



National Transportation Safety Board Aviation Accident Final Report

Location:	BILLINGS, MT	Accident Number:	SEA98LA016
Date & Time:	11/25/1997, 0813 MST	Registration:	N691A
Aircraft:	Short Brothers SD3-60	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 None
Flight Conducted Under:	Part 121: Air Carrier - Non-scheduled		

Analysis

The Short Brothers SD3-60 cargo flight was being vectored for the VOR/DME RWY 28R approach to the Billings Logan International airport during instrument meteorological conditions. Weather conditions one minute before the accident were winds 020 at 13 knots, light snow and mist, and visibility was deteriorating rapidly. The co-pilot (occupying the right seat) was flying the aircraft, and the PIC (occupying the left seat) was handling radio communications. At 0812:25, having crossed the final approach fix, the aircraft descended through 100 feet above the MDA (3,940 feet or 426 feet above the runway threshold), and immediately thereafter the crew visually acquired the runway. At 0813:01 the aircraft's GPWS alert of 'SINK RATE' was heard, followed 2 seconds later by the PIC calling for 'POWER,' and a 2 second delay to ground impact. The co-pilot had logged a total of 103 hours in the SD3-60 (all within the previous 90 days,) while the PIC had just begun flying the aircraft in Montana's late fall weather after a 6 year assignment flying in the Hawaiian islands. The left main landing gear collapsed in overload during the ground impact.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The co-pilot's failure to maintain the proper descent rate on final approach, the pilot-in-command's delayed remedial action, and overload of the left main landing gear assembly. Factors contributing were snow, crosswind conditions and deteriorating visibility.

Findings

Occurrence #1: HARD LANDING

Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings

1. (F) WEATHER CONDITION - SNOW
 2. (F) WEATHER CONDITION - CROSSWIND
 3. (C) PROPER DESCENT RATE - NOT OBTAINED/MAINTAINED - COPILOT/SECOND PILOT
 4. LACK OF TOTAL EXPERIENCE IN TYPE OF AIRCRAFT - COPILOT/SECOND PILOT
 5. (F) WEATHER CONDITION - OTHER
 6. (C) REMEDIAL ACTION - DELAYED - PILOT IN COMMAND
 7. LACK OF FAMILIARITY WITH GEOGRAPHIC AREA - PILOT IN COMMAND
 8. (C) LANDING GEAR,MAIN GEAR - OVERLOAD
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Occurrence #2: GEAR COLLAPSED

Phase of Operation: LANDING - ROLL

Findings

9. (C) LANDING GEAR,MAIN GEAR - OVERLOAD

Factual Information

HISTORY OF FLIGHT

On November 25, 1997, at 0813 mountain standard time, a Short Brothers SD3-60, N691A, operated by Corporate Air, and crewed by an airline transport pilot-in-command (PIC) and a commercially rated first officer (co-pilot), was substantially damaged when the left main landing gear collapsed on landing at the Billings Logan International airport, Billings, Montana. Both pilots were uninjured. Instrument meteorological conditions existed at the time, and an IFR flight plan was in effect. The flight, which was an unscheduled, domestic cargo flight from Great Falls, Montana, to Billings, was to have been operated under 14CFR121, and departed Great Fall approximately 0715.

The flight, Airspur 814, departed Great Falls and upon approaching Billings was given a vector to fly 100 degrees (magnetic) for the VOR/DME RWY 28R approach. The aircraft was subsequently stepped down to 5,700 feet MSL (procedure turn/ARC minimum altitude - refer to DIAGRAM I) and given a heading of 140 degrees.

At 0806:56, the aircraft was given a right turn to 180 degrees and shortly thereafter the crew received ATIS information "Charlie" (refer to CVR Report and ATTACHMENT AT-I)

At 0808:17, Billings approach control advised Airspur 814 "four miles from Musty (final approach fix), turn right heading 290, maintain 5,700 till established on the final approach course, cleared for the VOR/DME runway 28R approach."

At 0809:08, Billings approach control advised Airspur 814 "I show you two miles from MUSTY now, you gonna be able to intercept OK?" The PIC acknowledged "yeah, it's fine for us" and the controller then switched the flight to the Billing ATCT (air traffic control tower).

At 0809:38, Airspur 814 contacted Billings ATCT advising "we're one from MUSTY now on the VOR/DME runway 28 right" and the aircraft was cleared to land.

At 0811:20, the Billings ATCT advised Airspur 814 "traffic on the roll now is a Beech airliner" which was acknowledged by the PIC.

At 0810:14, the aircraft's cockpit voice recorder (CVR) recorded "and there's MUSTY and we're just about on course, 3,940 right?" which was confirmed. Over the next two minutes the CVR recorded the two pilots executing the landing checklist.

At 0812:25, the aircraft's CVR recorded "hundred to minimums, instruments are normal and we've got uh, less than a mile to go." Ten seconds later the CVR recorded "there's minimums, thirty nine hundred (unintelligible), I got the ground...that's about it" followed by "there's the runway."

At 0812:49, the aircraft's CVR recorded "got it, should we land?" followed by "yeah, go ahead."

At 0813:01, the aircraft's CVR recorded "sink rate" generated by the aircraft's ground proximity warning system (GPWS), followed one second later by an intermittent warning horn and vibrating sound.

At 0813:03, the aircraft's CVR recorded the PIC calling "power, power, power" followed one second later by a sound similar to an increase in propeller RPM, and one second later by the sound of impact.

PERSONNEL INFORMATION

PIC:

The PIC reported a total of 8,850 flight hours of which 8,200 were logged as pilot-in-command and 2,800 hours were logged (all pilot-in-command) in the SD3-60 aircraft. Federal Aviation Administration (FAA) records showed he had received a type rating in the SD-3 series aircraft. The PIC, who was handling the aircraft radios at the time of the accident, occupied the left seat in the cockpit.

The PIC's most recent first class medical exam was conducted 11/03/97 and showed an address of Ewa Beach, Hawaii. According to personnel at Corporate Air, the PIC had been hired by the company in 1987 and flew out of Grand Forks, Nebraska. He was subsequently transferred to Honolulu in September 1991 where he flew the SD3-30/60 aircraft. He was reassigned to Billings in September of 1997 attending ground school and completing his final PIC check flight in the SD3-60 aircraft on 11/17/97, eight days before the accident.

CO-PILOT:

The co-pilot reported a total of 1,484 flight hours of which 511 were logged as pilot-in-command and 103 hours were logged (all co-pilot within the last 90 days) in the SD3-60 aircraft. The co-pilot, who was flying the aircraft at the time of the accident, occupied the right seat in the cockpit.

WRECKAGE AND IMPACT INFORMATION

The aircraft first touched down on runway 28R in the vicinity of the taxiway "B" intersection and continued down the runway coming to rest off the south side of the runway in the taxiway "D" throat area (refer to DIAGRAM II). Post-crash examination revealed that the left main landing gear assembly had broken and the left stub wing had contacted the ground (refer to photograph 1). The left wingtip was observed to have ground contact scratches and the underside of the fuselage was observed to be buckled in compression (refer to photographs 2 and 3).

METEOROLOGICAL INFORMATION

The Billings aviation surface weather observations reported the following conditions at the noted times:

0803 special observation: Wind 010 true at 11 knots, visibility 2 statute miles, light snow and mist, sky condition 300 foot scattered, ceiling 900 foot broken, 1,600 foot overcast, temperature 01 degrees C., dew point 0 degrees C., altimeter 29.88 inches Mercury.

0812 special observation: Wind 030 true at 13 knots, visibility 1/2 statute mile, light snow and mist, sky condition 200 foot scattered, ceiling 700 foot overcast, temperature 1 degrees C., dew point 0 degrees C., altimeter 29.86 inches Mercury.

0825 special observation: Wind 010 true at 10 knots, visibility 1/4 statute mile, snow and fog, ceiling 200 foot broken, 700 foot overcast, temperature 0 degrees C., dew point 0 degrees C., altimeter 29.87 inches Mercury.

At 0807:15, the flight crew of Airspur 814 received the following ATIS (Automatic Terminal Information Service) radio transmission: "Information Charlie; 1454 zulu; wind 350 at 11; visibility 3, light rain, snow and fog; 500 scattered; ceiling 1,600 broken; 3,000 overcast."

At 0809:54, the flight crew of Airspur 814 received the following weather information in a radio transmission from the Billings ATCT: "Wind is 010 at 11."

The climatological conditions in central Montana, as characterized by the previously documented aviation surface weather observations (crosswinds, snow, freezing temperatures and low ceilings) are substantially different from those characteristic of the Hawaiian Islands (relatively constant easterly trade winds, warm temperatures, and rain showers).

COMMUNICATIONS

A request to the FAA for a formal air traffic package including radar data was made following the accident, but was not provided (refer to ATTACHMENT ATR-I). A written transcript of radio communications between the Billings approach control/ATCT facility and the flight crew of Airspur 814 was provided and is included (refer to ATTACHMENT CT-I).

AERODROME INFORMATION

The Billings Logan International airport is served by three runways of 5,500 feet or less in length, along with a single 10,528 foot long, asphalt runway (10L/28R). Runway 28R/10L provides all the non-circling instrument approaches into Billings and is 150 feet in width (refer to DIAGRAM II). The only precision approach at Billings is an ILS to runway 10L. Both ends of the runway are served by non-precision approaches.

The VOR/DME RWY 28R approach is a non-precision approach and is predicated upon the Billings VOR located 4.6 nautical miles west of the threshold of runway 28R, and 10.1 nautical miles from MUSTY intersection, the initial/final approach fix for the VOR/DME RWY 28R approach (refer to DIAGRAM I).

FLIGHT AND COCKPIT VOICE RECORDERS

The aircraft was equipped with a CVR (cockpit voice recorder) and an FDR (flight data recorder). The CVR was read out at the NTSB's Vehicles Recorder Division, Washington, DC. A written transcript of the recording between 0806:36 until 0813:05 mountain standard time was provided (refer to Specialist's Factual Report of Investigation - CVR Report). A readout of the FDR data was attempted at the NTSB's Vehicles Recorder Division, Washington, DC. However, the data could not be accurately correlated with the accident flight. No useful FDR data were obtained (refer to Specialist's Factual Report of Investigation - FDR Report).

ADDITIONAL INFORMATION

The aircraft's CVR (serial number 26336) and FDR (serial number BF5107) were returned to the owner/operator from the NTSB's Vehicles Recorder Division, Washington, DC, in April 1998.

Pilot Information

Certificate:	Airline Transport; Commercial; Private	Age:	37, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	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 Valid Medical--no waivers/lim.	Last Medical Exam:	11/03/1997
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	8850 hours (Total, all aircraft), 2800 hours (Total, this make and model), 8200 hours (Pilot In Command, all aircraft), 56 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Short Brothers	Registration:	N691A
Model/Series:	SD3-60 SD3-60	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	3618
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	11/06/1997, Continuous Airworthiness	Certified Max Gross Wt.:	26453 lbs
Time Since Last Inspection:	34 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	18213 Hours	Engine Manufacturer:	P&W
ELT:	Installed, not activated	Engine Model/Series:	PT6A-65R
Registered Owner:	CORPORATE AIR	Rated Power:	1327 hp
Operator:	CORPORATE AIR	Air Carrier Operating Certificate:	Flag carrier (121); Supplemental; On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	HSYA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	BIL, 3649 ft msl	Observation Time:	0812 MST
Distance from Accident Site:	0 Nautical Miles	Direction from Accident Site:	0°
Lowest Cloud Condition:	Scattered / 200 ft agl	Temperature/Dew Point:	1° C / 0° C
Lowest Ceiling:	Overcast / 700 ft agl	Visibility	0.5 Miles
Wind Speed/Gusts, Direction:	13 knots, 20°	Visibility (RVR):	0 ft
Altimeter Setting:	29 inches Hg	Visibility (RVV):	0 Miles
Precipitation and Obscuration:			
Departure Point:	GREAT FALLS, MT (GTF)	Type of Flight Plan Filed:	IFR
Destination:	, MT (BIL)	Type of Clearance:	IFR
Departure Time:	0715 MST	Type of Airspace:	Class C

Airport Information

Airport:	BILLINGS LOGAN INTNL (BIL)	Runway Surface Type:	Asphalt
Airport Elevation:	3649 ft	Runway Surface Condition:	Wet
Runway Used:	28R	IFR Approach:	VOR/DME
Runway Length/Width:	10528 ft / 150 ft	VFR Approach/Landing:	

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	STEVEN A MCCREARY	Adopted Date:	09/28/1999
Additional Participating Persons:	EARL WEBB; HELENA, MT ALBERT G REITAN; WASHINGTON, DC ERIN M GORMLEY; WASHINGTON, DC		
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 pubinquiry@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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