



# Aviation Investigation Final Report

<b>Location:</b>	Atlantic Ocean, Atlantic Ocean	<b>Accident Number:</b>	NYC06LA016
<b>Date &amp; Time:</b>	October 22, 2005, 14:40 Local	<b>Registration:</b>	N378DA
<b>Aircraft:</b>	Boeing 737-832	<b>Aircraft Damage:</b>	None
<b>Defining Event:</b>		<b>Injuries:</b>	1 Serious, 2 Minor, 147 None
<b>Flight Conducted Under:</b>	Part 121: Air carrier - Scheduled		

## Analysis

Light turbulence prevailed during the climb after takeoff, and the seatbelt sign remained illuminated. About 230 miles northwest of the departure airport, at 34,000 feet, the turbulence subsided; however, more turbulence was forecasted for about 150 miles ahead of the airplane. The captain announced to the passengers that the seatbelt sign would be turned off for 10 minutes to allow them an opportunity to move about the cabin, but would be turned on again due to the upcoming turbulence. About 3 minutes after turning the seatbelt sign back on, the airplane encountered moderate turbulence. During that time, two passengers fell as they were attempting to sit down. In addition, a flight attendant fell to the floor as she was attempting to sit, and fractured her pelvis.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An encounter with turbulence during cruise flight.

### Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER  
Phase of Operation: CRUISE - NORMAL

#### Findings

1. (C) WEATHER CONDITION - TURBULENCE



## Factual Information

On October 22, 2005, about 1440 eastern daylight time, a Boeing 737-832, N378DA, operated by Delta Air Lines Inc., as flight 612, was not damaged during an encounter with turbulence in cruise flight about 300 miles northwest of Hamilton, Bermuda. There were no injuries to the 2 certificated airline transport pilots, 2 flight attendants, and 143 passengers; while 1 flight attendant was seriously injured, and 2 passengers sustained minor injuries. Visual meteorological conditions prevailed for the flight that departed Hamilton, Bermuda; destined for General Edward Lawrence Logan International Airport (BOS), Boston, Massachusetts. An instrument flight rules flight plan was filed for the air carrier flight conducted under 14 CFR Part 121.

The flightcrew reported that light turbulence prevailed during the climb from Bermuda, and the seatbelt sign remained illuminated. About 230 miles northwest of Bermuda, at 34,000 feet, the turbulence subsided; however, more turbulence was forecasted for about 150 miles ahead of the airplane. The captain announced to the passengers that the seatbelt sign would be turned off for 10 minutes to allow them an opportunity to move about the cabin, but would be turned on again due to the upcoming turbulence. The captain also decided against meal service due to the anticipated turbulence after 10 minutes.

About 300 miles northwest of Bermuda, the captain turned the seatbelt sign back on. About 3 minutes later, the airplane encountered moderate turbulence. During that time, two passengers and a flight attendant fell as they were attempting to sit down. The passengers sustained minor injuries, and the flight attendant fractured her pelvis.

The flight subsequently landed uneventfully at BOS, and was met by medical personnel.

## Pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	47, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	August 1, 2005
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	June 1, 2006
<b>Flight Time:</b>	14230 hours (Total, all aircraft), 1950 hours (Total, this make and model), 200 hours (Last 90 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

## Co-pilot Information

<b>Certificate:</b>	Airline transport; Flight engineer	<b>Age:</b>	36, Male
<b>Airplane Rating(s):</b>	Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	April 1, 2005
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	February 1, 2005
<b>Flight Time:</b>	9352 hours (Total, all aircraft), 3263 hours (Total, this make and model), 185 hours (Last 90 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Boeing	<b>Registration:</b>	N378DA
<b>Model/Series:</b>	737-832	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	29624
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	158
<b>Date/Type of Last Inspection:</b>	October 1, 2005 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	172500 lbs
<b>Time Since Last Inspection:</b>	30 Hrs	<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>	19800 Hrs at time of accident	<b>Engine Manufacturer:</b>	Snecma
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	CFM56-7B26
<b>Registered Owner:</b>	DELTA AIR LINES INC	<b>Rated Power:</b>	26000 Lbs thrust
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	Flag carrier (121)
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	DALA

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	BOS,19 ft msl	<b>Distance from Accident Site:</b>	500 Nautical Miles
<b>Observation Time:</b>	14:39 Local	<b>Direction from Accident Site:</b>	300°
<b>Lowest Cloud Condition:</b>	Scattered / 2400 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 3900 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	14 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	50°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.87 inches Hg	<b>Temperature/Dew Point:</b>	9°C / 6°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Hamilton (BDA )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Boston, MA (BOS )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	13:40 Local	<b>Type of Airspace:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious, 4 None	<b>Aircraft Damage:</b>	None
<b>Passenger Injuries:</b>	2 Minor, 143 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 2 Minor, 147 None	<b>Latitude, Longitude:</b>	37.635696,-72.860801(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Gretz, Robert
<b>Additional Participating Persons:</b>	Ron Williams; FAA FSDO-01; Boston, MA
<b>Original Publish Date:</b>	October 3, 2006
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=62719">https://data.ntsb.gov/Docket?ProjectID=62719</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).