



National Transportation Safety Board Aviation Accident Data Summary

Location:	DENVER, CO	Accident Number:	FTW96LA111
Date & Time:	02/04/1996, 1647 MST	Registration:	N957DL
Aircraft:	MCDONNELL DOUGLAS MD-88	Injuries:	1 Minor, 119 None
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Analysis

The captain said he flew what he considered to be a normal, stabilized approach, using 28 degrees of flaps and a Vref speed of 133 knots plus 5 knots. He flared the airplane over the runway and realized the sink rate was not being arrested as desired. He made a more 'aggressive' pull on the control yoke while advancing the thrust levers a 'significant amount.' The airplane landed hard, sustaining substantial damage. DFDR readout disclosed that the airspeed remained above Vref+5 knots until, at a radio altimeter altitude of 238 feet, it was 138.75 knots; thereafter, it began to drop. When the airplane touched down on the runway, airspeed was 124.75 knots, and the pitch attitude was 10.62 degrees nose up. There was a +5.54 'G' vertical acceleration spike.

Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Failure of the pilot to maintain sufficient airspeed to properly flare the airplane during the landing.

Findings

Occurrence #1: HARD LANDING

Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings

1. (C) AIRSPEED(VREF) - NOT MAINTAINED - PILOT IN COMMAND
2. (C) FLARE - IMPROPER - PILOT IN COMMAND

Pilot Information

Certificate:	Airline Transport; Commercial; Flight Engineer	Age:	48
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	14954 hours (Total, all aircraft), 4515 hours (Total, this make and model), 186 hours (Last 90 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	MCDONNELL DOUGLAS	Registration:	N957DL
Model/Series:	MD-88 MD-88	Engines:	2 Turbo Fan
Operator:	DELTA AIR LINES	Engine Manufacturer:	P&W
Operating Certificate(s) Held:	Flag carrier (121)	Engine Model/Series:	JT8D-219
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	DEN, 5431 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	8 knots / , 330°
Temperature:	9° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	DFW AIRPORT, TX (DFW)	Destination:	(DEN)

Airport Information

Airport:	DENVER INTERNATIONAL (DEN)	Runway Surface Type:	Concrete
Runway Used:	35L	Runway Surface Condition:	Dry
Runway Length/Width:	12000 ft / 150 ft		

Wreckage and Impact Information

Crew Injuries:	1 Minor, 4 None	Aircraft Damage:	Substantial
Passenger Injuries:	115 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None

Latitude, Longitude:

Administrative Information

Investigator In Charge (IIC):	ARNOLD W SCOTT	Adopted Date:	05/17/1996
Investigation Docket:	NTSB accident and incident docket 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/ .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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.