



National Transportation Safety Board Aviation Accident Final Report

Location:	DENVER, CO	Accident Number:	DEN93FA047
Date & Time:	04/26/1993, 1722 MDT	Registration:	N14816
Aircraft:	MCDONNELL DOUGLAS DC-9-82	Aircraft Damage:	Substantial
Defining Event:		Injuries:	90 None
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Analysis

WHILE ON FINAL APPROACH, AT APPROXIMATELY 100 FEET AGL, THE AIRCRAFT EXPERIENCED A SIGNIFICANT LOSS OF INDICATED AIRSPEED AND ENCOUNTERED A HIGH SINK RATE WHICH TERMINATED IN A HARD LANDING. THE LOWER AFT BODY OF THE AIRCRAFT IN THE AREA OF THE TAIL SKID WAS CRUSHED INWARD CAUSING STRUCTURAL DAMAGE. AT 47 FEET ABOVE TOUCHDOWN AND 126 KNOTS THE AIRPLANE BEGAN TO ROTATE AND DESCENDED TO 3 FEET ABOVE TOUCHDOWN, WITH AN AIRSPEED OF 109 KNOTS, IN 3 SECONDS. TOUCHDOWN OCCURRED WITH A NOSE UP ATTITUDE OF 8.334 DEGREES WITH A VERTICAL ACCELERATION OF 2.246 G. TOUCHDOWN OCCURRED AT 110 KNOTS WITH FULL POWER BEING DEVELOPED. THE LLWAS DID NOT ACTIVATE. NCAR RESEARCHERS REPORTED THAT A LOCALIZED MICROBURST COULD OCCUR WITHOUT ACTIVATING THE LLWAS.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: AN INFLIGHT ENCOUNTER WITH A MICROBURST AT AN ALTITUDE INSUFFICIENT TO EFFECT RECOVERY.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: APPROACH - VFR PATTERN - FINAL APPROACH

Findings

1. (C) WEATHER CONDITION - MICROBURST/DRY
2. PROPER DESCENT RATE - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #2: HARD LANDING
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Factual Information

HISTORY OF FLIGHT

On Monday, April 26, 1993, at 1722 mountain daylight time, a McDonnell Douglas DC-9-82, N14816, operating as Continental Airlines Flight 182, incurred damage to the lower aft body on landing at Stapleton International Airport, Denver, Colorado. The two pilots, four flight attendants, and 84 passengers were not injured; however, the aircraft sustained substantial damage. The aircraft was being operated under 14 CFR Part 121 when the accident occurred. Visual meteorological conditions prevailed and an IFR flight plan was filed. The flight originated in Salt Lake City, Utah, at 1616.

PERSONNEL INFORMATION

Details of flight crew qualifications and experience is depicted in this document and attached crew supplement. The captain on this flight was the model manager for the DC-9 fleet and was a qualified check airman in the aircraft.

METEOROLOGICAL INFORMATION

Recorded Stapleton International Airport weather at the time of the accident is attached and provides information that the airport weather at the time of the accident was visual meteorological conditions and that the recorded surface wind was from the northeast at 8 knots. The remarks section indicated that cumulonimbus clouds and virga were present in all quadrants and was moving to the northeast.

The attached witness statement submitted by the captain of Continental Flight 1284, which was conducting a visual approach to runway 26L at 1720, describes what that crew experienced. A rapid gain in indicated airspeed was followed by a loss. Based on that experience, the activation of the on board wind alert system, and after witnessing the landing of the accident aircraft, they performed a go-around. The captain stated that virga was present in all quadrants and they encountered gusting conditions during the approach.

A review of the low level wind shear alert system (LLWAS) was conducted. The recording tapes of that system did not indicate any activation of the system during the time period when the accident occurred.

Interviews were conducted with personnel from the National Center for Atmospheric Research (NCAR), located in Boulder, Colorado. The researchers indicated that it was possible for a localized microburst to occur, which would not trigger the LLWAS system.

AERODROME INFORMATION

Stapleton International Airport is served by an advanced LLWAS system which was determined to be fully operational at the time of the accident.

The accident aircraft and the aircraft which conducted a go around, as discussed above, were conducting visual approaches to runways 26R and 26L respectively. These runways are parallel and are 900 feet apart centerline to centerline.

FLIGHT RECORDERS

The flight data recorder and voice recorder were removed from the accident aircraft and sent to the National Transportation Safety Board Laboratory in Washington, D.C. The reports from

the recorders are attached.

WRECKAGE AND IMPACT INFORMATION

Flight recorder data indicated that at 47 feet above touchdown, the aircraft began to rotate and descended to 3 feet above touchdown in three seconds. Touchdown occurred with a nose up attitude of 8.334 degrees with a vertical acceleration of 2.246 Gs. At 47 feet, the indicated airspeed was 126 knots and decreased to 109 knots in 2 seconds. Touchdown occurred at 110 knots with full power being developed.

Tower personnel witnessed the touchdown and related that sparks and smoke emitted from the aircraft. This was reported to the crew.

The captain's statement is quoted as follows:

"Final approach was smooth and final landing configuration was established at approximately 1000 ft. AGL, with landing flaps at 40 degrees and a target speed of Vref plus 10 kts. on VASI. At approximately 200 ft. AGL a slight increase in airspeed was noted - to approximately Vref plus 15kts. - throttles were left at 1.25 EPR. The flight continued to an altitude of 100 ft. AGL - then experienced a rapid loss of airspeed (estimated to be greater than 25 kts.) and a large sink rate developed immediately. The throttles were advanced to mechanical stops and pitch attitude was increased to arrest sink rate, which appeared to increase until the aircraft touched down firmly on the runway. The control tower advised us that smoke and sparks were observed on touch down - First officer Gordon advised the tower of the airspeed loss. During the landing roll out we heard a number of pilots reporting large airspeed fluctuations on short final, and one or more missed approaches. The landing roll out and taxi to the gate were normal and uneventful."

Inspection of the aircraft revealed general crushing of the skin and structure on the lower aft body in the area of the tail skid. Longitudinal scarring and scapping were present on the skin surface.

ADDITIONAL DATA/INFORMATION

The wreckage was verbally released to Continental Airlines maintenance personnel the day of the accident following inspection. The flight data recorder and cockpit voice recorder were released after they were examined.

Pilot Information

Certificate:	Airline Transport	Age:	53, 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 Valid Medical--w/ waivers/lim.	Last Medical Exam:	03/12/1993
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	MCDONNELL DOUGLAS	Registration:	N14816
Model/Series:	DC-9-82 DC-9-82	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	49370
Landing Gear Type:	Retractable - Tricycle	Seats:	151
Date/Type of Last Inspection:	04/26/1993, Continuous Airworthiness	Certified Max Gross Wt.:	150000 lbs
Time Since Last Inspection:	7 Hours	Engines:	2 Turbo Jet
Airframe Total Time:	25628 Hours	Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	JT8D-217A
Registered Owner:	CITY CORP. OF NORTH AMERICA	Rated Power:	20850 lbs
Operator:	CONTINENTAL AIRLINES	Air Carrier Operating Certificate:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	CALA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	DEN, 5333 ft msl	Observation Time:	1736 MDT
Distance from Accident Site:	0 Nautical Miles	Direction from Accident Site:	0°
Lowest Cloud Condition:	Scattered / 9500 ft agl	Temperature/Dew Point:	22 °C / -5 °C
Lowest Ceiling:	Broken / 13000 ft agl	Visibility	70 Miles
Wind Speed/Gusts, Direction:	8 knots, 50°	Visibility (RVR):	0 ft
Altimeter Setting:	29 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:			
Departure Point:	SALT LAKE CITY, UT (SLC)	Type of Flight Plan Filed:	IFR
Destination:		Type of Clearance:	IFR
Departure Time:	1612 MDT	Type of Airspace:	Class E

Airport Information

Airport:	STAPLETON INTERNATIONAL (DEN)	Runway Surface Type:	Concrete
Airport Elevation:	5333 ft	Runway Surface Condition:	Dry
Runway Used:	26R	IFR Approach:	ILS; Visual
Runway Length/Width:	8599 ft / 150 ft	VFR Approach/Landing:	Straight-in

Wreckage and Impact Information

Crew Injuries:	6 None	Aircraft Damage:	Substantial
Passenger Injuries:	84 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	90 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	NORMAN F WIEMEYER	Adopted Date:	06/30/1994
Additional Participating Persons:	DONALD J WILLIAMS; DENVER, CO		
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.nts.gov/pubdms/ .		

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