



Aviation Investigation Final Report

Location:	Myrtle Beach, Atlantic Ocean	Accident Number:	DCA23LA382
Date & Time:	July 28, 2023, 08:16 Local	Registration:	N77431
Aircraft:	Boeing 737-924ER	Aircraft Damage:	None
Defining Event:	Turbulence encounter	Injuries:	1 Serious, 184 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

United Airlines flight 2122 encountered severe turbulence while in cruise flight at flight level (FL) 330 enroute to Punta Cana Airport (PUJ), Dominican Republic, and a flight attendant (FA) sustained serious injuries.

The flight crew reported that after reaching a cruise altitude of FL330 and before entering oceanic airspace they downloaded the latest Weather Services International (WSI) radar image, lightning data, and SkyPath ride reports. The airborne radar was in use which depicted some very small, scattered cells well below their altitude. Shortly thereafter, the captain visually acquired a cloud buildup immediately ahead and below their altitude. With no visual indication of the cloud on the weather radar they made a right turn to avoid any potential turbulence. While in the right turn, the airplane entered visual meteorological conditions and the captain visually acquired another cloud buildup directly ahead. To avoid the buildup the captain continued the right turn to no avail. The airplane entered the clouds and immediately encountered severe turbulence for about 5 seconds. A public address (PA) announcement was immediately made “be seated immediately, be seated immediately”. Following the turbulence encountered the flight crew was notified that two aft FAs had been injured.

Just before the turbulence event, the number 2L and 2R FAs had moved the beverage cart to the aft galley, so the 2R FA could use the lavatory. After entering the lavatory, she was thrown into the air and landed on her left ankle and knee. The 2L FA stated that as soon as the 2R FA entered the lavatory, they encountered severe turbulence. She and the beverage cart were tossed into the air, and she impacted the floor of the airplane on her left side. She stated that the impact was like “slamming down from a 5th floor building”. Upon being notified of the injuries, the flight crew declared an emergency and diverted to Myrtle Beach, South Carolina,

for medical assistance. The two injured FAs were transported to local hospitals where one was diagnosed with serious injuries.

At the time of the turbulence encounter there were no active significant meteorological information (SIGMETs), convective SIGMETs, airman’s meteorological information (AIRMETs), or pilot reports (PIREPs) of any significant turbulence.

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) while in cruise flight.

Findings	
Environmental issues	Convective turbulence - Effect on personnel
Environmental issues	Convective turbulence - Awareness of condition
Personnel issues	Knowledge of meteorologic cond - Flight crew

Factual Information

History of Flight

Enroute-cruise	Turbulence encounter (Defining event)
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Pilot Information

Certificate:	Airline transport; Flight instructor	Age:	41,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:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	May 22, 2023
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	December 17, 2022
Flight Time:	(Estimated) 12900 hours (Total, all aircraft), 6850 hours (Total, this make and model), 1800 hours (Pilot In Command, all aircraft), 180 hours (Last 90 days, all aircraft), 73 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Airline transport	Age:	35,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	March 27, 2023
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	March 29, 2023
Flight Time:	(Estimated) 4223 hours (Total, all aircraft), 280 hours (Total, this make and model), 1298 hours (Pilot In Command, all aircraft), 218 hours (Last 90 days, all aircraft), 99 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	Registration:	N77431
Model/Series:	737-924ER	Aircraft Category:	Airplane
Year of Manufacture:	2009	Amateur Built:	
Airworthiness Certificate:	Transport	Serial Number:	32833
Landing Gear Type:	Retractable - Tricycle	Seats:	156
Date/Type of Last Inspection:	August 5, 2022 Continuous airworthiness	Certified Max Gross Wt.:	187700 lbs
Time Since Last Inspection:		Engines:	2 Turbo fan
Airframe Total Time:	43798 Hrs as of last inspection	Engine Manufacturer:	CFM INTL
ELT:	C126 installed, not activated	Engine Model/Series:	CFM56-7B26/3
Registered Owner:	UNITED AIRLINES INC	Rated Power:	27300 Lbs thrust
Operator:	UNITED AIRLINES INC	Operating Certificate(s) Held:	Flag carrier (121)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	KMYR, 25 ft msl	Distance from Accident Site:	
Observation Time:	08:56 Local	Direction from Accident Site:	
Lowest Cloud Condition:		Visibility	
Lowest Ceiling:	Broken	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	None / Convective
Wind Direction:		Turbulence Severity Forecast/Actual:	N/A / Severe
Altimeter Setting:		Temperature/Dew Point:	
Precipitation and Obscuration:			
Departure Point:	Newark, NJ (EWR)	Type of Flight Plan Filed:	IFR
Destination:	Punta Cana, OF (PUJ)	Type of Clearance:	IFR
Departure Time:	07:24 Local	Type of Airspace:	Class A

Wreckage and Impact Information

Crew Injuries:	1 Serious, 5 None	Aircraft Damage:	None
Passenger Injuries:	179 None	Aircraft Fire:	None
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	1 Serious, 184 None	Latitude, Longitude:	34.516667,-74.085278(est)

Administrative Information

Investigator In Charge (IIC):	Banning, David
Additional Participating Persons:	AVP-100; Federal Aviation Administration ; Washington , DC
Original Publish Date:	November 15, 2023
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=192742

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](#).