



Federal Aviation Administration

Fact Sheet – Turbulence

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Attention Passengers: Sit Down and Buckle Up

What is turbulence?

Clear air turbulence is air movement created by atmospheric pressure, jet streams, air around mountains, cold or warm weather fronts or thunderstorms. It can be unexpected and can happen when the sky appears to be clear.

What should passengers do to avoid injuries?

Flying is the safest way to travel. Passengers can easily prevent injuries from unexpected turbulence by keeping their seat belt buckled at all times. The FAA's tips for staying safe:

- Listen to the flight attendants. Pay attention to the safety briefing at the beginning of your flight and read the safety briefing card.
- Buckle up. Keep you and your family safe by wearing a seat belt at all times.
- Use an approved child safety seat or device if your child is under two.
- Prevent inflight injuries by adhering to your airline's carry-on restrictions.

What do airlines do to avoid turbulence and prevent injuries?

Working together through the Commercial Aviation Safety Team (CAST), the FAA developed guidance material to help air carriers and other operators prevent turbulence injuries. CAST develops an integrated, data-driven strategy to reduce the commercial aviation fatality risk in the United States and promotes government and industry safety initiatives throughout the world. Some of the material responds to investigative work from the National Transportation Safety Board. The focus of the material (see additional reading) is to help air carriers avoid the conditions that

cause turbulence and minimize the risks when airplanes do encounter it. This impacts the operations and training of flight crews, flight attendants, dispatchers and managers.

The FAA recommends that air carriers:

- improve dispatch procedures by keeping communication channels open full-time;
- include turbulence in weather briefings;
- promote real-time information sharing between pilot and dispatcher;
- reinforce the air carrier's turbulence avoidance policy through dispatcher training;
- consider rerouting using automation, atmospheric modeling, and data displays; and
- use all applicable weather data as well as reporting and forecasting graphics.

The FAA also encourages air carriers to use operating procedures and training to prevent turbulence injuries, emphasize the importance of flight attendant's personal safety, promote communication and coordination, and gather data and review the air carrier's history of turbulence encounters and injuries.

How many people have been injured during turbulence?

Year	Passenger	Crew	Total
2009	74	27	101
2010	35	23	58
2011	4	25	29
2012	4	19	23
2013	2	4	6
2014	19	9	28
2015	11	16	27
2016	29	13	42
2017	9	8	17
2018	4	5	9

The NTSB requires airlines to report serious injuries and fatalities. A serious injury is "any injury that (1) requires the individual to be hospitalized for more than 48 hours, commencing within seven days from the date the injury was received; (2)

results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second-or third-degree burns, or any burns affecting more than five percent of the body surface.” The FAA tracks these reports, but not general incidents of turbulence.

Additional reading:

Advisory Circular 120-88A Preventing Injuries Caused by Turbulence, 2007

Advisory Circular 00-30 Atmospheric Turbulence Avoidance, 1997

Airplane Upset Recovery Training Aid

Computer Simulation of an Aircraft Cabin

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