

National Transportation Safety Board  
Washington, DC 20594

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Brief of Accident

Adopted 05/17/2001

LAX99LA291 File No. 1786	09/02/1999	SANTA BARBARA, CA	Aircraft Reg No. N371UA	Time (Local): 14:06 PDT		
Make/Model: Boeing / 737-322			Fatal	Serious	Minor/None	
Engine Make/Model: Cfm / CFM56-3C-1			Crew	0	1	4
Aircraft Damage: Minor			Pass	0	0	108
Number of Engines: 2						
Operating Certificate(s): Flag Carrier/Domestic						
Name of Carrier: UNITED AIRLINES, INC.						
Type of Flight Operation: Scheduled; Domestic; Passenger Only						
Reg. Flight Conducted Under: Part 121: Air Carrier						
Last Depart. Point: LOS ANGELES, CA			Condition of Light: Day			
Destination: SAN FRANCISCO, CA			Weather Info Src: Weather Observation Facility			
Airport Proximity: Off Airport/Airstrip			Basic Weather: Visual Conditions			
			Lowest Ceiling: None			
			Visibility: 10.00 SM			
			Wind Dir/Speed: 230 / 009 Kts			
			Temperature (°C): 21			
			Precip/Obscuration:			
Pilot-in-Command	Age: 42	Flight Time (Hours)				
Certificate(s)/Rating(s)			Total All Aircraft: 6117			
Airline Transport; Multi-engine Land; Single-engine Land			Last 90 Days: 178			
			Total Make/Model: 1743			
Instrument Ratings			Total Instrument Time: UnK/Nr			
Airplane						

The flight had just leveled off at flight level 240 with the autopilot still engaged. The seat belt sign had been off for about 5 minutes, and the cabin crew was in the process of preparing a beverage service. The airplane was crossing a VORTAC when the flight encountered turbulence the crew categorized as 'severe,' with a rapid right roll and pitch excursion. The captain disconnected the autopilot and attempted to counter the excursions with control inputs. As a result of the aircraft motions, 1 flight attendant sustained serious injuries, and another flight attendant and 13 passengers sustained minor injuries. The airplane sustained minor damage, limited primarily to ceiling tiles and seats. A review of the meteorological data showed no evidence of any atmospheric phenomena in the area. A simulation study comparing the known airplane response to control inputs versus the motion of the airplane as recorded on the DFDR data showed that the flight controls alone did not cause the recorded motion of the airplane. Radar data established that the flight was in trail of a MD-11 by 11.5 nmi and 97 seconds when the upset occurred. The MD-11 had climbed through the flight's cruise altitude and was 600 feet above the flight at the time of the encounter. Wake vortex studies by NASA have documented vortex descent rates between 270 and 440 feet per minute.

Brief of Accident (Continued)

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SANTA BARBARA, CA

Aircraft Reg No. N371UA

Time (Local): 14:06 PDT

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Occurrence #1: VORTEX TURBULENCE ENCOUNTERED

Phase of Operation: CRUISE

Findings

1. (C) WEATHER CONDITION - OTHER
2. (C) WAKE TURBULENCE - ENCOUNTERED

Findings Legend: (C) = Cause, (F) = Factor

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The National Transportation Safety Board determines the probable cause(s) of this accident as follows.  
The flight's encounter with wake vortices from a preceding heavy aircraft.