



# National Transportation Safety Board Aviation Accident Final Report

<b>Location:</b>	Hayden, CO	<b>Accident Number:</b>	CEN09FA126
<b>Date &amp; Time:</b>	01/11/2009, 0942 MST	<b>Registration:</b>	N604WP
<b>Aircraft:</b>	PILATUS AIRCRAFT LTD PC-12/45	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot had filed an instrument flight rules flight plan with a planned departure time of 0700 in order to arrive at his intended destination in time for a planned engagement. He and his passenger arrived at the airport approximately 0800 and requested that the airplane be fueled. The airplane was pulled from its heated hangar into heavy snowfall and fueled at 0917. As the airplane sat outside in the heavy snowfall, a measurable amount of wet slushy snow accumulated on the airplane. The Fixed Base Operator manager suggested to the pilot that the airplane be deiced, but he declined. The airplane was then pulled out to the taxiway in an effort to prevent it from becoming stuck in the snow. At 0939, approximately 22 minutes after the airplane was pulled out of its hangar, the pilot departed with a visibility of 3/4 of a mile in snow and with a 4-knot direct tailwind. The pilot then made a right turn and announced that he was heading to his first waypoint. The airplane continued into an ever tightening right turn until it impacted the ground while in an inverted position about one mile north-northwest of the runway. An examination of the airplane's wreckage revealed no anomalies with either the engine or airframe that would have contributed to the loss of control. The airplane's Pilot Operating Handbook and Airplane Flight Manual contained the following limitation: "The aircraft must be clear of all deposits of snow, ice and frost adhering to the lifting surfaces immediately prior to takeoff."

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control due to snow/ice contamination on the airplane's lifting surfaces as a result of his decision not to deice the airplane before departure.

## Findings

<b>Aircraft</b>	Aircraft capability - Capability exceeded (Cause)
<b>Personnel issues</b>	Lack of action - Pilot (Cause)

## Factual Information

### HISTORY OF FLIGHT

On January 11, 2009, at 0942 mountain standard time (MST), N604WP, a Pilatus PC-12/45 single-engine turbo-prop airplane, was substantially damaged on impact with terrain following a loss of control shortly after takeoff from the Yampa Valley Airport (HDN), Hayden, Colorado. The private pilot and passenger were fatally injured. The airplane was owned and operated by the Rooney Consulting and Aviation LLC., of Bandon, Oregon. Instrument meteorological conditions prevailed and an instrument flight rules (IFR) flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The 633-nautical mile cross-country flight, which was originating at the time of the accident, was destined for the Chino Airport (CNO), Chino, California.

According to the General Manager at Galaxy Aviation, a Fixed Base Operator (FBO) located at HDN, the pilot contacted him about 0730 and asked that the airplane be pulled from its heated hangar and fueled. The airport manager suggested to the pilot that they wait to pull the airplane until after he arrived in order to prevent falling snow from accumulating on the airplane. The pilot agreed and called again around 0800 to let the manager know that he and his passenger had arrived.

Three line crew members assisted in getting the airplane ready for departure. The line crew members reported that once the airplane was pulled outside, the pilot performed a walk around inspection before he and the passenger boarded the airplane. While the pilot and passenger remained in the airplane, the airplane was fueled about 0917, and then pulled out to the taxiway in an effort to prevent it from becoming stuck in the snow. The line crew also reported "heavy" snowfall from the time the airplane was pulled from the hangar until the airplane departed. In addition, two of the line crew members reported seeing an accumulation of "wet snow" on the airplane's wings. One of the two line crew members described the accumulation on the wings as "probably a good inch of slushy wet snow." A line crew member also reported that the FBO manager had suggested to the pilot that he taxi to fuel and de-ice because of the accumulating heavy wet snow; however, the pilot declined.

The three line crew members described what they observed during the airplane's takeoff roll. One reported that the airplane did not take too long to takeoff and that it appeared normal. Another said it appeared as if the airplane was not picking up enough speed during takeoff. The third one stated that it was a slow takeoff roll as if the airplane was "heavy." In addition, the FBO manager estimated the airplane's takeoff roll to be about 4,000 feet and then observed the airplane make a shallow right bank before flying out of sight.

Airport fire department personnel reported the airplane departed from runway 28 at 0939. A fireman, who observed the airplane takeoff, reported that the airplane appeared to level off momentarily about 500-feet above ground level (AGL) before entering a right turn. He then lost site of the airplane due to reduced visibility.

Footage taken by an automated airport camera located on top of the airport's terminal building, showed the airplane for about 5 seconds as it climbed and then appeared to level off or slightly descend, before leaving the camera's view.

When the pilot did not check in with the Denver Air Traffic Control Center after departure, a search was initiated, and the airplane was found adjacent to the airport a short time later. The

airplane was fully engulfed in flames.

Radar data revealed that the airplane entered a right turn after takeoff. The right turn continued to tighten through approximate 270 degrees, until the airplane impacted the ground approximately 1 mile north-northwest from the approach end of runway 28. The data also revealed the airplane had momentarily leveled off about 200-feet AGL, and reached a maximum altitude of approximately 900-feet AGL during the turn.

#### PERSONNEL INFORMATION

The pilot, age 54, held a private pilot certificate with ratings for airplane single-engine land and instrument airplane. His last Federal Aviation Administration (FAA) third-class medical was issued on June 25, 2008, with the limitations that he must have glasses available for near vision, the medical was not valid for any class after June 30, 2009, and the medical was not valid outside the borders of the United States.

A copy of the pilot's logbook revealed that as of the last entry dated March 10, 2008, the pilot had accumulated an estimated 867 flight hours; of which 82 hours were in the accident airplane. Included in that time were 55 flight hours of actual instrument conditions and 57 flight hours of simulated instrument conditions. The pilot had completed his most recent biannual flight review and instrument proficiency check on March 10, 2008. In addition, a training certificate indicated that the pilot had successfully completed recurrent training for the Pilatus PC-12/45 from American Air Safety Accreditations LLC., on March 10, 2008.

Per a signed document dated March 12, 2008, the pilot reported a total of 1,720 flight hours of which 559 hours were in turbine aircraft. On the pilot's last medical application dated June, 25, 2008, the pilot listed a total of 2,000 flight hours with 150 flight hours in the previous 6 months.

Flight records for the 9 months preceding the accident were not recovered during the course of the investigation.

#### AIRPLANE INFORMATION

The 2004-model Pilatus Aircraft LTD., PC-12/45, serial number 604, was a pressurized low wing airplane, with a retractable landing gear, and was configured for 8 occupants. The airplane was powered by a single, Pratt & Whitney Canada PT6A-67B turbo-prop engine, rated at 1,200 horsepower, and was driving a four-bladed constant speed Hartzell propeller.

According to the airplane's logbooks, the airframe and engine's most recent annual inspection was completed on January 2, 2008, with an airframe and engine total time of 558.4 hours.

According to a fuel receipt dated January 11, 2009, the airplane was fueled at HDN, about 0917, with 100 gallons of Jet A aviation fuel.

#### METEOROLOGICAL INFORMATION

At 0935, the automated weather observing system at Hayden Airport (HDN), reported wind from 100 degrees at 4 knots, visibility of 3/4 of a mile, overcast sky at 1,200 feet, temperature 19 degrees Fahrenheit, dew point 18 degrees Fahrenheit, with an altimeter setting of 30.38 inches of Mercury.

The automated weather observation system at HDN did not have a precipitation discriminator;

however, airport personnel were reporting “heavy” snowfall as the airplane was pulled from its hangar through the time the airplane departed.

According to the General Manager at Galaxy Aviation, the runway conditions at the time of the airplane’s departure were reported as Thin Loose/Packed Snow.

#### AIDS TO NAVIGATION

The initial waypoint on the pilot’s filed flight plan was the Hayden VOR/DME (CHE). CHE was located 4.5 miles from the departure end of runway 28 on a heading of 301 degrees. To fly direct to the VOR the pilot would have needed to make a course correction of approximately 20 degree to the right, after takeoff.

#### COMMUNICATIONS

According to a transcript of weather service communications, on January 10, 2009, at 2036, the pilot contacted a Prescott Automated Flight Service Station (AFSS) weather briefer, and filed an IFR flight plan for 0700 the next morning. During the conversation the pilot reported that he had planned to leave that morning; however, because of high winds at his destination airport he elected to depart the next morning. The pilot discussed with the briefer that he needed to be at an engagement near his intended destination the next day at 1200 pacific standard time (PST). During the call he brought the subject of the engagement up several times and discussed what time he would need to leave in order to make the engagement.

On January 11, 2009, at 0721, the pilot again contacted a weather briefer at Prescott AFSS and inquired as to the expected winds at his destination airport for the estimated time of arrival. The pilot did not request weather conditions for his departure airport, and when asked if he would like weather information for his route of flight he declined; however, the evening before while talking to a weather briefer the pilot mentioned that he had been checking weather conditions with his personal computer.

According to a transcript of air traffic control communications, at 0937:20, the accident pilot contacted the Denver air route traffic control center sector 11 radar controller (referred to as “Denver Center”) and reported that he was holding short of runway 28 and that he had an “IFR filed to Chino California.”

At 0937:42 the controller stated that the pilot was cleared from Hayden Airport to Chino Airport as filed and instructed him to climb and maintain flight level 260, squawk 6533, and report when airborne to which the pilot acknowledged. At 0938:07 the controller informed the pilot that the weather “is marginal” and that the “ceiling’s pretty low.” The pilot acknowledged and asked if he was cleared for takeoff to which the controller replied, “affirmative report airborne.” At 0938:29 the pilot stated, “we’ll report airborne.”

About 0939 airport personnel heard the pilot announce over the airport’s Unicom frequency that he was departing runway 28 and shortly thereafter heard the pilot report, “headed to Craig VOR.”

No further radio communications were received from the pilot.

## AIRPORT INFORMATION

The Yampa Valley Airport (HDN) was a non-towered airport operated by Routt County. The field elevation was 6,606-feet mean sea level (MSL). The airport featured a single 10/28 asphalt runway which was 9,998-feet long, by 150-feet wide. A left hand traffic pattern was noted for runway 28.

## WRECKAGE AND IMPACT INFORMATION

The wreckage was located in a snow covered field, approximately 1 mile north-northwest from the approach end of runway 28. Snow was in excess of 1 foot deep and investigators accessed the site via a snowcat. The airplane had impacted the ground while inverted and in a nose down attitude of approximately 70 degrees. The debris field encompassed an area approximately 265-feet long and approximately 50-feet wide, on a magnetic heading of 135 degrees. Following the onsite documentation, the airplane was recovered to a secure location. Another search of the area was performed after the spring thaw and additional parts were recovered. All major components of the airplane were accounted for.

The cabin area, forward fuselage, and sections of both wings were nearly consumed in the post crash fire. The empennage remained attached to a section of the aft fuselage. The horizontal and vertical stabilizers, each elevator and the rudder remained attached in their respective positions.

The aileron trim and the rudder trim were found in their neutral positions and the stabilizer trim was in the green take-off range. The landing gear and flaps were found in the fully retracted position. Partial control continuity was established for all flight controls; however, control continuity in the cockpit area could not be established due to thermal and impact damage.

The airplane was equipped with three components that included non-volatile memory. These included the Engine Instrument System (EIS), the Flap Control and Warning Unit (FCWU), and the Central Advisory and Warning Computer (CAWC). All three units were found impact and thermally damaged and no data could to be extracted. An electric attitude indicator was located and examined. The internal gyroscope and the gyroscope housing contained rotational scoring signatures consistent with operation at the time of impact.

The engine was located about 36 inches below the ground surface. The engine was removed and partially disassembled. Rotational signatures observed on the compressor, compressor turbine, and the power turbines were consistent with the engine producing power at the time of impact.

The propeller hub remained attached to the engine. Blade "A" remained attached to the hub and exhibited leading edge polishing and "S" bending. Blades "B and C" remaining attached to the hub, were pushed aft toward the engine, and exhibited leading edge polishing. Blade "D" was found separated from the hub and exhibited leading edge polishing.

No anomalies were found with either the engine or airframe that would have contributed to the loss of control.

## MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot on January 13, 2009, by the Jefferson County Coroner's Office in Golden, Colorado.

The FAA's Civil Aerospace Medical Institute performed forensic toxicology on specimens from the pilot. The toxicology report stated no ethanol was detected in the liver or the muscle, and no drugs were detected in the liver.

#### TEST AND RESEARCH

Shortly after the accident, the fuel truck that had serviced the accident airplane was quarantined and the fuel tested. The results were negative for contamination.

#### ADDITIONAL INFORMATION

The Federal Aviation Administration (FAA) issues Official FAA Holdover Time Tables to be used to determine a time period of protection that an airplane can be exposed to various weather conditions without adversely affecting the airplane's handling characteristics. According to Table 1B, Snowfall Intensities as a Function of Prevailing Visibility, when using the recorded temperature of 18 degrees Fahrenheit and the recorded visibility of 3/4 of a mile, the snowfall was categorized as "moderate."

According to Table 1, FAA Guidelines for Holdover Times SAE Type I Fluid Mixtures as a Function of Weather Conditions and Outside Air Temperature, the holdover period for Type I deicing fluid for moderate snow and for a temperature of 18 degrees Fahrenheit, would result in a 4 to 6 minute window of protection from the time of being anti-iced to takeoff. If the snow was identified as heavy, as indicated by airport personnel, no holdover period was available.

The Pilatus PC-12 Pilot Operating Handbook (POH) and Airplane Flight Manual (AFM), dated September 3, 2007, section 2, page 2-15, contained the following limitation:

"The aircraft must be clear of all deposits of snow, ice and frost adhering to the lifting surfaces immediately prior to takeoff"

#### History of Flight

Prior to flight	Aircraft servicing event
Takeoff	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	54, Male
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	06/25/2008
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	03/10/2008
<b>Flight Time:</b>	867 hours (Total, all aircraft), 82 hours (Total, this make and model), 867 hours (Pilot In Command, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	PILATUS AIRCRAFT LTD	<b>Registration:</b>	N604WP
<b>Model/Series:</b>	PC-12/45	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	604
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	8
<b>Date/Type of Last Inspection:</b>	01/02/2008, Annual	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Turbo Prop
<b>Airframe Total Time:</b>	558 Hours as of last inspection	<b>Engine Manufacturer:</b>	Pratt & Whitney Canada
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	PT6A-67B
<b>Registered Owner:</b>	ROONEY CONSULTING & AVIATION LLC	<b>Rated Power:</b>	1200 hp
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	HDN, 6606 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	0935 MST	Direction from Accident Site:	240°
Lowest Cloud Condition:	Partial Obscuration	Visibility	0.75 Miles
Lowest Ceiling:	Overcast / 1200 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	100°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.38 inches Hg	Temperature/Dew Point:	-7° C / -8° C
Precipitation and Obscuration:	Blowing - Snow		
Departure Point:	Hayden, CO (HDN)	Type of Flight Plan Filed:	IFR
Destination:	Chino, CA (CNO)	Type of Clearance:	IFR
Departure Time:	0939 MST	Type of Airspace:	

## Airport Information

Airport:	Yampa Valley Airport (HDN)	Runway Surface Type:	Asphalt
Airport Elevation:	6606 ft	Runway Surface Condition:	Snow
Runway Used:	28	IFR Approach:	None
Runway Length/Width:	9998 ft / 150 ft	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:	40.487778, -107.203056

## Administrative Information

Investigator In Charge (IIC):	Timothy LeBaron	Report Date:	06/27/2011
Additional Participating Persons:	Randy Kind; Federal Aviation Administration; Denver, CO Konrad Oetiker; Pilatus Aircraft Ltd; Stans, Switzerland, Paul Crosby; Pratt & Whitney Canada; Bridgeport, WV Bob Renshaw; Pilatus Aircraft Ltd; Broomfield, CO		
Publish Date:	06/27/2011		
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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		



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