Aviation Investigation Final Report

Location:	Chicago, Illinois	**Accident Number:**	DCA23LA305
Date & Time:	June 1, 2023, 17:06 Local	**Registration:**	N28457
Aircraft:	Boeing 737-924ER	**Aircraft Damage:**	None
Defining Event:	Turbulence encounter	**Injuries:**	1 Serious, 185 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

A flight attendant was seriously injured when United Airlines flight 1734 encountered convectively-induced turbulence during the descent into the Chicago O'Hare International Airport (ORD), Chicago, Illinois.

Flight 1734 originated from the San Francisco International Airport (SFO) and the captain was the pilot monitoring and the first officer was the pilot flying.

The flight crewmembers reported that they were not aware of any adverse reports of turbulence from either air traffic control (ATC), or other aircraft and they found the route along the arrival path to be generally smooth. Their weather radar was on and showed some cells located to the west of ORD, but none were along either their arrival route, the airport itself, or the area east of ORD where they conducted their approach to landing. When they first checked in with the Chicago approach controller, they were assigned runway 27R. However, they preferred a longer runway due to their landing weight and were therefore assigned runway 28C which they had to load into the flight management computer and re-brief.

The captain indicated that the seat belt sign had been turned on early in the descent during the “arrival” passenger announcement. About 13,000 ft, the captain gave the cabin crew the “double chime” indicating that they should prepare the cabin for landing and then take their seats.

The flight crewmembers reported that as the aircraft was descending through an isolated overcast layer, they observed a small cloud buildup with the top of the buildup slightly above their altitude. They contacted ATC and requested and were approved to make a left turn to avoid the cloud build-up. Although they attempted to avoid the cloud, the aircraft penetrated the left outermost area of the cloud buildup at an altitude of approximately 12,100 ft. The flight crewmembers indicated that as they went through this area, they experienced about 5 seconds

of light to borderline moderate turbulence. As soon as they exited the area, the air was once again smooth.

Shortly after the encounter, the flight crewmembers received a call from the cabin crew informing them that one of the flight attendants had fallen in the rear galley and had injured her foot. According to the cabin crew, shortly after they heard the double chime, there was a big bump of turbulence, and a flight attendant lost her balance, twisted her ankle, and hit her back on the corner of her jump seat. A physician who was onboard the airplane assisted her and helped move her to a passenger seat for the remainder of the flight. Emergency medical personnel met the airplane at the gate and a post-flight medical evaluation revealed that the flight attendant had a fracture injury to her metatarsal bone in the left foot.

Based on a review of WSR-88Dweather radar (KMKX), satellite (GOES-16), and upper air model (HRRR) data, the turbulence encounter appeared generally coincident in time and location with a convective updraft that reached heights above 12,100 ft.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

An encounter with convectively-induced turbulence (CIT).

Findings

Environmental issues	(general) - Effect on personnel

Factual Information

History of Flight

Enroute-descent	Turbulence encounter (Defining event)

Pilot Information

Certificate:	Airline transport	**Age:**	55,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	January 26, 2023
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 23, 2023
Flight Time:	22950 hours (Total, all aircraft), 17558 hours (Total, this make and model), 13445 hours (Pilot In Command, all aircraft), 142 hours (Last 90 days, all aircraft), 12 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Airline transport	**Age:**	54,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	February 9, 2023
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 14, 2023
Flight Time:	15600 hours (Total, all aircraft), 2800 hours (Total, this make and model), 10300 hours (Pilot In Command, all aircraft), 200 hours (Last 90 days, all aircraft), 36 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N28457
Model/Series:	737-924ER	**Aircraft Category:**	Airplane
Year of Manufacture:	2012	**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	41744
Landing Gear Type:	Retractable - Tricycle	**Seats:**	188
Date/Type of Last Inspection:	Continuous airworthiness	**Certified Max Gross Wt.:**	188200 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:		**Engine Manufacturer:**	CFM INTL
ELT:	Installed	**Engine Model/Series:**	CFM56-7B27
Registered Owner:	UNITED AIRLINES INC	**Rated Power:**	273000 Lbs thrust
Operator:	UNITED AIRLINES INC	**Operating Certificate(s) Held:**	Flag carrier (121), Supplemental

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Not reported
Observation Facility, Elevation:	KBUU	**Distance from Accident Site:**	3.85 Nautical Miles
Observation Time:	23:15 Local	**Direction from Accident Site:**	342.75°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 6000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	Clear air / Convective
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	Unknown / Light
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	26°C / 16°C
Precipitation and Obscuration:			
Departure Point:	San Francisco, CA (KSFO)	**Type of Flight Plan Filed:**	IFR
Destination:	Chicago , IL (KORD)	**Type of Clearance:**	IFR
Departure Time:	19:15 UTC	**Type of Airspace:**	Class B

Wreckage and Impact Information

Crew Injuries:	1 Serious, 7 None	**Aircraft Damage:**	None
Passenger Injuries:	178 None	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 185 None	**Latitude, Longitude:**	42.6315,-88.2718

Administrative Information

Investigator In Charge (IIC):	Hauf, Michael
Additional Participating Persons:	FAA
Original Publish Date:	October 16, 2023
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=192293

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.