller examination performed by the propeller manufacturer did not identify indications of preimpact failure and concluded that the propeller blade damage was consistent with significant rotational energy at impact. Propeller blade internal witness marks were also consistent with the blades being in the forward thrust operating range at impact.

Additional Information

FAA Advisory Circular 61-67C (Stall and Spin Awareness Training) states, "Just before the stall occurs, buffeting, uncontrollable pitching, or vibrations may begin."

FAA Safety Alert for Operators 06002 (Ground Deicing Practices for Turbine Aircraft in Nonscheduled 14 *CFR* Part 135 Operations and in Part 91), issued March 29, 2006, recommended that operators review their standard operating procedures to ensure they include, "procedures to ensure that the aircraft's lift-generating surfaces are COMPLETELY free of contamination before flight through a tactile (hands-on) check of the critical surfaces WHEN FEASIBLE. Even when otherwise permitted, operators should avoid smooth or polished frost on lift-generating surfaces as an acceptable preflight condition."

The operator's standard operating procedures defined icing conditions as visible moisture (clouds, rain, snow, ice crystals) with an outside air temperature of 5°C or less.

The operator's flight operations manual (FOM) provided the following guidance for operations during ground icing conditions:

Even small amounts of snow, ice or frost contamination may cause a potentially dangerous degradation of aircraft performance and unexpected flight characteristics. All Southern Airways pilots must use the methods outlined in this manual to ensure that no aircraft will takeoff with ice, frost or snow adhering to any surface.

Ground Icing Conditions exist when:

1. Frost, ice, or snow is adhering to or may adhere to the critical surfaces of an aircraft.
2. Ground Icing Conditions also exist when active frost, frozen or freezing precipitation is reported or observed.

The FOM also described pre-takeoff contamination inspections, stating:

A. Whenever ground icing conditions are in effect, a pre-takeoff contamination check must be accomplished to ensure the aircraft is free of frost, ice or snow on the following surfaces:

1. Windshield
2. Empennage
3. Stabilizing or control surfaces
4. Wing
5. Pitot Static Tubes
6. Propeller
7. Engine Inlet

B. This must occur during the normal preflight walk-around inspection. If any contamination is discovered during the preflight inspections; the PIC must ensure the contamination is properly removed. This check must be accomplished within 5 minutes prior to beginning the takeoff run.

C. The Pilot in Command is responsible for the following:

1. Ensuring the aircraft is clean of frost, ice or snow "contamination" prior to takeoff.
2. Complying with the pre-takeoff contamination check.
3. Advising the Company as early as possible that there may be a need to remove the contamination.
4. Advising the Director of Operations of any changes that will improve the procedure.

D. The Pilot in Command or SIC, if assigned, will accomplish a visual inspection of the wings and horizontal stabilizer 5 minutes prior to takeoff for contamination whenever active icing is occurring. If the SIC is assigned, the PIC remains responsible for ensuring the process is properly completed. The following procedure will be used to accomplish this inspection from outside the aircraft:

1. The Captain will visually inspect both wings (Outboard of the fuselage) and the Pitot Static Tubes.
2. The Captain will visually inspect both horizontal stabilizers from the open cockpit door.
3. The propeller and engine inlet must be checked from the front of the aircraft with the engine shut down.
4. If at night, the Captain will use a flashlight to inspect required components and surfaces.

5. If the aircraft is not airborne within 5 minutes of the last pre-takeoff contamination check, the above procedure must be repeated.
6. If at any point the Captain is unsure if the wing is clear of contamination, the Captain will perform a tactile check of the wings and control surfaces.
7. If the wing and horizontal stabilizer are contaminated the aircraft will return to gate/hangar and the contamination will be removed.
8. Accepted means for de-icing the aircraft are Type-1 de-ice fluid, heated forced air, placing the aircraft in a heated hangar and use of a soft brush or broom designated specifically for de-icing. Holdover times may not be used when using Type 1 fluid for the purpose of deicing.

The winter operations guidance and training material provided by the operator did not contain a definition for "active icing."

Preventing Similar Accidents

Aircraft Ground Icing (SA-006)

The Problem

Fine particles of frost or ice, the size of a grain of table salt and distributed as sparsely as one per square centimeter over an airplane wing's upper surface, which may be virtually imperceptible, can destroy lift during takeoff and result in significant performance degradation. Such small, almost visually imperceptible amounts of ice distributed on an airplane's wing upper surface cause the same aerodynamic penalties as much larger (and more visible) ice accumulations. They can also result in localized, asymmetrical stalls on the wing, which can result in roll control problems during takeoff.

Ice accumulation on the wing upper surface may be very difficult to detect from the cockpit, cabin, or front and back of the wing because it is clear/white. Further, it is nearly impossible to determine by observation whether a wing is wet or has a thin film of ice. A very thin film of ice or frost will degrade the aerodynamic performance of any airplane. Most pilots understand that visible ice contamination on a wing can cause severe aerodynamic and control penalties, but many pilots do not recognize that minute amounts of ice adhering to a wing can result in similar penalties. Thin layers of ice or frost on the wing upper surface are no more benign than large ice accumulations on the wing leading edges.

What can you do?

- Pilots should be aware that no amount of snow, ice or frost accumulation on the wing upper surface should be considered safe for takeoff. It is critically important to ensure, by any means necessary, that the upper wing surface is clear of contamination before takeoff.
- The NTSB believes strongly that the only way to ensure that the wing is free from critical contamination is to touch it.
- With a careful and thorough preflight inspection, including tactile inspections and proper and liberal use of deicing processes and techniques, airplanes can be operated safely in spite of the adversities encountered during winter months.
- Pilots should be aware that, even with a wing inspection light, the observation of a wing from a 30- to 40-foot distance through a window does not constitute a careful examination.
- Pilots may observe what they perceive to be an insignificant amount of ice on the airplane's surface and be unaware that they may still be at risk because of reduced stall margins resulting from icing-related degraded airplane performance.
- Depending on the airplane's design (size, high wing, low wing, etc.) and the environmental and lighting conditions (wet wings, dark night, dim lights, etc.) it may be difficult for a pilot to see frost, snow and rime ice on the upper wing surface from the ground or through the cockpit or other windows.
- Frost, snow, and rime ice may be very difficult to detect on a white upper wing surface and clear ice can be difficult to detect on an upper wing surface of any color.
- Many pilots may believe that if they have sufficient engine power available, they can simply "power through" any performance degradation that might result from almost imperceptible amounts of upper wing surface ice accumulation. However, engine power will not prevent a stall and loss of control at liftoff, where the highest angles of attack are normally achieved.
- Some pilots incorrectly believe that if they cannot see ice or frost on the wing from a distance, or maybe through a cockpit or cabin window, it must not be there – or if it is there and they cannot see it under those circumstances, then the accumulation must be too minute to be of any consequence.

See <https://www.nts.gov/Advocacy/safety-alerts/Documents/SA-006.pdf> for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Young, Joshua
Additional Participating Persons:	Cody Watson; FAA/FSDO; Herndon, VA Casey Love; Textron Aviation; Wichita, KS Michael Hodge; P&WC Beverly Harvey; TSB
Original Publish Date:	April 3, 2026
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this incident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=193691

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](#).