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## Turbulence injuries, Boeing 727-200, July 28, 2000

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**Micro-summary:** This Boeing 727-200 encountered severe turbulence in cruise, seriously injuring two occupants.

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**Event Date:** 2000-07-28 at 1737 EDT


**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: ATL00LA072		Aircraft Registration Number: N364PA	
		Occurrence Date: 07/28/2000		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place CHARLESTON		State SC	Zip Code 29401	Local Time 1737	Time Zone EDT
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 727-200		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 July 28, 2000, at 1737 eastern daylight time, a Boeing B727-200, N364PA, operating as Pan Am Flight 164, encountered severe turbulence at flight level 330, 60 miles south of Columbia, South Carolina. The flight diverted into Charleston, South Carolina and landed without further incident. The scheduled domestic passenger flight was operated by Pan Am Airways Corporation under the provisions of Title 14 CFR Part 121 with an instrument flight plan filed. The aircraft was in instrument meteorological conditions at the time of the turbulence. The airplane was not damaged. One passenger and a flight attendant received serious injuries, 11 passengers and 3 flight attendants received minor injuries, and the air transport pilot with 4 crewmembers and 52 passengers were not injured. The air carrier flight departed Orlando Sanford Airport in Sanford, Florida at 1653.</p> <p>The air carrier flight departed Orlando Sanford Airport in Sanford, Florida at 1653. At 1703:55, Jacksonville Center, St. Johns Radar Control Position (R57), reported hazardous weather information for the southeast United States in Convective Sigmet 85E. According to the pilot, at approximately 1730, while flying at flight level 330 he deviated to avoid thunderstorm activity. At approximately the same time, the pilot turned on the fasten seat-belt sign, and advised the flight attendants to secure their stations. About 60 miles south of Columbia, South Carolina, the flight encountered severe turbulence as the pilot maneuvered the airplane to avoid convective activity.</p> <p>After departing the region of severe turbulence, the pilot was informed of injuries in the passenger cabin. The flight diverted to Charleston International Airport in Charleston, South Carolina, and the pilot requested medical assistance upon arrival. The flight terminated in Charleston, South Carolina at 1807. Severe turbulence notation was recorded in the aircraft log for required maintenance inspection. Reportedly, 16 persons from the flight, including four flight attendants, were transported to local hospitals for treatment. Several passengers were treated and released. However, a flight attendant and a passenger remained hospitalized with serious neck and back injuries.</p> <p>The pilot held an airplane airline transport certificate and instrument rating. His had accumulated 20,400 flight hours, of which approximately 5,600 hours had been flown in the Boeing 727-200 airplane. The pilot held a first-class medical certificate, dated June 18, 2000.</p> <p>The co-pilot held an airplane commercial pilot certificate, and a flight engineer certificate. His had accumulated a total of 613 flight hours, of which approximately 363 flight hours had been flown in the Boeing 727-200 airplane. The co-pilot held a second-class medical, dated October 22, 1999.</p> <p>The Boeing 727-200, N364PA, was owned by Guilford Transportation of Portsmouth, New Hampshire, and operated by Pan American Airways Corporation of Portsmouth, New Hampshire. The airplane was powered by three Pratt and Whitney JT8D-15 engines. The last continuous airworthiness inspection was completed on July 27, 2000. The airplane had flown 5 hours since the last inspection, and had</p>					
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National Transportation Safety Board

## FACTUAL REPORT

AVIATION

NTSB ID: ATLOOLA072

Occurrence Date: 07/28/2000

Occurrence Type: Accident

## Narrative (Continued)

accumulated a total time of 47,930 hours.

The Columbia Metropolitan Airport's weather observation at 1556, reported winds from 240 degrees at 5 knots, visibility 10 miles in thunderstorms, scattered clouds at 5,000 feet, ceiling broken at 13,000 feet, broken at 25,000 feet, temperature 27 degrees C (81 degrees F), dew point 20 degrees C (68 degrees F), altimeter 29.99 inches of mercury (Hg). Remarks; automated observation, stated thunderstorm activity north through south moving southeast, occasional lightning cloud-to-ground, precipitation recorded since last hourly observation less than 0.01 inch, temperature 27.2 degrees C, dew point 20.2 degrees C. At 1607, special weather observation indicated the thunderstorm ended at 1601.

Charleston International Airport's weather observation at 1656 indicated wind from 150 degrees at 11 knots, visibility 10 miles, sky clear below 12,000 feet, temperature 31 degrees C (88 degrees F), dew point temperature 22 degrees (72 degrees F), altimeter 29.98 inches of Hg.

The closest weather upper air reporting site was located at Charleston, South Carolina. The Charleston report stated that the Lifted Index showed severe thunderstorms probable. It also showed the wind at 32,684 feet was 232 degrees at 29 knots, and 265 degrees at 26 knots at 35,696 feet.

Composite reflectivity showed there was a broken line of echoes parallel to the coast in a northeast to the southeast across South Carolina into Georgia, and then south into northern Florida. Several clusters showed level five activity. According to the crew, they were circumnavigating around these echoes when the airplane penetrated the western edge of light precipitation and encountered the severe turbulence.

Convective SIGMET 85E was issued at 1656, and valid until 1855 on July 28, 2000. The flight path was in the southern edge of the Convective SIGMET. The convective SIGMET was issued for an area of severe thunderstorms moving from 280 degrees at 20 knots, with tops to 43,000 feet. Hail to 1 inch and wind gusts to 50 knots possible.


AIRMET Tango update number 3 issued at 1531 on July 28, 2000, and valid until 2200, showed that no significant turbulence was expected in the vicinity of convective activity.

There were no SIGMETs or Severe Weather Forecast Alerts issued over South Carolina or Georgia from 1500 through 1900 on July 28, 2000.

The digital flight data recorder (FDR), a Lockheed model 209F (serial number 671), was removed from the airplane and transported to the National Transportation Safety Board's laboratory in Washington, D.C. for further readout. A successful readout was performed and it determined approximately 29 minutes after take-off, the aircraft leveled off to a pressure altitude of 33,000 feet with an indicated airspeed of 298 knots. Shortly after level off, the airplane experienced vertical acceleration between -0.07 and 1.73 g's. During this time, altitude fluctuated between 32,563 feet and 33,410 feet.

Reportedly, 16 persons from the flight, including four flight attendants, were transported to local hospitals for treatment. Eleven passengers and three flight attendants were treated and released with minor injuries. However, a flight attendant and a passenger remained hospitalized with serious neck and back injuries.


Pan American Airways flight 164 was dispatched from Orlando Sanford Airport in Sanford, Florida, to Pittsburgh International Airport in Pittsburgh, Pennsylvania, with a destination alternate of Philadelphia International Airport in Philadelphia, Pennsylvania, at approximately 1349. The dispatch release noted that additional fuel was added for anticipated enroute deviations around thunderstorm activity.


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**Narrative (Continued)**

The flight dispatcher issued a weather document to the flight crew at 1349, on July 28, 2000. Based on the statements made by the pilot, that was their only source of weather for this flight. The weather document included weather reports (METARS), forecasts (TAFS), and NOTAMS for the departure, destination, alternate and selected enroute airports, as well as the last 2 hours of Convective SIGMETS for the eastern and central region. The 1255 and 1155, Convective SIGMETS did not have any advisories current for thunderstorms or turbulence that impacted the route of flight.

There were no Center Weather Advisories, PIREPS, or other enroute forecasts included in the document issued to the flight crew. The pilot did not request any additional enroute weather information from the dispatcher. Nor, did the pilot inquire into the Convective SIGMET 85E, which was advised by Jacksonville ARTCC, St. Johns Radar Control Position (R57).

 <b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b>		NTSB ID: ATL00LA072				
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<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 Boeing		Model/Series 727-200		Serial Number 21107		
Airworthiness Certificate(s): Transport						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No		Number of Seats: 154	Certified Max Gross Wt. 197700 LBS		Number of Engines: 3	
Engine Type: Turbo Fan		Engine Manufacturer: P&W		Model/Series: JT8D-15	Rated Power: 15500 LBS	
- Aircraft Inspection Information						
Type of Last Inspection Continuous Airworthiness		Date of Last Inspection 07/2000	Time Since Last Inspection 5 Hours		Airframe Total Time 47930 Hours	
- Emergency Locator Transmitter (ELT) Information						
ELT Installed?		ELT Operated?		ELT Aided in Locating Accident Site?		
<b>Owner/Operator Information</b>						
Registered Aircraft Owner GUILFORD TRANSPORTATION		Street Address 14 AVIATION AVE				
		City PORTSMOUTH		State NH	Zip Code 03801	
Operator of Aircraft PAN AM AIRWAYS CORP.		Street Address Same as Reg'd Aircraft Owner				
		City		State	Zip Code	
Operator Does Business As:				Operator Designator Code: RIVA		
- 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						

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**First Pilot Information**

Name On File	City On File	State On File	Date of Birth On File	Age 59
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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; 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): 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: 04/2000
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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	20400	5600								
Pilot In Command(PIC)										
Instructor										
Last 90 Days		138								
Last 30 Days		59								
Last 24 Hours		8								

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed?	Second Pilot? Yes
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**Flight Plan/Itinerary**

Type of Flight Plan Filed: IFR	
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Departure Point ORLANDO	State FL	Airport Identifier SFB	Departure Time 1653	Time Zone EDT
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Destination PITTSBURGH	State PA	Airport Identifier PIT	
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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: ATL00LA072
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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
CHS	1656	EDT	45 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			5000 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: Broken		13000 Ft. AGL		Visibility: 10 SM	Altimeter: 30.00 "Hg
Temperature: 26 °C	Dew Point: 20 °C	Wind Direction: 350		Density Altitude: 1000 Ft.	
Wind Speed: 5	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): 0 Ft.	Visibility (RVV) 0 SM	Intensity of Precipitation: Light			
Restrictions to Visibility:					
Type of Precipitation: Rain					

<b>Accident Information</b>		
Aircraft Damage: Minor	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				1	1
Cabin Attendants		1	3	1	5
Other Crew					
Passengers		1	11	49	61
<b>- TOTAL ABOARD -</b>		2	14	53	69
Other Ground	0	0	0		0
<b>- GRAND TOTAL -</b>	0	2	14	53	69

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**



NTSB ID: ATL00LA072

Occurrence Date: 07/28/2000

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

PHILLIP POWELL

Additional Persons Participating in This Accident/Incident Investigation:

CHARLIE HENDERSON  
SOUTH CAROLINA FSDO