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## Turbulence injury, McDonnell Douglas DC-9-82, October 1, 1997

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**Micro-summary:** This McDonnell Douglas DC-9-82 encountered turbulence, resulting in a flight attendant being seriously injured.

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**Event Date:** 1997-10-01 at 2044 EDT


**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!***
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		NTSB ID: MIA98LA002		Aircraft Registration Number: N33502	
		Occurrence Date: 10/01/1997		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place CROSS CITY	State FL	Zip Code 32628	Local Time 2044	Time Zone EDT	
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer McDonnell Douglas		Model/Series DC-9-82		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>On October 1, 1997, about 2044 eastern daylight time, a McDonnell Douglas DC-9-82, N33052, registered to and operated by American Airlines, Inc., as flight 230, experienced in-flight turbulence during cruise flight near Cross City, Florida. Instrument meteorological conditions prevailed at the time and an IFR flight plan was filed for the 14 CFR Part 121 scheduled, domestic, passenger flight. The airplane was not damaged and the airline transport-rated captain, commercial-rated first officer, and 89 passengers were not injured. One flight attendant was seriously injured and two flight attendants and one passenger sustained minor injuries. The flight originated about 1755 central daylight time from the Chicago-O'Hare International Airport, Chicago, Illinois.</p> <p>According to the captain, the flight was about 110 nautical miles north of the PIE VORTAC when they encountered a rapidly developing thunderstorm from below. As the cell appeared on radar, he checked the winds aloft on the Flight Management System (FMS) and began a turn to the right. The flight then experienced no more than 1 second of moderate turbulence which injured all 3 flight attendants; there were no reported injuries to any of the passengers. The flight continued and landed uneventfully about 24 minutes later. The seat belt sign was not illuminated at the time of the occurrence. The Digital Flight Data Recorder (DFDR) was removed from the airplane and read out. A copy of the readout is an attachment to this report.</p> <p>A National Track Analysis Program (NTAP) from the Jacksonville Air Route Traffic Control Center which depicts changes in heading, altitude, and ground speed is an attachment to this report.</p> <p>Review of the DFDR readout revealed that about 15 seconds before the autopilot system was deactivated and continuing for about 12 seconds, the airplane began a roll to the right which increased to about an 11 degree right wing low attitude. During that time frame, both engine EPRs decreased and the indicated airspeed increased from about 274 knots to a high of about 278 knots and ended at about 276 knots. Two seconds later the aircraft's vertical acceleration increased from a maximum of positive .95 Gs to a maximum of 1.75 Gs, and the aircraft rolled to the right about 15 degrees. One second later the autopilot system was deactivated, and one second after that the airplane rolled to the maximum of about 30 degrees right wing low and the airplane experienced a maximum of negative .28 Gs. The vertical acceleration values diminished and the airplane was returned to cruise flight.</p> <p>According to the NTSB Meteorological Factual Report which is an attachment to this report, review of Weather Surveillance Radar from Tallahassee, Florida, for the period of 2033.15 to 2042.55, revealed a level 4 radar return located under and to the east of the flight track of the airplane in the area of the accident. Due to the configuration of the radar at the time, the highest elevation for detection was 30,500 feet. The same radar returns for the period 2043.03, and 2052.44, revealed a radar return of level 3 to 6 along and to the east of the flight track. Additionally, about 2 minutes after the accident, or 2046 local, the Jacksonville Air Route Traffic</p>					
FACTUAL REPORT - AVIATION					
					Page 1

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**

SAFETY BOARD


NTSB ID: MIA98LA002


Occurrence Date: 10/01/1997

Occurrence Type: Accident

**Narrative** (Continued)

Control Center Weather Service Unit issued Center Weather Advisory 101. This indicated a cluster of level 5 thunderstorm/moderate rain with a diameter of 20 nautical miles with maximum tops to FL450. The center of which was located about 60 nautical miles west-southwest of Cross City, Florida. That location when plotted was about 23 nautical miles west-southwest of the accident location.

 <b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b>		NTSB ID: MIA98LA002				
		Occurrence Date: 10/01/1997				
		Occurrence Type: Accident				
<b>Landing Facility/Approach Information</b>						
Airport Name		Airport ID:	Airport Elevation Ft. MSL	Runway Used 0	Runway Length	Runway Width
Runway Surface Type:						
Runway Surface Condition:						
Type Instrument Approach:						
VFR Approach/Landing:						
<b>Aircraft Information</b>						
Aircraft Manufacturer McDonnell Douglas		Model/Series DC-9-82		Serial Number 49739		
Airworthiness Certificate(s): Transport						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No		Number of Seats: 139	Certified Max Gross Wt. 149500 LBS		Number of Engines: 2	
Engine Type: Turbo Fan		Engine Manufacturer: P&W		Model/Series: JT8D	Rated Power: 21000 LBS	
- Aircraft Inspection Information						
Type of Last Inspection Continuous Airworthiness		Date of Last Inspection 09/1997	Time Since Last Inspection 28 Hours		Airframe Total Time 23882 Hours	
- Emergency Locator Transmitter (ELT) Information						
ELT Installed? Yes		ELT Operated? No		ELT Aided in Locating Accident Site?		
<b>Owner/Operator Information</b>						
Registered Aircraft Owner AMERICAN AIRLINES, INC.		Street Address MD 4280- P.O. BOX 619616				
		City DALLAS		State TX	Zip Code 75261	
Operator of Aircraft Same as Reg'd Aircraft Owner		Street Address Same as Reg'd Aircraft Owner				
		City		State	Zip Code	
Operator Does Business As:				Operator Designator Code: AALA		
- 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						

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: MIA98LA002
	Occurrence Date: 10/01/1997
	Occurrence Type: Accident

**First Pilot Information**

Name On File	City On File	State On File	Date of Birth On File	Age 41
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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--no waivers/lim.	Date of Last Medical Exam: 05/1997
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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		3389								
Pilot In Command(PIC)		2501								
Instructor										
Last 90 Days		171								
Last 30 Days		50								
Last 24 Hours		5								

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				
Departure Point	State	Airport Identifier	Departure Time	Time Zone
CHICAGO	IL	ORD	1755	CDT
Destination	State	Airport Identifier		
TAMPA	FL	TPA		


Type of Clearance: IFR

Type of Airspace: Class A

**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: MIA98LA002
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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
GNV	2050	EDT	152 Ft. MSL	80 NM	89 Deg. Mag.
Sky/Lowest Cloud Condition: Clear			0 Ft. AGL	Condition of Light: Night/Bright	
Lowest Ceiling: None		0 Ft. AGL		Visibility: 7 SM	Altimeter: 29.00 "Hg
Temperature: 23 °C	Dew Point: 19 °C	Wind Direction: 300		Density Altitude: Ft.	
Wind Speed: 4	Gusts:	Weather Conditions at Accident Site: Instrument 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: None	Aircraft Fire: None	Aircraft Explosion: None

Classification: U.S. Registered/U.S. Soil					
- Injury Summary Matrix	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			1	89	90
- TOTAL ABOARD -		1	3	91	95
Other Ground	0	0	0		0
- GRAND TOTAL -	0	1	3	91	95

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**



NTSB ID: MIA98LA002

Occurrence Date: 10/01/1997

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

TIMOTHY W. MONVILLE

Additional Persons Participating in This Accident/Incident Investigation:

STAN F OKON  
FAA FSDO  
ORLANDO, FL