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## Turbulence injury, Boeing 747-422, May 1, 2002

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**Micro-summary:** This Boeing 747-422 experienced clear air turbulence in cruise, seriously injuring a flight attendant.

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**Event Date:** 2002-05-01 at 0629 UTC


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

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

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  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: LAX02LA146		Aircraft Registration Number: N182UA	
		Occurrence Date: 05/01/2002		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Pacific Ocean		State PO	Zip Code	Local Time 0629	Time Zone UTC
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 747-422		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>On May 1, 2002, at 0629 coordinated universal time (UTC), a Boeing 747-422, N182UA, encountered clear air turbulence while climbing through approximately 31,000 feet and while in international airspace over the Pacific ocean about 700 miles north of New Zealand. According to the airplane's onboard Flight Management Computer (FMC) recorded data, the aircraft was at location 174.0027 degrees east longitude and 24.4684 degrees south latitude when the encounter occurred. The airline transport certificated pilot and remaining 3 flight crewmembers were not injured. Of the 17 flight attendant crewmembers, 1 was seriously injured, 1 received minor injuries, and 15 were not injured.</p> <p>Of the 269 passengers aboard, 5 received minor injuries and 264 were not injured. The airplane was not damaged. The flight was operated by United Airlines, Incorporated, under 14 CFR Part 121, as flight 862, a regularly scheduled international passenger flight. The flight departed from Sydney, Australia at 0353 UTC and was destined for San Francisco, California. Following the encounter with turbulence, the flight crew altered course and landed at Auckland, New Zealand at 1056 UTC. Visual meteorological conditions prevailed and the flight was operating on an instrument flight plan.</p> <p>According to the Captain, the airplane was flying over a flat broken cloud layer with a smooth ride. He said, "Passing 25 degrees south at FL310 we noticed that the cloud tops were gradually rising. Radar showed very little - a few green returns off to the right. We were in an area of no forecasted turbulence or cumulonimbus cloud buildups. I turned on the seatbelt sign and made a passenger announcement, as it appeared we would soon be just above or in the cloud tops and I expected a few light bumps although the clouds looked benign. After entering the top of the cloud layer...we encountered 10 - 15 seconds of sharp severe turbulence with momentary over speed warning and stick shaker."</p> <p>The captain said that he called the Purser and he was advised of flight attendant and passenger injuries. He contacted dispatch and was advised that he should divert to Auckland. After consulting with an onboard doctor and a company doctor in Chicago, the airplane diverted.</p> <p>According to one of the flight attendants, he was assigned the position number 4 at door 3 left outboard. He said, "About 3 to 3 1/2 hours into the flight, the seat belt sign was illuminated. As per my duties, I went to check seat belts. When I reached row 59 on the left side of the plane, the pilot announced that flight attendants should be seated. At that moment, I sat down immediately on the floor between seats 59b and 59d. I held on to the bar under seat 59b. Within seconds, the plane started to go through very, very, violent turbulence. It started to fish tale...What I saw however was something totally different. Two flight attendants had started counting the merchandise in the duty free carts." He said he saw one of attendants counting the duty free merchandise was thrown to the left of the airplane along with the duty free cart. The other flight attendant near to the duty free cart was also injured. The duty free cart ended up upside down, and all the merchandise was strewn over the floor. The seriously injured flight attendant was struck by the duty free cart.</p>					
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National Transportation Safety Board

## FACTUAL REPORT

AVIATION

NTSB ID: LAX02LA146

Occurrence Date: 05/01/2002


Occurrence Type: Accident


## Narrative (Continued)

According to Digital Flight Data Recorder (DFDR) data, at 0628:58 a series of oscillating vertical and lateral accelerations began that lasted until 0630:38. The vertical accelerations (expressed in units of gravity or "g's", 1.0 is normal) ranged from a low of +0.31 to a high of +1.7. The lateral accelerations (a value of zero is normal) ranged from 0.119 left to 0.115 right. During the time frame of the encounter, the FMC reported winds went from 92 knots to 50, then back to 101. The indicated airspeed also varied from a pre-encounter average value of 315 knots to a peak of 344 before returning to the nominal 315 value.

The investigation reviewed the dispatch and flight release package provided to the flight crew. The weather forecast portion of the document noted that in the vicinity of 173 degrees east and 25 degrees south the upper air winds between 31,000 and 35,000 feet were forecast to be from 290 degrees at 102 to 113 knots. The document also noted the possibility of moderate or lesser turbulence from longitudes 164 degrees east to 172 degrees east along the planned flight track. Two SIGMETs were listed on the documents. The first, SIGMET AMMC MW01 (valid from April 30 at 2200 UTC to May 1 at 0400 UTC) forecast severe clear air turbulence between 25,000 and 35,000 feet, though the area concerned was some 900 nautical miles south and west of the accident location. The second one, SIGMET NTAA NR01 (valid on May 1 from 0200 to 0800 UTC) forecast isolated and embedded cumulo nimbus clouds with tops to 46,000 feet over a wide area well west and north of the planned flight track.

The National Weather Service Significant Weather Forecast Chart issued at 1700 UTC on April 30 and valid until 0600 UTC on May 1 showed a 120 knot jet stream and moderate or lesser clear air turbulence south of the accident location and an area of isolated cumulo nimbus clouds with tops to 40,000 feet to the north. No SIGMETs were in effect for turbulence.

 <p>National Transportation Safety Board <b>FACTUAL REPORT</b> AVIATION</p>	NTSB ID: LAX02LA146				
	Occurrence Date: 05/01/2002				
	Occurrence Type: Accident				
<b>Landing Facility/Approach Information</b>					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used NA	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Type Instrument Approach: NONE					
VFR Approach/Landing: None					
<b>Aircraft Information</b>					
Aircraft Manufacturer Boeing		Model/Series 747-422		Serial Number 25279	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 391	Certified Max Gross Wt.	875000 LBS	Number of Engines: 4	
Engine Type: Turbo Fan		Engine Manufacturer: Pratt & Whitney		Model/Series: PW2040	Rated Power: 56000 LBS
- Aircraft Inspection Information					
Type of Last Inspection Continuous Airworthiness		Date of Last Inspection	Time Since Last Inspection Hours	Airframe Total Time 48837 Hours	
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?			
<b>Owner/Operator Information</b>					
Registered Aircraft Owner United Airlines, Inc		Street Address PO Box 66100			
		City Chicago	State IL	Zip Code 60666	
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: UALA		
- 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; International; Passenger Only					

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: LAX02LA146
	Occurrence Date: 05/01/2002
	Occurrence Type: Accident

**First Pilot Information**

Name On File	City On File	State On File	Date of Birth On File	Age 58
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Sex: M	Seat Occupied: Left	Principal Profession: Occupational Pilot	Certificate Number: On File
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Certificate(s): Airline Transport; Flight Instructor; Commercial; Flight Engineer

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

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

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

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: 03/2002
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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										
Pilot In Command(PIC)										
Instructor										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

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
Sydney		YSSY	0353	UTC
Destination	State	Airport Identifier		
San Francisco	CA	SFO		


Type of Clearance: IFR

Type of Airspace: Unknown

**Weather Information**

Source of Briefing:  
Unknown

Method of Briefing: Unknown

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: LAX02LA146
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**Weather Information**

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
NZAA	1100	UTC	Ft. MSL	NM	Deg. Mag.

Sky/Lowest Cloud Condition: **Scattered** 2300 Ft. AGL Condition of Light: **Day**

Lowest Ceiling: **Broken** 3500 Ft. AGL Visibility: **20** SM Altimeter: **29.92** "Hg

Temperature: **15 °C** Dew Point: **12 °C** Wind Direction: **230** Density Altitude: **Ft.**

Wind Speed: **11** Gusts:  Weather Conditions at Accident Site: **Visual Conditions**

Visibility (RVR): **Ft.** Visibility (RVV) **SM** Intensity of Precipitation:

Restrictions to Visibility: **No Obscuration; No Precipitation**

Type of Precipitation:

**Accident Information**

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	1	15	17
Other Crew				2	2
Passengers			5	264	269
- TOTAL ABOARD -		1	6	283	290
Other Ground					
- GRAND TOTAL -		1	6	283	290

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**



NTSB ID: LAX02LA146

Occurrence Date: 05/01/2002

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

RICHARD B. PARKER

Additional Persons Participating in This Accident/Incident Investigation:

Robert Hendley

CMO

Federal Aviation Administration

San Francisco, CA