



National Transportation Safety Board Aviation Accident Final Report

Location:	Salmon, ID	Accident Number:	SEA08FA042
Date & Time:	12/10/2007, 0755 MST	Registration:	N925TT
Aircraft:	BEECH 200	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal, 2 None
Flight Conducted Under:	Part 91: General Aviation - Executive/Corporate		

Analysis

The pilot removed the airplane from a hangar that was kept heated to about 60 degrees Fahrenheit, and parked it on the ramp while awaiting the arrival of the passengers. The outside temperature was below freezing, and a steady light to moderate snow was falling. The airplane sat in the aforementioned ambient conditions for at least 45 minutes before the initiation of the takeoff roll. Prior to attempting the takeoff, the pilot did not remove the accumulated snow or the snow that had melted on the warm airframe and then refroze as ice. The surviving passengers said that the takeoff ground run was longer than normal and the airplane lifted off at 100 knots indicated and momentarily touched back down, and then lifted off again. Almost immediately after it lifted off the second time, the airplane rolled into a steep right bank severe enough that the surviving passengers thought that the wing tip might contact the ground. As the pilot continued the takeoff initial climb, the airplane repeatedly rolled rapidly to a steep left and right bank angle several times and did not seem to be climbing. The airplane was also shuddering, and to the passengers it felt like it may have stalled or dropped. The pilot then lowered the nose and appeared to attain level flight. The pilot made a left turn of about 180 degrees to a downwind for the takeoff runway. During this turn the airplane reportedly again rolled to a steeper than normal bank angle, but the pilot successfully recovered. When the pilot initiated a left turn toward the end of the runway, the airplane again began to shake, shudder, and yaw, and started to rapidly lose altitude. Although the pilot appeared to push the throttles full forward soon after initiating the turn, the airplane began to sink at an excessive rate, and continued to do so until it struck a hangar approximately 1,300 feet southwest of the approach end of runway 35. No pre-impact mechanical malfunctions or failures were identified in examinations of the wreckage and engines.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An in-flight loss of control due to the pilot's failure to remove ice and snow from the airplane prior to takeoff. Contributing to the accident were the pilot's improper preflight preparation/actions, falling snow, and a low ambient temperature.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (F) WEATHER CONDITION - SNOW
2. (F) WEATHER CONDITION - TEMPERATURE,LOW
3. (C) ICE/FROST REMOVAL FROM AIRCRAFT - NOT PERFORMED - PILOT IN COMMAND
4. (C) PREFLIGHT PLANNING/PREPARATION - IMPROPER - PILOT IN COMMAND
5. (C) STALL/MUSH - ENCOUNTERED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings

6. OBJECT - HANGAR/AIRPORT BUILDING

Factual Information

HISTORY OF FLIGHT

On December 10, 2007, about 0755 mountain standard time, a Beech King Air 200, N925TT, collided with a hangar while attempting an emergency landing at Lemhi County Airport, Salmon, Idaho. The impact took place about five minutes after the flight took off from the same airport. The commercial pilot and the passenger in the right front seat were killed in the accident, and two other passengers were uninjured. The airplane, which was owned and operated by QB Corporation, of Salmon, Idaho, was destroyed by the impact and the post-crash fire. The 14 CFR Part 91 corporate/executive flight was departing for Boise, Idaho, to pick up another passenger before proceeding on to Las Vegas, Nevada. Snow was falling at the time of the takeoff, and the pilot had received his departure clearance for his previously-filed Instrument Flight Rules (IFR) flight plan. There was no report of an ELT activation.

On the day of the accident, the pilot arrived at the private hangar in which the airplane was kept at an undetermined time prior to 0700. When the first passenger arrived at the hangar about 0700, the airplane was already sitting on the ramp in front of the hangar, and the main hangar doors were fully open. According to this passenger, a light to moderate snow was falling, and when he briefly entered the airplane he noticed that the inside of the airplane was warm.

This passenger brought breakfast for himself and the pilot, so the two of them went into the hangar to eat. About 0720 the pilot closed the main hangar doors. The main hangar doors were kept closed, with the airplane outside, until they were partially reopened in order to put the vehicles of the other two passengers inside after they arrived. Reportedly, the second passenger arrived about 0735, and the last passenger arrived a little over five minutes prior to the time the pilot taxied for a departure to the north.

At 0747, the pilot contacted Salt Lake Air Traffic Control Center via radio while still on the ground at Salmon. At that time he advised the controller that it would be about three more minutes before he departed, and he requested his Instrument Flight Rules (IFR) clearance to Boise. The controller cleared him to the Boise airport "as filed," advised him to climb and maintain Flight Level 180, and told him to report when he was airborne. The pilot read back the clearance, and advised the controller that he would call him once airborne. The takeoff roll on runway 35 was estimated to have begun between 0748 and 0750. The pilot did not make post-takeoff contact with the Center controller.

According to the passengers, initially the sound of the engines and the rest of the takeoff sequence seemed normal, except that the takeoff ground run distance seemed a little longer than they had expected. Then, according to one of the passengers, who from his forward-facing position in the back could see the airspeed indicator, around 100 knots the pilot rotated the airplane for takeoff. The airplane then lifted off, momentarily touched back down, and lifted off again. Almost immediately after it lifted off the second time, the airplane rolled into a steep right bank. The angle of bank was severe enough that the surviving passengers thought that the wing tip might contact the ground. As the pilot continued the takeoff-to-initial-climb sequence, the airplane rolled rapidly to a steep left or right bank angle several times. Each time it momentarily recovered, but would then roll again. According to the passengers, during this sequence of events the airplane did not seem to be climbing. Eventually, after what was estimated to be 30 seconds or longer, the rapid banking began to diminish, and the pilot

appeared to push the throttles to the full-forward position and increase the airplane's pitch attitude. This resulted in the airplane shuddering, and to the passengers it felt like it may have stalled or dropped. The pilot then lowered the nose and appeared to maintain level flight. That action seemed to reduce the shuddering, but the airplane's nose reportedly yawed from side to side.

Soon after the nose was lowered and the shuddering was reduced, the pilot made a left turn of about 180 degrees to a ground track that paralleled the runway with the airplane heading back to the south. During this turn the airplane reportedly again rolled to a steeper than normal bank angle, but the pilot successfully rolled out on what was essentially a low-level downwind on the west side of the airport. According to both witnesses on the ground and the surviving passengers, the most northerly portion of this left turn took the airplane over the southern edge of the town of Salmon, which is located about four miles north of the airport.

While on the downwind, the airplane reportedly stabilized in a wings-level position without any significant rolling or shuddering. When the airplane was about adjacent to Airport Road, which is about one-quarter mile south of the runway 35 threshold, the pilot initiated a left turn toward the end of the runway. The passengers reported that as soon as the pilot initiated the turn, the airplane again began to shake, shudder, and yaw, and started to lose altitude. Although the pilot appeared to push the throttles full forward soon after initiating the turn, the airplane began to sink at an excessive rate, and continued to do so until it struck a hangar approximately 1,300 feet southwest of the approach end of runway 35. Just prior to impacting the hangar the airplane began to roll further to the left.

After the airplane impacted the hangar and came to a stop, the two passengers in the rear were able to exit the airplane by getting the air-stair entry door to partially open. Almost immediately after the impact, the front portion of the airplane caught on fire, and the fire quickly worked its way aft. According to the two surviving passengers, it sounded and appeared to them that both of engines continued to produce a significant amount of power for a short period after they were able to exit the airplane.

PERSONNEL INFORMATION

The pilot was a 61-year-old male who held a commercial pilot certificate with ratings for airplane single engine land (ASEL), airplane multi-engine land (AMEL), and flight solely by reference to instruments. He held a second class medical certificate with limitations for vision. At his last medical, which occurred on February 20, 2007, he reported a total flying time of 14,200 hours, with 300 hours having been accumulated in the previous six months. Although the pilot's log book was not recovered, records provided by QB Corporation indicated that he had accumulated about 75 hours of flight time in the King Air 200 in the 90 days prior to the accident, 15 of which took place during flight training. The pilot's King Air B200 Initial Course was completed at SIMCOM Training Centers on July 19, 2007.

METEOROLOGICAL INFORMATION

According to witnesses, on the morning of the accident there were numerous snow showers of varying intensity moving through the area around Salmon. Reportedly, most of the showers were of light to moderate intensity, but occasionally heavy snow was falling. About 0615, when the pilot called the Federal Aviation Administration (FAA) to file his flight plan, he (the pilot) mentioned that the temperature in Salmon was about ten degrees and there was a "little bit of snow."

During the investigation, the Investigator-In-charge (IIC) interviewed an individual who lived about one-quarter mile southwest of the accident site. That individual stated that he came out to shovel his sidewalk about 0730, and that snow was falling steadily but not heavily. According to this individual, by the time the airplane passed over his residence just before impacting the hangar, the snow was falling very hard. He further stated that although the snow "let up" soon after the accident, when he went to the area of the crash site soon after the impact, he noticed that any tire tracks made by the airplane as it initially taxied away from its hangar had been made indiscernible by the accumulation of falling snow.

The 0755 automated aviation surface weather observation (METAR) for Salmon indicated calm winds, one statute mile visibility, an overcast ceiling of 1,600 feet, a temperature of minus six degrees Celsius, a dew point of minus eight degrees Celsius, and an altimeter setting of 30.04 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The hangar that was impacted was estimated to be about 25 feet at its peak. Its structure consisted of a skeletal framework of heavy steel beams covered by insulated aluminum siding. The initial impact point appeared to be near the top of the west side of the hangar. Below that location, entangled in the hangar siding about three feet above the ground, was located much of the most-outboard five feet of the left wing, along with the entire left aileron and its trim tab. The remainder of the airplane had come through the northern (front) half of the top of the hangar, and came to rest on the ground at a location just beyond the northeast corner of the hangar floor. The airframe of the airplane, which was entangled and intermixed with both the steel beams and siding of the hangar, had come to rest in a nearly upright position aligned generally to the north. All major components of the airplane structure and flight control system, except for the aforementioned wing tip and aileron, were identified at that location.

Except for a portion of the bottom fuselage skins in the area of the aft baggage compartment, the entire fuselage, to a point aft of the aft pressure bulkhead, was almost completely consumed by the post-impact fire. The top portion of the air-stair door and its frame were consumed by the fire, but the bottom half, although severely damaged by the fire, was still discernible. The most aft portion of the fuselage containing the autopilot servos and the flight control bell cranks remained intact and mostly undamaged by the fire. The empennage and its flight control surfaces were intact and only slightly thermally damaged along the leading edge of the vertical stabilizer. Correct empennage flight control and trim tab movement were confirmed when the control cables were hand-manipulated from a mid-cabin location.

The instrument panel was almost entirely consumed by fire, but readings were able to be taken from five impact and thermally damaged instruments located in the remains of the co-pilot's instrument panel. The right engine gas generator RPM indicator needle was about 11 percent, and the left engine gas generator RPM needle was about 75 percent. The co-pilot Horizontal Situation Indicator (HSI) indicated a heading of 38 degrees, and the altimeter Kollsman setting was 30.05. The co-pilot's airspeed indicator needle was about 140 knots indicated airspeed.

The wing fuselage carry-through area, along with the inboard two-thirds of both wings, was mostly consumed by fire. Both the right and left inboard and outboard flaps had been consumed by fire, but all four flap actuators were located and their rod extension measured. The rod extension of all four actuators corresponded to a position consistent with the flaps being in a nearly fully deployed/extended position, and the flap handle in the remains of the

instrument panel was found in the approach flap position. The outboard one-third of the right wing was intact but significantly damaged by fire. The right aileron had been consumed by fire. The section of the left wing panel just inboard of the section that was found entangled in the side of the hangar was partially intact, but had been severely damaged by the impact and much of its aluminum structure was consumed or severely damaged by fire. Due to thermal and impact damage, right and left aileron control continuity was unable to be established.

The right landing gear assembly and the nose landing gear strut were found under the right engine. The right gear actuator mounting structure had separated from the nacelle structure in a manner consistent with an extended gear being forced aft at the time of impact. The left gear assembly was found separated and laying on the ground behind the left engine. Its manner of separation was not determined.

Both engines were found lying within the remains of their nacelles. The left engine was sitting upright. The right engine was on its left side. The extent of the impact and fire damage precluded determination of the continuity of the associated engine-to-airframe oil, fuel, and electrical connections to both engines. Both engines displayed evidence of first stage compressor blade circumferential scoring of their associated shrouds.

The left engine reduction gearbox housing was largely consumed by fire, and the propeller shaft was impact-fractured immediately forward of the propeller oil transfer sleeve. The propeller hub was still attached to the fractured shaft. Some portion of all four propeller blades were still present. The outboard two-thirds of one blade had melted in the fire. The outboard one-third of a second blade had melted, and its root was loose and able to be rotated in the hub. There were two clear leading edge indentations in its remaining two-thirds. A third blade, which was bent aft about 90 degrees just passed half-span, had rotated 90 degrees in the hub. Its most outboard eight inches had been thermally destroyed. It had massive leading edge indentation along its entire remaining length. The fourth blade, which was bent aft about 30 degrees about one-half its span, contained massive leading edge indentations along its outboard one-half.

The right engine reduction gearbox was intact. The propeller shaft was still attached to the gearbox and the propeller hub. Most of the full span of three of the propeller blades remained, although all suffered some degree of thermal damage. The fire consumed about 80 percent of the fourth blade. About one-half of one of the full-span blades was partially melted and severely distorted by the fire. Two of the remaining blades and the 80 percent-consumed blade were found within their normal operational pitch range. One of the full-span blades had rotated almost 90 degrees in the hub, and had leading edge indentations along its outboard one-half. All three full-span blades were curled aft greater than 90 degrees starting about one-half their span.

Both engines underwent teardown inspections after being recovered from the scene. Both engines had heavy impact-induced circumferential rubbing damage of their power turbine shroud from rotational contact with the first and second stage power turbine blades. Both engines displayed heavy power turbine blade tip rubbing that had destroyed/eroded much of the knife-edge seals on the tips of the first and second stage power turbine blades. The upstream side of the first stage power turbine disc center spigot on both engines exhibited circular scarring from rubbing contact with the first stage power turbine vane ring baffle. There was no evidence on either engine of any pre-impact malfunction or anomaly that would have prevented the engines from producing full rated power.

MEDICAL AND PATHOLOGICAL INFORMATION

Western Pathology Associates, LLC, performed an autopsy on the pilot. The cause of death listed in the autopsy was, "Blunt force trauma to head and trunk."

The Federal Aviation Administration's Forensic Toxicology Research Team performed a forensic toxicological examination on samples taken from the pilot. The examination was negative for carbon monoxide and cyanide in the blood, and negative for ethanol and screened drugs in the urine.

ADDITIONAL DATA AND INFORMATION

TAKEOFF DISTANCE

Soon after the accident, an employee of a fixed base operator (FBO) at the airport drove down the runway to evaluate the runway condition and to see if wheel tracks would indicate the point of liftoff of N925TT. According to that individual, the runway surface was covered with about two inches of recently fallen wet snow. Tire tracks on the snow showed that the nose wheel of N925TT lifted off about 2,100 feet from the south end of the runway. Tracks from the main gear tires indicated that the airplane took off about 2,500 feet down the runway. An additional track, which the employee believed was from the right main gear tire, showed that about 2,750 feet down the runway the airplane touched down briefly and then lifted off a second time.

DEICING

A review of the Raytheon Aircraft Pilot's Operating Handbook and FAA Airplane Flight Manual for the Beech Super King Air 200 revealed that Section VIII (Handling, Service, and Maintenance) addresses deicing and anti-icing of airplanes on the ground. According to this section, "Snow and ice on an airplane will seriously affect its performance. Removal of these accumulations is necessary prior to takeoff. Airfoil contours may be altered by the ice and snow to the extent that their lift qualities will be seriously impaired. Ice and snow on the fuselage can increase drag and weight."

The manual further states that, "If the airplane has been hangared and snow is falling, coat the airplane surfaces with an anti-icing solution; snow falling on the warm surface will have a tendency to melt, then refreeze."

The manual also says, "After snow has been removed from the airplane, inspect the airplane for evidence of residual snow." It also states, "Following snow removal, should freezing precipitation continue, the airplane surfaces should be treated for anti-icing."

Under the ice removal section the manual states, "Moderate or heavy ice and residual snow deposits should be removed with a deicing fluid." The manual goes on to state, "After completing the deicing process, the airplane should be inspected to ensure that its condition is satisfactory for flight. All external surfaces should be examined for residual ice or snow. Special attention should be given to all vents, openings, static ports, control surfaces, hinge points, and the wing, tail, and fuselage surfaces for obstructions or accumulations of ice or snow."

In an interview with the IIC, the passenger who arrived at the airport around 0700 stated that from the time he arrived at the hangar until the time the three passengers entered the airplane, he did not see the pilot take any action to remove snow or possible ice accumulation from the airplane structure. When asked by the IIC, he and the other surviving passenger both said that

they had not seen the pilot do any deicing and had not seen any evidence of deicing fluid melting or staining the snow on the ground around the airplane's structure. In addition, neither survivor saw the pilot bring out or use the tall A-frame ladder that had been recently purchased in order to provide access to the top of the airplane's horizontal stabilizer. During the investigation, the IIC located that ladder in the back room of the hangar. There were no water stains on the cement floor at its base to indicate the melting of snow after it was brought back inside the warm hangar after recently being used in the snow.

According to these two passengers, after all three passengers entered the airplane, the pilot performed an external walk-around inspection. They stated that the pilot did not seem to take any more time doing his external inspection than they were used to him taking, and they did not hear or feel anything that sounded or felt like the pilot scraping or sweeping snow or ice from the airplane's structure. One of the passengers remarked that when the engines were started it appeared that the propeller blast blew snow off the upper surface of the wing.

Neither passenger, both of who had flown with the pilot many times before, was aware of any deicing fluid being kept at the hangar. A search of the hangar by the IIC did not reveal any deicing fluid or equipment for applying it. In addition, the owner of a FBO, who had been in the hangar many times in the past while in the process of maintaining the company's previous airplane, stated that he was not aware of any such fluid or equipment ever being in the hangar.

As part of the investigation, the day after the accident, the IIC took digital measurements of the temperature within the hangar that the airplane had been stored in prior to the accident flight. Those measurements revealed that the temperature four feet above the hangar floor was 57 degrees Fahrenheit, and the temperature nine feet above the floor was 60 degrees Fahrenheit. According to the hangar owner, the thermostat had not been moved since the time the airplane had been removed for the flight.

Pilot Information

Certificate:	Commercial	Age:	61, 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):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 With Waivers/Limitations	Last FAA Medical Exam:	02/20/2007
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	09/09/2007
Flight Time:	14500 hours (Total, all aircraft), 75 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	BEECH	Registration:	N925TT
Model/Series:	200	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	BB746
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	07/03/2007, AAIP	Certified Max Gross Wt.:	12500 lbs
Time Since Last Inspection:		Engines:	2 Turbo Prop
Airframe Total Time:	10885 Hours at time of accident	Engine Manufacturer:	Pratt & Whitney Canada
ELT:	Installed	Engine Model/Series:	PT6A-41
Registered Owner:	QB CORPORATION	Rated Power:	850 hp
Operator:	QB CORPORATION	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Dawn
Observation Facility, Elevation:	KSMN, 4043 ft msl	Distance from Accident Site:	5 Nautical Miles
Observation Time:	0755 MST	Direction from Accident Site:	360°
Lowest Cloud Condition:		Visibility	1 Miles
Lowest Ceiling:	Overcast / 1600 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.04 inches Hg	Temperature/Dew Point:	-6 °C / -8 °C
Precipitation and Obscuration:	Moderate - Showers - Snow		
Departure Point:	Salmon, ID (KSMN)	Type of Flight Plan Filed:	IFR
Destination:	Boise, ID (KBOI)	Type of Clearance:	IFR
Departure Time:	0748 MST	Type of Airspace:	

Airport Information

Airport:	Lemhi County Airport (KSMN)	Runway Surface Type:	Asphalt
Airport Elevation:	4043 ft	Runway Surface Condition:	Snow
Runway Used:	35	IFR Approach:	None
Runway Length/Width:	5150 ft / 60 ft	VFR Approach/Landing:	Precautionary Landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal, 2 None	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal, 2 None	Latitude, Longitude:	45.113889, -113.884722 (est)

Administrative Information

Investigator In Charge (IIC):	Orrin K Anderson	Report Date:	12/28/2008
Additional Participating Persons:	Daniel L Frandson; Federal Aviation Administration; Boise, ID Paul E Yoos; Hawker Beechcraft; Wichita, KS Thomas A Berthe; Pratt & Whitney Canada; Canada,		
Publish Date:	08/04/2011		
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.nts.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](#).