



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Sacramento, California	<b>Accident Number:</b>	DCA23LA213
<b>Date &amp; Time:</b>	March 21, 2023, 15:23 Local	<b>Registration:</b>	N79011
<b>Aircraft:</b>	Boeing 777-224	<b>Aircraft Damage:</b>	None
<b>Defining Event:</b>	Turbulence encounter	<b>Injuries:</b>	1 Serious, 191 None
<b>Flight Conducted Under:</b>	Part 121: Air carrier - Scheduled		

## Analysis

United Airlines flight 194 encountered convective turbulence while climbing through 19,000 ft after departure from San Francisco International Airport (SFO), San Francisco, CA, and a flight attendant was seriously injured. Upon being notified of the injury, the flight crew declared an emergency and diverted to Denver, Colorado for medical assistance.

The flight crew reported that before departure, the purser (lead flight attendant) was asked to have the flight attendants remain seated until the 10,000 ft signal due to weather conditions at the departure airport. After departure, airspeed fluctuations and turbulence were encountered with a smooth ride once the airplane was above a cloud layer. About 12,000 ft the captain gave the 10,000 ft signal that it was safe for the flight attendants to begin the initial service.

When the flight was about 32 miles northeast of SFO the flight crew established communication with Oakland Air Route Traffic Control Center (ARTCC) while climbing through flight level (FL) 175 [17,500 ft]. The controller advised them to expect occasional light turbulence up to FL 260 and instructed them to climb to FL350.

Shortly thereafter, as the airplane climbed through 19,000 ft, the flight encountered unexpected turbulence for about 5 seconds. The flight crew then received a call from the cabin advising them that a flight attendant had fractured her leg.

At the time of the turbulence event, one of the flight attendants was in the aft galley preparing her cart for the initial service when she felt "violent up and down jolting turbulence". She attempted to move towards the nearest jump seat when another "intense bump" occurred. She was thrown into the air and impacted the floor fracturing her leg.

Airmen's Meteorological Information (AIRMETs) were in effect at the time of the accident for moderate turbulence below 12,000 ft and moderate turbulence from FL220 to FL360. A convective Significant Meteorological Information (SIGMET) was issued at 1455 PDT and in effect at the time of the accident for the area with areas of thunderstorms forecast with tops to FL290. A convective SIGMET implies severe or greater turbulence, severe icing, and low-level windshear. Numerous pilot reports (PIREPs) reporting moderate or greater turbulence were issued for central California (including the accident area) within two hours of the accident time.

## Probable Cause and Findings

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

An encounter with forecast convective turbulence during climb.

### Findings

Environmental issues	Convective turbulence - Effect on personnel
Environmental issues	Convective turbulence - Effect on operation

## Factual Information

### History of Flight

Enroute-climb to cruise	Turbulence encounter (Defining event)
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### Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	Age:	62, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	Airplane	Second Pilot Present:	
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	November 2, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	December 12, 2022
Flight Time:	28800 hours (Total, all aircraft), 183 hours (Total, this make and model), 10600 hours (Pilot In Command, all aircraft), 183 hours (Last 90 days, all aircraft), 88 hours (Last 30 days, all aircraft)		

### Co-pilot Information

Certificate:	Airline transport; Commercial	Age:	56, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	5-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:	December 1, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	September 30, 2022
Flight Time:	21900 hours (Total, all aircraft), 1560 hours (Total, this make and model), 3850 hours (Pilot In Command, all aircraft), 77 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Boeing	<b>Registration:</b>	N79011
<b>Model/Series:</b>	777-224	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1999	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	29859
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	400
<b>Date/Type of Last Inspection:</b>	September 14, 2021 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	622061 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2
<b>Airframe Total Time:</b>	101792 Hrs at time of accident	<b>Engine Manufacturer:</b>	
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	
<b>Registered Owner:</b>	UNITED AIRLINES INC	<b>Rated Power:</b>	
<b>Operator:</b>	UNITED AIRLINES INC	<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>	Day
<b>Observation Facility, Elevation:</b>	KSMF, 25 ft msl	<b>Distance from Accident Site:</b>	17 Nautical Miles
<b>Observation Time:</b>	15:27 Local	<b>Direction from Accident Site:</b>	355°
<b>Lowest Cloud Condition:</b>	Scattered / 4400 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 6000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	25 knots / 38 knots	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	140°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.34 inches Hg	<b>Temperature/Dew Point:</b>	16°C / 8°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Sacramento, CA	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Munich, OF	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class A

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious, 11 None	<b>Aircraft Damage:</b>	None
<b>Passenger Injuries:</b>	180 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 191 None	<b>Latitude, Longitude:</b>	38.41679,-121.56391

## Administrative Information

**Investigator In Charge (IIC):** Banning, David

**Additional Participating Persons:**

**Original Publish Date:** June 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.nts.gov/Docket?ProjectID=106933>

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](#).