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## Hard landing, McDonnell Douglas MD-88, February 4, 1996

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**Micro-summary:** This McDonnell Douglas MD-88 experienced a hard landing.

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**Event Date:** 1996-02-04 at 1647 MST


**Investigative Body:** National Transportation Safety Board (NTSB), USA


**Investigative Body's Web Site:** <http://www.nts.gov/>


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1. Accident reports can be and sometimes are revised. Be sure to consult the investigative agency for the latest version before basing anything significant on content (e.g., thesis, research, etc).
  2. Readers are advised that each report is a glimpse of events at specific points in time. While broad themes permeate the causal events leading up to crashes, and we can learn from those, the specific regulatory and technological environments can and do change. ***Your company's flight operations manual is the final authority as to the safe operation of your aircraft!***
  3. Reports may or may not represent reality. Many many non-scientific factors go into an investigation, including the magnitude of the event, the experience of the investigator, the political climate, relationship with the regulatory authority, technological and recovery capabilities, etc. It is recommended that the reader review all reports analytically. Even a "bad" report can be a very useful launching point for learning.
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 <b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b>		NTSB ID: FTW96LA111		Aircraft Registration Number: N957DL	
		Occurrence Date: 02/04/1996		Most Critical Injury: Minor	
		Occurrence Type: Accident		Investigated By: NTSB	
<b>Location/Time</b>					
Nearest City/Place DENVER		State CO	Zip Code 80249	Local Time 1647	Time Zone MST
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
<b>Aircraft Information Summary</b>					
Aircraft Manufacturer MCDONNELL DOUGLAS		Model/Series MD-88		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
<b>Narrative</b>					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>On February 4, 1996, at 1647 mountain standard time, a McDonnell Douglas MD-88, N957DL, operated by Delta Air Lines, Inc., as flight 1879, scheduled domestic passenger service under Title 14 CFR Part 121, sustained substantial damage during a hard landing at Denver International Airport. Visual meteorological conditions prevailed at the time, and an IFR flight plan had been filed. The captain, first officer, two flight attendants, and 115 passengers were not injured, but one flight attendant did sustain a minor injury. The flight originated at Dallas-Fort Worth International Airport, Texas, approximately 1 hour, 44 minutes before the accident.</p> <p>According to the captain's statement, 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. A very firm touchdown occurred." Examination disclosed damage to the tail bumper and wrinkled skin.</p> <p>Readout of the airplane's digital flight data recorder (DFDR) disclosed subframes 1584 through 1589 contained the accident data, with subframe 1587 containing the runway contact data. The readout showed airspeed remained above VREF+5 up until subframe 1568, when, at a radio altimeter altitude of 238 feet, it was at 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 vertical acceleration spike (see attached DFDR factual report).</p>					
FACTUAL REPORT - AVIATION					
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 <b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b>		NTSB ID: FTW96LA111			
		Occurrence Date: 02/04/1996			
		Occurrence Type: Accident			
<b>Landing Facility/Approach Information</b>					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
DENVER INTERNATIONAL	DEN	5431 Ft. MSL	35L	12000	150
Runway Surface Type: Concrete					
Runway Surface Condition: Dry					
Type Instrument Approach: Visual					
VFR Approach/Landing: Full Stop					
<b>Aircraft Information</b>					
Aircraft Manufacturer		Model/Series		Serial Number	
MCDONNELL DOUGLAS		MD-88		49976	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Tricycle					
Homebuilt Aircraft? No	Number of Seats: 150	Certified Max Gross Wt.	149500 LBS	Number of Engines: 2	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	P&W	JT8D-219	15500 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness	01/1996	128 Hours	16529 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? No	ELT Operated?	ELT Aided in Locating Accident Site?			
<b>Owner/Operator Information</b>					
Registered Aircraft Owner		Street Address			
WILMINGTON TRUST COMPANY		RODNEY SQUARE NORTH			
		City	State	Zip Code	
		WILMINGTON	DE	19890	
Operator of Aircraft		Street Address			
DELTA AIR LINES		1030 DELTA BLVD.			
		City	State	Zip Code	
		ATLANTA	GA	30320	
Operator Does Business As:			Operator Designator Code: DALA		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Flag Carrier/Domestic					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; Domestic; Passenger Only					
FACTUAL REPORT - AVIATION					

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: FTW96LA111
	Occurrence Date: 02/04/1996
	Occurrence Type: Accident

**First Pilot Information**

Name On File	City On File	State On File	Date of Birth On File	Age 48
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Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
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Certificate(s): Airline Transport; Commercial; Flight Engineer

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review?
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--w/ waivers/lim.	Date of Last Medical Exam: 01/1996
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	14954	4515								
Pilot In Command(PIC)										
Instructor										
Last 90 Days	186	186								
Last 30 Days										
Last 24 Hours	4	4								

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? Yes
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**Flight Plan/Itinerary**

Type of Flight Plan Filed: IFR	
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Departure Point DFW AIRPORT	State TX	Airport Identifier DFW	Departure Time 1605	Time Zone CST
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Destination Same as Accident/Incident Location	State	Airport Identifier DEN	
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Type of Clearance: IFR

Type of Airspace: Class B

**Weather Information**

Source of Briefing:  
Company

Method of Briefing:

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: FTW96LA111
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<b>Weather Information</b>					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
DEN	1653	MST	5431 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Clear			0 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None		0 Ft. AGL	Visibility: 10 SM	Altimeter: 30.00	"Hg
Temperature: 9 °C	Dew Point: -11 °C	Wind Direction: 330		Density Altitude: 5906	Ft.
Wind Speed: 8	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): 0 Ft.	Visibility (RVV) 0 SM	Intensity of Precipitation: Unknown			
Restrictions to Visibility: None					
Type of Precipitation: None					

<b>Accident Information</b>		
Aircraft Damage: Substantial	Aircraft Fire: None	Aircraft Explosion: None

Classification: U.S. Registered/U.S. Soil					
<b>- Injury Summary Matrix</b>	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot				1	1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants			1	2	3
Other Crew					
Passengers				115	115
- TOTAL ABOARD -			1	119	120
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	1	119	120

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**



NTSB ID: FTW96LA111

Occurrence Date: 02/04/1996

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

ARNOLD W. SCOTT

Additional Persons Participating in This Accident/Incident Investigation:

RAYMOND J RYAN  
FAA FSDO  
DENVER, CO 80216