



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Rushville, Indiana	<b>Accident Number:</b>	DCA23LA170
<b>Date &amp; Time:</b>	February 10, 2023, 21:51 Local	<b>Registration:</b>	N944AN
<b>Aircraft:</b>	Boeing 737	<b>Aircraft Damage:</b>	None
<b>Defining Event:</b>	Turbulence encounter	<b>Injuries:</b>	1 Serious, 73 None
<b>Flight Conducted Under:</b>	Part 121: Air carrier - Scheduled		

## Analysis

American Airlines flight 2516 encountered clear air turbulence during decent, while en route to Chicago O'Hare International airport (ORD), Chicago, Illinois. The flight was a regularly scheduled passenger flight from Orlando International Airport (MCO), Orlando, Florida to ORD. As a result of the turbulence, one flight attendant (FA) sustained serious injuries. The aircraft was not damaged, and the flight landed without further incident.

The flight crew reported that while on the VEECK5 arrival at flight level (FL)290, near the top of the decent, air traffic control (ATC) advised of reports of moderate turbulence between FL240 and FL190. ATC suggested the flight begin its decent early to avoid the area, and the flight crew agreed. The flight had previously been smooth, and this was the first turbulence advisory they had received from ATC.

The captain informed the cabin crew to expect moderate turbulence in about 10 minutes and advised them to prepare the cabin for landing and take their seats. The captain made an announcement for the passengers to remain seated. The seatbelt sign was on. While the cabin crew was preparing for landing, the airplane encountered severe turbulence as it descended through FL250.

FA1 reached the forward jumpseat, while FA2 and FA3 reached nearby cabin seats. All 3 had difficulty reaching their seats and trouble securing their seatbelts due to the turbulence. FA4 was lifted up then down to the floor while attempting to reach a seat, injuring her left leg and ankle. She remained on the aisle floor until the turbulence ended, about 2 minutes after it began.

Once FA1 confirmed it was safe to get up, she informed the captain about the injury to FA4 and went to check on the passengers with FA2. FA3 tended to FA4 and made a passenger announcement requesting medical assistance. A nurse who was a passenger on board rendered

aid to FA4. The captain advised dispatch of the event and requested medical personnel meet the airplane at the gate. After landing, FA4 was transported to the hospital where she was diagnosed with multiple fractures to her left leg and ankle which required surgery.

A post-accident weather analysis provided by the operator showed strong horizontal and vertical wind shear and gravity waves in the area indicating an environment conducive to clear air turbulence. Preflight weather planning predicted light to moderate turbulence between FL290 to FL360 in the area of the event. While there were no active Significant Meteorological hazards (SIGMETs) over the area of the event, a turbulence SIGMET was in effect between FL290 and FL360 for an area about 20 nautical miles southeast of the event. The Turbulence Auto-PIREP System (TAPS) had generated severe turbulence reports for altitudes between FL276 and FL244 in the hour prior to the event, and one pilot report of severe turbulence between FL200 and FL250 was issued a few minutes after the event.

### Probable Cause and Findings

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

An encounter with clear air turbulence during descent.

Findings	
Environmental issues	Clear air turbulence - Effect on personnel
Personnel issues	Illness/injury - Cabin crew

## Factual Information

### History of Flight

Enroute-descent	Turbulence encounter (Defining event)
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### Pilot Information

Certificate:	Airline transport; Flight engineer; Flight instructor	Age:	63,Female
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	Glider	Restraint Used:	Unknown
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane single-engine	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	December 13, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	September 7, 2022
Flight Time:	14282 hours (Total, all aircraft), 4453 hours (Total, this make and model)		

### Co-pilot Information

Certificate:	Airline transport; Flight instructor	Age:	60,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	Unknown
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane single-engine	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	November 14, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	December 17, 2022
Flight Time:	14504 hours (Total, all aircraft), 3852 hours (Total, this make and model)		

### Cabin crew Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Unknown
Other Aircraft Rating(s):	Restraint Used:	
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

### Cabin crew Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Unknown
Other Aircraft Rating(s):	Restraint Used:	
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

### Cabin crew Information

Certificate:	Age:	
Airplane Rating(s):	Seat Occupied:	Unknown
Other Aircraft Rating(s):	Restraint Used:	
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

## Cabin crew Information

<b>Certificate:</b>	<b>Age:</b>
<b>Airplane Rating(s):</b>	<b>Seat Occupied:</b> None
<b>Other Aircraft Rating(s):</b>	<b>Restraint Used:</b>
<b>Instrument Rating(s):</b>	<b>Second Pilot Present:</b> Yes
<b>Instructor Rating(s):</b>	<b>Toxicology Performed:</b>
<b>Medical Certification:</b>	<b>Last FAA Medical Exam:</b>
<b>Occupational Pilot:</b>	<b>Last Flight Review or Equivalent:</b>
<b>Flight Time:</b>	

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Boeing	<b>Registration:</b>	N944AN
<b>Model/Series:</b>	737 823	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2000	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	29535
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	181
<b>Date/Type of Last Inspection:</b>	February 7, 2023 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	174200 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>	64466 Hrs at time of accident	<b>Engine Manufacturer:</b>	CFM International
<b>ELT:</b>	C126 installed, not activated	<b>Engine Model/Series:</b>	CFM56
<b>Registered Owner:</b>	American Airlines	<b>Rated Power:</b>	26400 Lbs thrust
<b>Operator:</b>	American Airlines	<b>Operating Certificate(s) Held:</b>	Flag carrier (121)

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>	KGEZ,803 ft msl	<b>Distance from Accident Site:</b>	16 Nautical Miles
<b>Observation Time:</b>	21:53 Local	<b>Direction from Accident Site:</b>	270°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	Clear air / Clear air
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	Moderate / Severe
<b>Altimeter Setting:</b>	30.37 inches Hg	<b>Temperature/Dew Point:</b>	1°C / -3°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Orlando, FL (MCO)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Chicago, IL (ORD)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	20:15 Local	<b>Type of Airspace:</b>	Class A

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious, 5 None	<b>Aircraft Damage:</b>	None
<b>Passenger Injuries:</b>	68 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 73 None	<b>Latitude, Longitude:</b>	39.61003,-85.45(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Brazy, Douglass
<b>Additional Participating Persons:</b>	AVP100; Federal Aviation Administration; Washington, DC
<b>Original Publish Date:</b>	March 12, 2024
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 4</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=106723">https://data.nts.gov/Docket?ProjectID=106723</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](#).