
Turbulence injury, Boeing 737-7H4, June 4, 2004

Micro-summary: This Boeing 737-7H4 experienced turbulence in cruise, breaking a flight attendant's ankle.


Event Date: 2004-06-04 at 1817 CDT


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

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

Cautions:

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!***
 3. Reports may or may not represent reality. Many many non-scientific factors go into an investigation, including the magnitude of the event, the experience of the investigator, the political climate, relationship with the regulatory authority, technological and recovery capabilities, etc. It is recommended that the reader review all reports analytically. Even a "bad" report can be a very useful launching point for learning.
 4. Contact us before reproducing or redistributing a report from this anthology. Individual countries have very differing views on copyright! We can advise you on the steps to follow.
-

		NTSB ID: CHI04LA148		Aircraft Registration Number: N757LV	
		Occurrence Date: 06/04/2004		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Liberal	State KS	Zip Code 67905	Local Time 1817	Time Zone CDT	
Airport Proximity:		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 737-7H4		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 June 4, 2004, at 1817 central daylight time (CDT), a Boeing 737-7H4, N757LV, operated by Southwest Airlines Co. (SWA) as flight 2297, encountered turbulence approximately 15 nautical miles (NM) southeast of Liberal, Kansas (LBL), during cruise flight at flight level (FL) 370. One flight attendant was seriously injured. The flight then diverted to Kansas City International Airport, Kansas City, Missouri, where it landed without further incident. Visual and instrument meteorological conditions with convective activity prevailed at the time of the accident. The scheduled domestic passenger flight was operating on an instrument rules flight plan under the provisions of Title 14 Code of Federal Regulations Part 121. The 2 flight crew members, 2 remaining flight attendants, and 131 passengers reported no injuries. The flight departed from Phoenix Sky Harbor International Airport, Phoenix, Arizona, at 1650 mountain daylight time, and was en route to Port Columbus International Airport, Columbus, Ohio.</p> <p>According to SWA's Director of Flight Operational Safety, flight 2297 had been in cruise flight at FL370. The flight was in cirrus and in and out of cloud tops experiencing some light chop for the last 100-150 miles. The seat belt sign was on with all passengers seated. The radar was in turbulence mode. The crew had been watching cells with heavy rain and turbulence just north of the Amarillo, Texas, area and the airplane passed well north on the upwind side. Near LBL, they saw a patch of blue sky to the right front and painted nothing in front of them. The encounter occurred when a large buildup appeared in front of the airplane with less than two seconds notice. The airplane experienced airspeed excursions from about 275 knots to 225 knots with an altitude loss of 500 feet. During the encounter, the airplane also experienced small hail. Other aircraft in the area reported no conditions greater than light [turbulence].</p> <p>Just prior to the encounter, the captain released the flight attendants to resume service. The 'A' flight attendant informed the flight crew that as the flight attendants in the galley removed their seat belts, the 'B' flight attendant became injured. No emergency was declared.</p> <p>The following are transcribed transmissions between SWA flight 2297, Kansas Air Route Traffic Control Center R23 and R09 positions, and an unknown Kansas Air Route Traffic Control Center controller (UNK). The following transcription times are based upon CDT.</p> <p>1816:54, SWA flight 2297, "southwest uh twenty two ninety seven we'd like to take a right turn here south for uh some weather"</p> <p>1817:02, R23, "southwest twenty two ninety seven approved as requested direct saint louis uh when able"</p> <p>1817:07, SWA flight 2297, "southwest twenty two ninety seven"</p> <p>1817:19, SWA flight 2297, "uh southwest twenty two ninety seven there's a buildup right there"</p>					
FACTUAL REPORT - AVIATION					
Page 1					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI04LA148
	Occurrence Date: 06/04/2004
	Occurrence Type: Accident

Narrative (Continued)

that's not showing radar that we got some uh moderate to severe turbulence here we're climbing back to three seven zero"

1817:29, R23, "roger uh just uh one small pocket there"

1817:31, SWA flight 2297, yeah didn't show up on radar at all"

1817:34, R23, "i'm not showing anything either"

1819:02, R23, "southwest twenty two ninety seven was that right on the uh edge of the weather"

1819:07, SWA flight 2297, "uh southwest uh twenty two ninety seven say again please"

1819:09, R23, "was that right on the edge of the weather uh or after you were in the clear"

1819:13, SWA flight 2297, "actually we were just uh we been just skimming through the tops it's kind of a haze layer and like i said we were uh painting that cell that was just north of amarillo but that one did not show at all so uh it was a build up that was inside of the haze we didn't even see it"

1819:28, R23, "all right thanks for that southwest twenty two ninety seven contact kansas city center now one three three point two"

1819:32, SWA flight 2297, "thirty three two thanks"

1819:56, SWA flight 2297, "and before we go here twenty two ninety seven there was some hail in that stuff as well"

1820:02, R3, "some hail in there (unintelligible)"

1820:03, SWA flight 2297, "affirmative and uh pretty good down drafts we lost five hundred feet"

1820:06, R23, "all right thanks"

1820:24, R23, "go ahead"

1820:26, UKN, "hey what's the deal with southwest twenty two ninety seven could you ask him how his ride was through that thunderstorm we got company wanting to know"

1820:34, R23, "he uh just south of liberal he encountered a cell that he said he wasn't painting that he got uh moderate to severe turbulence lost five hundred feet hail in there and uh just one little blip there and then it was done but otherwise (unintelligible)"

1830:52, UNK, "okay that was southwest"


1820:54, R23, "yeah"

1820:09, SWA flight 2297, "center southwest twenty two ninety seven is flight level three seven zero"

1820:12, R06, "southwest twenty two ninety seven kansas city center roger"

1828:27, SWA flight 2297, "that was us that was uh twenty two ninety seven"

1828:27, R06, "southwest twenty two ninety seven roger were you at flight level three seven zero at

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI04LA148
	Occurrence Date: 06/04/2004
	Occurrence Type: Accident

Narrative (Continued)

that time"

1828:34, SWA flight 2297, "that's affirmative it was only lasted for uh --- oh --- i'd say a minute minute and a half it was an area of weather that uh had tops above three seven zero that did not show on (unintelligible)"

1828:47, R06, "and you said that was out around liberal or where exactly was that"

1828:50, SWA flight 2297, "it was almost right on top of liberal three seven zero"

1828:54, R06, "okay"


1828:58, SWA flight 2297, "we were flying in the haze an uh (unintelligible) right in the middle there's also some hail in there"


SWA download the airplane's flight data recorder and reported the maximum vertical accelerations during the turbulence encounter were +1.7 g and -0.258 g.

The airplane landed without further incident and the company reported the airplane did not sustain any damage. The flight attendant sustained a broken ankle.

Convective SIGMET 75C, valid until 1955 CDT, was issued for an area from 40 NM west northwest of LBL to 40 NM north-northwest of Amarillo, Texas, to 30 NM south-southwest of Tucumcari, New Mexico, to 30 NM east of Tobe, Colorado, to 40 NM west-northwest of LBL. The SIGMET stated: area of severe thunderstorms moving little; tops to FL 400; hail to 2.5 inches; wind gusts to 60 knots possible.

The Federal Aviation Administration and SWA were parties to the investigation.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: CHI04LA148			
		Occurrence Date: 06/04/2004			
		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Type Instrument Approach:					
VFR Approach/Landing:					
Aircraft Information					
Aircraft Manufacturer Boeing		Model/Series 737-7H4		Serial Number 29850	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 145	Certified Max Gross Wt.	154000 LBS	Number of Engines: 2	
Engine Type: Turbo Fan	Engine Manufacturer: General Electric	Model/Series: CFM-56	Rated Power: 22000 LBS		
- Aircraft Inspection Information					
Type of Last Inspection Continuous Airworthiness	Date of Last Inspection 05/2004	Time Since Last Inspection 110 Hours	Airframe Total Time 17244 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner Southwest Airlines Co		Street Address PO Box 36611			
		City Dallas	State TX	Zip Code 75235	
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: SWAA		
- 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>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI04LA148
	Occurrence Date: 06/04/2004
	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 53
-----------------	-----------------	------------------	--------------------------	-----------

Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
--------	---------------------	--------------------------------------	-----------------------------

Certificate(s): Airline Transport; Commercial

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

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): Airplane Multi-engine

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review? 03/2004
---	---

Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 04/2004
------------------------	--	------------------------------------

- 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	15200	10800	2000	6000	1200	1200				
Pilot In Command(PIC)	8000	3000	2000							
Instructor										
Last 90 Days	195	195								
Last 30 Days	57	57								
Last 24 Hours	2									

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? Yes
--------------------	----------------------------	--------------------------	-------------------

Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point Phoenix	State AZ	Airport Identifier PHX	Departure Time 1650	Time Zone MDT
----------------------------	-------------	---------------------------	------------------------	------------------

Destination Columbus	State OH	Airport Identifier CMH	
-------------------------	-------------	---------------------------	--


Type of Clearance: IFR

Type of Airspace: Class A

Weather Information

Source of Briefing: Company

Method of Briefing:

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI04LA148
	Occurrence Date: 06/04/2004
	Occurrence Type: Accident

Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
LBL	1815	CDT	2883 Ft. MSL	15 NM	315 Deg. Mag.
Sky/Lowest Cloud Condition: Few			3900 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None		Ft. AGL	Visibility: 10	SM	Altimeter: 29.94 "Hg
Temperature: 33 °C	Dew Point: 13 °C	Wind Direction: 190		Density Altitude: Ft.	
Wind Speed: 15	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): Ft.	Visibility (RVV)	SM	Intensity of Precipitation:		
Restrictions to Visibility: None					
Type of Precipitation: None					

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		2	3
Other Crew					
Passengers				131	131
- TOTAL ABOARD -		1		135	136
Other Ground					
- GRAND TOTAL -		1		135	136

National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: CHI04LA148

Occurrence Date: 06/04/2004

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

Mitchell F. Gallo

Additional Persons Participating in This Accident/Incident Investigation:

Ron Meyers
Inspector
Federal Aviation Administration
10015 N Executive Hills
Kansas City, MO 64153

Jeff Grenier
Manager Flight Safety Response
Southwest Airlines Co.
P.O. Box 36611
Dallas, TX 75235