National Transportation Safety Board
Aviation Accident Final Report

Location:	BISMARCK, ND	**Accident Number:**	CHI98FA119
Date & Time:	04/07/1998, 0838 CDT	**Registration:**	N868FE
Aircraft:	Cessna 208B	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

The airplane was making an instrument landing system approach in instrument meteological icing conditions when control was lost. The airplane impacted the terrain 1.6 miles from the approach end on the runway. The airplane contacted the terrain with the left wing first prior to cartwheeling and coming to rest approximately 120 feet from the point of first impact. The pilot had 19 hours total flight time in Cessna 208's of which 1.9 hours were in actual instrument meteorological conditions.

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 approach which resulted in an inadvertant stall. Factors associated with the accident were the icing conditions and the pilot's low level experience in this make and model of airplane.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings
1. (F) WEATHER CONDITION - ICING CONDITIONS
2. (C) AIRSPEED - INADEQUATE - PILOT IN COMMAND
3. (F) LACK OF EXPERIENCE - PILOT IN COMMAND
4. (C) STALL - INADVERTENT - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On April 7, 1998, at 0838 central daylight time (cdt), a Cessna 208B, N868FE, registered to Federal Express Corporation, and operated by Corporate Air, of Billings, Montana, as FedEx Flight 8738, was destroyed following a loss of control and collision with the terrain. The airplane was on the ILS approach to Runway 31 at the Bismarck Municipal Airport, Bismarck, North Dakota, when the accident occurred. The commercial pilot received fatal injuries. The 14 CFR Part 135 flight was operating on an IFR flight plan. Instrument meteorological conditions prevailed.

The flight departed Grand Forks, North Dakota, at 0728 cdt, with 2,710 pounds of cargo on a regular scheduled flight to Bismarck. Two other Corporate Air flights, also being operated as FedEx cargo flights, departed Grand Forks shortly after N868FE. Both of these airplanes were destined for Bismarck.

N868FE was cleared to climb to 6,000 feet mean sea level (msl) after takeoff from Grand Forks. Shortly after takeoff the pilot requested a climb to 8,000 feet msl due to icing. The pilot was issued a climb to 7,000 feet msl. N868FE then contacted Minneapolis Air Route Traffic Control Center and stated to the controller that he was not picking up any more ice at 7,000 feet msl and that he was on top of the clouds. The pilot informed the controller that the ice he had picked up was mixed and that it was like wet droplets running back over the wing and freezing.

The pilot of N868FE was instructed to contact Bismarck Approach Control who issued vectors and cleared N868FE for the ILS Runway 31 approach. The pilot then contacted the Bismarck Air Traffic Control Tower and was cleared to land at 0836 cdt. The pilot acknowledged the clearance at 0837 cdt. There was no further radio contact with the N868FE.

PERSONNEL INFORMATION

The pilot was born December 6, 1956. He was the holder of a commercial pilot certificate with single, multi-engine, and instrument ratings. He also held a second class medical issued on November 14, 1997. The medical certificate contained the limitation that the holder shall wear corrective lenses.

A review of the pilot's last logbook revealed his most recent biennial flight review was on December 24, 1997. He had accumulated a total of 2,265 hours of flight time, 18.9 hours of which were in a Cessna 208B airplane at the time of the accident.

The pilot had 1.9 hours of actual instrument time in a Cessna 208 and 4.7 hours of simulated instrument time in a Cessna 208.

The pilot completed the Flight Safety International Caravan I Initial Pilot Training Course on March 27, 1998.

AIRCRAFT INFORMATION

N868FE was a Cessna 208B, serial number 208B0193. The airplane had accumulated 6,140 hours of time in service at the time of the accident. The engine also had 6,140 hours of total time at the time of the accident. The most recent inspection was conducted on February 26, 1998, 45 hours prior to the accident.

METEOROLOGICAL INFORMATION

Another Corporate Air pilot departed Grand Forks approximately 5 to 10 minutes after N868FE. His destination was also Bismarck. He stated both flights had filed to fly at 6,000 feet msl. He stated he was cleared to 8,000 feet msl after departure for separation purposes. He reported the tops were at 6,700 feet msl with light mixed icing in the clouds which accumulated to 1/8 to 1/4 inch. He reported hearing the pilot of N868FE request a higher altitude because he was picking up ice at 6,000 feet msl. He stated the pilot of N868FE was cleared to 7,000 feet msl. He recalled center asking the pilot of N868FE if he was out of the ice. The pilot reported that he was now on top and that he had been picking up light mixed ice in the clouds and that some of it was running back and freezing aft on the wing. This pilot stated that en route the tops lowered to about 4,000 feet msl and he was clear of the clouds until he began the descent into Bismarck. He stated he encountered light mixed ice during the approach into Bismarck which had accumulated 1/8 to 1/4 inch. He stated he recalled the ice melting away during the ILS approach.

A third Corporate Air pilot was also flying from Grand Forks to Bismarck around the same time. He stated he also picked up light mixed ice during the departure from Grank Forks so he requested a higher altitude and was subsequently cleared to 8,000 feet msl. He stated that at 7,000 feet msl he was out of the icing conditions, but was still in instrument conditions. By 8,000 feet msl he was between layers. Approximately 35 miles northeast of Bismarck his "...flight conditions deteriorated." He was in instrument conditions at 8,000 feet msl and began picking up light clear/mixed icing during the descent through 7,600 feet msl. He reported he continued to pick up ice through 5,000 feet msl and as he descended through 4,000 feet msl the ice began to melt. He stated that after landing he noted the unprotected areas of his airplane had 3/8 to 1/2 inch of ice on them and the protected areas had approximately 1/4 in of ice. The pilot landed at 0850 cdt.

A pilot, flying a Cessna T210, who departed from Bismarck an hour before the accident stated the weather information forecast the chance of light to occasional moderate icing in clouds between the freezing level and 14,000 feet msl. After departure from Bismarck he encountered cloud bases at about 1,000 feet above the ground (agl) or 2,700 msl. There were several layers of clouds as he departed to the northwest. The lowest layer had a base at 3,500 msl and tops at 6,000 msl. In this layer the outside air temperature was about +2C with liquid precipitation. As the rain hit the leading edge of the wings, it moved back aft of the de-icing boots. The rain started to freeze and stick to the bottom side of both wings. The pilot reported the ice adhered to the left wing from the pitot mast inboard from approximately mid chord, aft to the end of the flaps. From the pitot mast outboard, the ice formed from the trailing edge of the de-icing boots, back to the end of the ailerons. This freezing precipitation ended about 6,000 msl. From approximately 6,000 msl to about 7,000 msl, he was still in IMC with light rime icing. The 1/4 to 1/2 inch of ice did not shed off the wings when the pilot inflated the boots. The pilot recycled the boots two or three times, but the ice remained. He could see the ribs on the boots expanded and ice flex, but the it did not shed off the leading edge of the wings.

Reported weather at Bismarck, at 0840 cdt, was an overcast ceiling at 400 feet, visibility 8 statute miles, wind was from 010 degrees at 12 knots, temperature and dewpoint were both 33 degrees F, and the altimeter was 29.85".

FLIGHT RECORDERS

The airplane was equipped with a Power Analyzer and Recorder (PAR) unit which is a light weight, compact monitoring system designed to provide the airplane operator with real time performance data and a non-volatile record of engine/airframe performance. The PAR unit accumulates, stores, and outputs the records of all starts, shutdowns, limit exceedences and other specified data for engine conditions checks and trend analysis. See attached PAR Incident Investigation Report for details.

WRECKAGE AND IMPACT INFORMATION

The NTSB on-scene investigation began at 1200 on April 8, 1998. The airplane impacted the terrain in an field approximately 1.6 miles from the end of Runway 31. The initial impact ground scar contained pieces of red lens cover from the left wing. The engine contacted the ground shortly thereafter at which point one propeller blade separated. Pieces of the right wing were located in the third ground scar, which was relatively in line with the first ground scar. The engine, cockpit, overhead panel, and the left wing separated from the fuselage shortly after this impact. The main portion of the wreckage came to rest shortly thereafter. The fuselage came to rest inverted along with the right wing and the empennage which separated from the fuselage. The distance between the first ground impact and where the main wreckage came to rest was 102 feet. The wreckage path was on a heading of 250 degrees.

MEDICAL AND PATHOLOGICAL INFORMATION

A post mortem examination of the pilot was conducted on April 8, 1998, by the North Dakota Department of Health, Bismarck, North Dakota.

The pilot's toxicological analysis was performed by the Federal Aviation Administration's Civil Aeromedical Institute, Oklahoma City, Oklahoma. The test results were negative for those substances screened.

TESTS AND RESEARCH

The engine was inspected and torn down at Executive Air Taxi Corp., Bismarck, North Dakota, on April 8th and 9th, 1998. See attached Engine Teardown Report for details.

The propeller was inspected at DuPage County Airport, West Chicago, Illinois, on August 7, 1998. See attached Propeller Teardown Report for details.

ADDITIONAL DATA

Parties to the investigation were the Federal Aviation Administration, Cessna Aircraft Company, United Technologies Pratt & Whitney Canada, Federal Express Corporation, Corporate Air.

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	41, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	11/14/1997
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	2265 hours (Total, all aircraft), 19 hours (Total, this make and model), 2103 hours (Pilot In Command, all aircraft), 71 hours (Last 90 days, all aircraft), 19 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N868FE
Model/Series:	208B 208B	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	208B0193
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	02/26/1998, AAIP	**Certified Max Gross Wt.:**	3997 lbs
Time Since Last Inspection:	45 Hours	**Engines:**	1 Turbo Prop
Airframe Total Time:	6140 Hours	**Engine Manufacturer:**	P&W
ELT:	Installed, not activated	**Engine Model/Series:**	PT 6A-114
Registered Owner:	FEDERAL EXPRESS CORPORATION	**Rated Power:**	600 hp
Operator:	CORPORATE AIR, INC.	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	FEDERAL EXPRESS	**Operator Designator Code:**	HYSA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Dawn
Observation Facility, Elevation:	BIS, 1677 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	0840 CDT	**Direction from Accident Site:**	128°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	8 Miles
Lowest Ceiling:	Overcast / 400 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	1°C / 1°C
Precipitation and Obscuration:			
Departure Point:	GRAND FORKS, ND (GFK)	**Type of Flight Plan Filed:**	IFR
Destination:	(BIS)	**Type of Clearance:**	IFR
Departure Time:	0728 CDT	**Type of Airspace:**	Class D

Airport Information

Airport:	BISMARCK MUNICIPAL (BIS)	**Runway Surface Type:**	Asphalt
Airport Elevation:	1677 ft	**Runway Surface Condition:**	Snow--wet
Runway Used:	31	**IFR Approach:**	ILS
Runway Length/Width:	8794 ft / 150 ft	**VFR Approach/Landing:**	Full Stop

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	TODD J CARLSON	**Report Date:**	04/20/2000
Additional Participating Persons:	VERL W ADDISON; FARGO, ND LEAH D RIDDLE; WICHITA, KS THOMAS A BERTHE; S. BURLINGTON, VT ROBERT D MCIVER; BILLINGS, MT		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.