

THE ANATOMY OF A TORNADO

Tornadoes are one of the most destructive forces on Earth.

- ~1,200 in the U.S. every year
- Tangential wind speed: 40 mph to >300 mph
- Ground speed: <10 mph to >70 mph
- Track length: several feet to >200 miles
- Duration: minutes to hours

How Severe Tornadoes Form

1 Under unstable and highly sheared atmospheric conditions, a rotating thunderstorm, called a supercell, can form thousands of feet above the earth.

Interactions between the storm and its environment can cause a concentration of the supercell's rotation into a small, rapidly spinning parcel of air, called a funnel cloud.

2

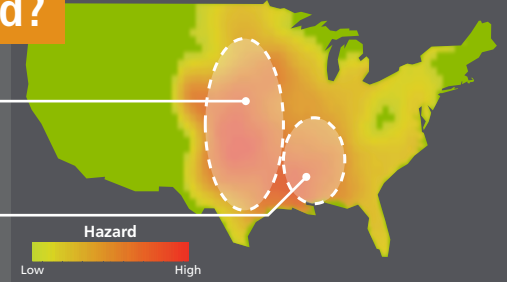
This parcel can grow in size, eventually becoming a tornado—forming one continuous column of rotating air between the ground and the bottom of the supercell.

3

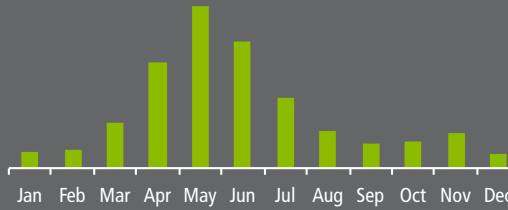
Where's the Hazard?

Most common in "Tornado Alley"

Notable activity also in "Dixie Alley"



A Season for Tornadoes?



Activity peaks in April–June, but tornadoes can develop any time of the year—some regions even experience a secondary peak in early fall

Understanding Tornado Damage

- Extreme pressure or suction can cause catastrophic damage
- Debris can hit windows and glazing of high-rise structures
- Breached windows and roofs expose contents to damage
- Breach of garage doors can lift off the roof and collapse walls



Tornadoes Have Wind Fields Too

- Catastrophic destruction
- Significant structural damage
- Moderate damage to building envelope
- Minor damage to non-structural components
- No significant damage

Managing the Risk



Insured average annual loss for tornado is nearly \$4 billion—hail and straight-line wind add an extra \$9 billion



Losses are highly volatile from year to year, but growing exposure concentrations mean that the potential for large losses is increasing



Using historical data alone does not tell the whole story about future loss potential



Detailed modeling using a blend of statistical and physical methods overcomes data limitations to provide a comprehensive view of the risk