



National Transportation Safety Board Aviation Accident Final Report

Location:	Kayenta, AZ	Accident Number:	SEA08LA082
Date & Time:	02/22/2008, 0745 MST	Registration:	N305PC
Aircraft:	Raytheon Aircraft Company 1900D	Aircraft Damage:	Substantial
Defining Event:	Runway excursion	Injuries:	2 Serious, 3 Minor, 15 None
Flight Conducted Under:	Part 91: General Aviation - Executive/Corporate		

Analysis

The captain initially flew the GPS (global positioning system) runway 2 approach down to minimums and executed a missed approach. The approach chart listed the minimum visibility for the straight-in approach as 1 mile, the minimum descent altitude (MDA) as 6,860 feet mean sea level (329 feet above ground level), and the missed approach point as the runway threshold. The audio information extracted from the CVR indicated the flight crew listened to the automated weather station at the airport twice during the second approach; both times the report stated, in part, "visibility one half [mile] light snow sky conditions ceiling two hundred broken one thousand overcast." At 0744:09, the first officer said, "there's MDA," and at 0744:27, "there's the runway right below ya." The CVR recorded the ground proximity warning system (GPWS) audio alert "sink rate, sink rate, sink rate, sink rate" at 0744:37, the sound of touchdown at 0744:52, and the sound of impact at 0745:00. According to both pilots, the airplane touched down even with the midfield windsock. The captain applied brakes and full reverse on both propellers; however, the airplane did not slow down and continued off the end of the runway, impacted and knocked down a chain link fence, and continued into downsloping rough terrain. The landing gear collapsed and the airplane slid to a stop. The operator reported that there was 2 to 3 inches of slush on the runway. The runway was equipped with pilot activated medium intensity runway lights, runway end identifier lights, and a visual approach slope indicator. The first officer said that on both approaches, he attempted to turn on the lights, but the lights did not activate. The Federal Aviation Regulation that specifies the instrument flight rules for takeoff and landing states, in part, that no pilot may operate an aircraft below the authorized MDA unless (1) the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and (2) the flight visibility is not less than the visibility prescribed in the standard instrument approach being used. The regulation further states that if these conditions are not met when the aircraft is being operated below the MDA or upon arrival at the missed approach point, the pilot shall immediately execute an appropriate missed approach procedure. In this case, the minimum required visibility was 1 mile versus the 1/2-mile visibility reported by the automated weather station. Additionally, the activation of the GPWS "sink rate" audio alert indicates a normal rate of descent was exceeded during the

landing. Both of these conditions should have prompted the flight crew to execute a missed approach, which would have prevented the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight crew's failure to execute a missed approach, which resulted in a runway excursion after landing. Contributing to the accident were the inoperative lights, weather conditions below published approach minimums, and the slush contaminated runway.

Findings

Personnel issues	Incorrect action selection - Flight crew (Cause)
Environmental issues	Snow/slush/ice covered surface - Contributed to outcome (Factor) Below approach minima - Decision related to condition (Factor) Approach lighting - Effect on operation (Factor)

Factual Information

On February 22, 2008, about 0745 mountain standard time, a Raytheon Aircraft Company 1900D, N305PC, sustained substantial damage when it overran the runway during landing at Peabody Bedard Field Airport (38AZ), Kayenta, Arizona. The captain, first officer, and 13 of the 18 passengers were not injured. Two passengers received serious injuries and three passengers received minor injuries. The airplane was being operated by Peabody Energy, St. Louis, Missouri, under 14 Code of Federal Regulations Part 91. The purpose of the flight was to transport company personnel to the Black Mesa Coal Mine. Instrument meteorological conditions prevailed and an instrument flight rules (IFR) flight plan was filed. The flight departed from Flagstaff about 0700, and the intended destination was 38AZ.

According to information provided by the operator, the captain initially flew the GPS (global positioning system) runway 2 approach down to minimums and executed a missed approach. A second approach was made and the airplane touched down even with the midfield windsock. The captain applied brakes and full reverse on both propellers; however, the airplane did not slow down and continued off the end of the runway. The airplane impacted and knocked down a chain link fence and continued into downsloping rough terrain. The landing gear collapsed and the airplane slid to a stop. The operator reported that there was about 2 to 3 inches of slush on the runway.

The airport is privately owned and operated by Peabody Energy. The field elevation is 6,564 feet. There is one runway, runway 2/20, which has a paved asphalt surface that is 7,500 feet long by 75 feet wide. The runway is equipped with medium intensity runway lights, runway end identifier lights (REILs), and visual approach slope indicators that are pilot activated using the common traffic advisory frequency (122.8).

Review of the approach plate for the RNAV (GPS) runway 2 approach revealed that the minimums for the straight-in approach are 1 mile visibility, and a minimum descent altitude (MDA) of 6,860 feet mean sea level (329 feet agl). The missed approach point is the RWY02 waypoint, which is located at the threshold of runway 2. No alternative minimums to reflect inoperative lighting components are provided.

The airplane was equipped with a cockpit voice recorder (CVR) and a flight data recorder (FDR). The two recorders were removed from the airplane and sent to the National Transportation Safety Board laboratory in Washington, DC, for readout.

The FDR data indicates that the airplane lifted off around 0703, made a left turn to a northerly heading, and climbed to a cruise altitude of 17,000 feet. Around 0724, the airplane began to descend from cruise. The flaps were fully extended by 0728:22, and the recorded airspeed was 136 knots as the airplane was about to pass through 10,000 feet. Two minutes later, the autopilot parameter changed from engaged to disengaged. During the next minute, the pressure altitude remained around 6,800 feet for a period before it began to decrease again, recording a minimum value of 6,499 feet at 0731:25, and a recorded airspeed of 112 knots. The airplane pitch attitude and engine torque began to increase 2 seconds prior to the minimum recorded altitude value. The flaps were retracted as the airplane climbed, leveled off at 10,000 feet, and the autopilot reengaged around 0735.

The airplane began to descend again after 0740. The autopilot disengaged at 0744:05 as the pressure altitude reached 6,808 feet. Between 0744:30 and 0744:45, the engine torque was

reduced, and the pressure altitude decreased from around 6,800 feet to about 6,500 feet. Based on the data recorded, the aircraft most likely touched down around 0744:48, with an airspeed of 112 knots. The left and right prop parameter indicated a reverse status within 2 seconds with the recorded airspeed at 106 knots. There was increased activity recorded on the vertical acceleration parameter over the next 15 seconds until the end of recorded data. The last recorded data point was at 0745, with an airspeed value of 31 knots. For further details of the data recorded by the FDR, see the public docket for this accident.

The audio information extracted from the CVR began at 0714:53 and continued to 0745:01. At 0718:47, the first officer commented, "hopefully the REILs are working, they weren't working yesterday." Between 0726:22 and 0731:23, conversation took place indicating the flight crew was performing the GPS Runway 2 approach and executing a missed approach. At 0735:47, the flight crew listened to the automated weather station at the airport, which was reporting, in part, "visibility one half [mile] light snow sky conditions ceiling two hundred broken one thousand overcast." At 0738:17, the first officer said, "I didn't see any lights on. I clicked them three separate times."

At 0737:40, the captain stated that he was starting the procedure turn, indicating the beginning of the second approach. At 0739:08, the captain stated that he was turning back inbound on the procedure turn. At 0740:15, the flight crew again listened to the automated weather station at the airport, which was reporting, in part, "visibility one half light snow sky conditions ceiling two hundred broken one thousand overcast." At 0744:09, the first officer said, "there's MDA," and at 0744:27, "there's the runway right below ya." The ground proximity warning system (GPWS) gave the audio alert, "sink rate, sink rate, sink rate, sink rate" at 0744:37. The area microphone recorded the sound of touchdown at 0744:52, and the sound of impact at 0745:00. A summary transcript of the entire recording is included in the public docket for this accident.

In a written statement, the captain described the termination of the second approach as follows: the first officer called the runway at 12 o'clock; they left the minimum descent altitude at 120 knots; and he landed about even with the midfield windsock. He braked and applied maximum reverse, but the aircraft did not slow down.

In a written statement, the first officer described the termination of the second approach as follows: we broke out and saw the end of the runway go below us. Could not see any lights, but saw the midfield windsock when the captain touched down. He started braking and there was zero effect. The captain went to full reverse and we were not slowing.

The airport is equipped with an Automated Weather Observation System (AWOS) that issued the following reports surrounding the period of the accident.

At 0715, wind from 170 degrees at 6 knots; visibility 2 miles in light snow, clouds scattered at 400 feet above ground level (agl), broken at 1,300 feet agl, overcast at 1,900 feet agl, temperature 0 degrees Celsius (C), dew point 0 degrees C, altimeter 29.99 inches of Mercury (Hg).

At 0720, wind from 170 degrees at 6 knots, visibility 1 and 1/4 miles in light snow; clouds scattered at 500 feet agl, broken at 1,300 feet agl, overcast at 1,900 feet agl; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.99 inHg.

At 0725, wind from 160 degrees at 7 knots; visibility 1 mile in unknown precipitation; clouds broken at 100 feet agl, broken at 500 feet agl, overcast at 1,400 agl; temperature 0 degrees

Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

At 0730, wind from 160 degrees at 8 knots; visibility 1 miles in light snow; clouds broken at 200 feet agl, overcast at 1,000 feet agl; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

At 0735, wind from 170 degrees at 8 knots; visibility 3/4 mile in light snow; clouds broken at 200 agl, overcast at 1,000 feet agl; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

At 0740, wind from 180 degrees at 9 knots; visibility 3/4 mile in unknown precipitation; clouds broken at 200 agl, overcast at 1,000 feet agl; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

At 0745, wind from 180 degrees at 9 knots; visibility 1/2 mile in light snow; clouds broken at 100 feet agl, overcast at 1,000 feet agl; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

At 0750, wind from 170 degrees at 8 knots; visibility 1/4 mile in light snow; clouds overcast at 100 feet; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

At 0755, wind from 170 degrees at 8 knots; visibility 1/2 mile in light snow; clouds overcast at 100 feet; temperature 0 degrees Celsius (C); dew point 0 degrees C; altimeter 29.98 inHg.

Section 91.175 of the Federal Aviation Regulations specifies the flight rules applicable to takeoff and landing under IFR. Paragraphs (c), (d) and (e) state as follows:

(c) Operation below DA/DH or MDA. Except as provided in paragraph (l) of this section, where a DA/DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, below the authorized MDA or continue an approach below the authorized DA/DH unless--

(1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and for operations conducted under part 121 or part 135 unless that descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;

(2) The flight visibility is not less than the visibility prescribed in the standard instrument approach being used; and

(3) Except for a Category II or Category III approach where any necessary visual reference requirements are specified by the Administrator, at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

(i) The approach light system, except that the pilot may not descend below 100 feet above the touchdown zone elevation using the approach lights as a reference unless the red terminating bars or the red side row bars are also distinctly visible and identifiable.

(ii) The threshold.

(iii) The threshold markings.

(iv) The threshold lights.

(v) The runway end identifier lights.

(vi) The visual approach slope indicator.

(vii) The touchdown zone or touchdown zone markings.

(viii) The touchdown zone lights.

(ix) The runway or runway markings.

(x) The runway lights.

(d) Landing. No pilot operating an aircraft, except a military aircraft of the United States, may land that aircraft when--

(1) For operations conducted under paragraph (l) of this section, the requirements of (l)(4) of this section are not met; or

(2) For all other part 91 operations and parts 121, 125, 129, and 135 operations, the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used.

(e) Missed approach procedures. Each pilot operating an aircraft, except a military aircraft of the United States, shall immediately execute an appropriate missed approach procedure when either of the following conditions exist:

(1) Whenever operating an aircraft pursuant to paragraph (c) or (l) of this section and the requirements of that paragraph are not met at either of the following times:

(i) When the aircraft is being operated below MDA; or

(ii) Upon arrival at the missed approach point, including a DA/DH where a DA/DH is specified and its use is required, and at any time after that until touchdown.

(2) Whenever an identifiable part of the airport is not distinctly visible to the pilot during a circling maneuver at or above MDA, unless the inability to see an identifiable part of the airport results only from a normal bank of the aircraft during the circling approach.

History of Flight

Landing	Landing area overshoot
Landing-landing roll	Runway excursion (Defining event) Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Airline Transport; Commercial	Age:	46, 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:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 With Waivers/Limitations	Last Medical Exam:	09/10/2007
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	07/30/2007
Flight Time:	5080 hours (Total, all aircraft), 2700 hours (Total, this make and model), 3800 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Co-Pilot Information

Certificate:	Airline Transport; Commercial	Age:	32, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 With Waivers/Limitations	Last Medical Exam:	05/22/2007
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	09/06/2007
Flight Time:	5524 hours (Total, all aircraft), 4207 hours (Total, this make and model), 2179 hours (Pilot In Command, all aircraft), 85 hours (Last 90 days, all aircraft), 44 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Raytheon Aircraft Company	Registration:	N305PC
Model/Series:	1900D	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	UE-299
Landing Gear Type:	Retractable - Tricycle	Seats:	21
Date/Type of Last Inspection:	12/28/2007, Continuous Airworthiness	Certified Max Gross Wt.:	17120 lbs
Time Since Last Inspection:	97 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	6497 Hours	Engine Manufacturer:	Pratt & Whitney
ELT:	C126 installed, activated, did not aid in locating accident	Engine Model/Series:	PT6-67D
Registered Owner:	Avn Air LLC	Rated Power:	1279 hp
Operator:	Peabody Energy	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	38AZ, 6564 ft msl	Observation Time:	0745 MST
Distance from Accident Site:		Direction from Accident Site:	
Lowest Cloud Condition:		Temperature/Dew Point:	0°C / 0°C
Lowest Ceiling:	Broken / 100 ft agl	Visibility	0.5 Miles
Wind Speed/Gusts, Direction:	9 knots, 180°	Visibility (RVR):	
Altimeter Setting:	29.98 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	Light - Snow; Fog		
Departure Point:	Flagstaff, AZ (FLG)	Type of Flight Plan Filed:	IFR
Destination:	Kayenta, AZ (38AZ)	Type of Clearance:	IFR
Departure Time:	0700 MST	Type of Airspace:	

Airport Information

Airport:	Peabody Bedard Field (38AZ)	Runway Surface Type:	Asphalt
Airport Elevation:	6564 ft	Runway Surface Condition:	Slush covered
Runway Used:	02	IFR Approach:	Global Positioning System
Runway Length/Width:	7500 ft / 75 ft	VFR Approach/Landing:	Full Stop

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	2 Serious, 3 Minor, 13 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Serious, 3 Minor, 15 None	Latitude, Longitude:	36.471667, -110.417778

Administrative Information

Investigator In Charge (IIC):	Georgia R Struhsaker	Adopted Date:	01/29/2009
Additional Participating Persons:	Jim Kerr; Federal Aviation Administration; Scottsdale, AZ		
Publish Date:	01/29/2009		
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.ntsbt.gov/pubdms/ .		

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