Tornadoes!

Charleston District, Emergency Management Division
What is a tornado?

A tornado is a violent rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of up to 300 miles per hour. They can destroy large buildings, uproot trees and hurl vehicles hundreds of yards. They can also drive straw into trees. Damage paths can be in excess of one mile wide to 50 miles long. In an average year, 800 tornadoes are reported nationwide.
The Fujita-Pearson scale or more commonly known as the F scale, is used to measure the intensity of a tornado based on the amount of damage done by a passing tornado over an area. The scale was introduced in 1971 and is named for Ted Fujita who was a professor at the University of Chicago. The F scale rates a tornado from F0 all the way to F5 tornado having the fastest wind speeds and causing the most damage.
The Tornado Scale (continued)

<table>
<thead>
<tr>
<th>Fujita-Pearson Tornado Scale</th>
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<tbody>
<tr>
<td>F-0 40-72 mph</td>
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<tr>
<td>F-1 73-112 mph</td>
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<td>F-2 113-157 mph</td>
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<tr>
<td>F-3 158-205 mph</td>
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<tr>
<td>F-4 207-260 mph</td>
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<tr>
<td>F-5 261-318 mph</td>
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</table>
The Tornado Scale (continued)

An F0 Tornado:

- Has wind speeds between 40-72 miles per hour
- Causes light damage
- Branches can break off of trees and pushes over small trees
The Tornado Scale (continued)

An F1 Tornado:

• Has wind speeds between 73-112 miles per hour
• Causes moderate damage
• Tiles can break off of roofs. Cars and trailers can get pushed around.
The Tornado Scale (continued)

An F2 Tornado:

- Has wind speeds between 113-157 miles per hour
- Causes considerable damage
- Roofs can get torn off. Big trees can get toppled. Mobile homes can be destroyed. Heavy cars can be lifted and thrown.
The Tornado Scale (continued)

An F3 Tornado:

- Has wind speeds between 158-206 miles per hour
- Causes Severe damage
- Roofs can be torn off even on the most well constructed structures. Trains can be overturned.
An F4 Tornado:

- Has wind speeds between 207-260 miles per hour
- Causes Catastrophic damage
- Well constructed structures can be leveled. Structures with weak foundations can be blown away.
The Tornado Scale (continued)

An F5 Tornado:

• Has wind speeds between 261-318 miles per hour
• Causes Total damage
• Few if any structures are left standing. Cars become missiles flying in the air.
How do tornadoes form?

Most tornadoes form from thunderstorms. You need warm, moist air from the Gulf of Mexico and cool, dry air from Canada. When these two air masses meet, they create instability in the atmosphere. A change in wind direction and an increase in wind speed with increasing height creates an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the updraft tilts the rotating air from horizontal to vertical. An area of rotation, 2-6 miles wide, now extends through much of the storm. Most strong and violent tornadoes form within this area of strong rotation.
What do tornadoes look like?

Tornadoes can appear as a traditional funnel shape, or in a slender rope-like form. Some have a churning, smoky look to them, and others contain “multiple vortices,” which are small, individual tornadoes rotating around a common center. Even others may be nearly invisible, with only swirling dust or debris at ground levels as the only indication of the tornado’s presence.
Interesting Tornado Facts:

• Waterspouts are tornadoes that form over a body of water.
• A strong tornado can pick up a house and move it down the block.
• Knives and forks have been found embedded in tree trunks flung from a tornado.
• Usually a tornado starts off as a white cloud but if it stays around a while, the dirt and debris it sucks up eventually turns it into a black one.
Interesting Tornado Facts (continued):

• 3 out of every 4 tornadoes in the world happen in the United States.

• Tornado winds are the fastest winds on Earth.

• A tornado can sometimes hop along its path. It can destroy one house and leave the house next door untouched.

• Each year, dozens of Americans die from tornadoes.

• Some tornadoes make a considerable amount of noise while others make very little. It depends on the objects a tornado might hit or carry.
Interesting Tornado Facts (continued):

• Tornadoes is from the Spanish word, tronada, meaning thunderstorm.
• Dust Devils are strong tornadoes that pass over desert areas.
• The safest place to be during a Tornado is underground, which makes basements and cellars the ideal shelter to get away from Tornadoes.
• Most of the world’s destructive tornadoes occur during the summer in the mid-western states of the United States.
Interesting Tornado Facts (continued):

- Sometimes multiple tornadoes form and travel together in swarms.
- Rescue workers have compared the destruction left behind by a tornado to a bomb blast.
- The myth of opening the windows in a house will help prevent a tornado from it being destroyed is false. In fact, opening the wrong windows could allow air to rush in and blow the house apart from the inside.
- Tornadoes are often spawned during Hurricane activity.
What is a funnel cloud?

A funnel cloud is a rotating cone-shaped column of air extending downward from the base of a thunderstorm, but not touching the ground. When it reaches the ground it is called a tornado.
What is a supercell thunderstorm?

A supercell thunderstorm is a long-lived thunderstorm whose updrafts and downdrafts are in near balance. These storms have the greatest tendency to produce tornadoes that stay on the ground for long periods of time. Supercell thunderstorms can produce violent tornadoes with winds exceeding 200 miles per hour.
What is a mesocyclone?

A mesocyclone is a rotating vortex of air within a supercell thunderstorm. Mesocyclones do not always produce tornadoes.
What is a microburst?

A microburst is a downdraft (sinking air) in a thunderstorm that is less than 2.5 miles in scale. Although microbursts are not as widely recognized as tornadoes, they can cause comparable, and in some cases, worse damage than some tornadoes produce. In fact, wind speeds as high as 150 miles per hour are possible in extreme microburst cases.
What is a wall cloud?

A wall cloud is an abrupt lowering of a rain-free cumulonimbus base into a low-hanging accessory cloud. A wall cloud is usually situated in the southwest portion of the storm. A rotating wall cloud usually develops before tornadoes or funnel clouds.
What is a waterspout?

A waterspout is just a weak tornado that forms over water. They are most common along the Gulf Coast. Waterspouts can sometimes move inland, becoming tornadoes causing damage and injuries.
What is a gustnado?

A gustnado is a short-lived, relatively weak whirlwind that forms along a gust front. A gust front is the surge of very gusty winds at the leading edge of a thunderstorm’s outflow of air. Gustnadoes are not tornadoes. They do not connect with any cloud-base rotation. But because gustnadoes often have a spinning dust cloud at ground level, they are sometime wrongly reported as tornadoes. Gustnadoes can do minor damage.
When are tornadoes most likely to occur?

Tornadoes can happen at any time of the year and at any time of the day. In the southern states, peak tornado season is from March through May. Peak times for tornadoes in the northern states are during the summer. A few southern states have a second peak time for tornado outbreaks in the fall. Tornadoes are most likely to occur between 3 p.m. and 9 p.m.
Where are tornadoes most likely to occur?

The geography of the central part of the United States, known as the Great Plains, is suited to bring all of the ingredients together to form tornadoes. More than 500 tornadoes typically occur in this area every year and is why it is commonly known as “Tornado Alley.” Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Iowa, Missouri, Arkansas and Louisiana all make up Tornado Alley.
Tornado Watches and Warnings

**Tornado Watch** – Tornadoes are possible in your area. Stay tuned to the radio or television news.

**Tornado Warning** – A tornado is either on the ground or has been detected by Doppler radar. Seek shelter immediately!
Tornado Safety Tips:  
- Before a tornado -

Have a disaster plan. Make sure everyone knows where to go in case a tornado threatens. Make sure you know which county or parish you live in. Prepare a kit with emergency food for your home. Have enough food and water for at least 3 days. Having a weather radio in the house is a great idea.

Don’t bother opening windows to equalize the pressure in the house – it’s a waste of time and the tornado will take care of that for you if it does hit your house.
Tornado Safety Tips:
- During a tornado -

Go to the basement. If you do not have a basement, go to an interior room without windows on the lowest floor such as a bathroom or closet. If you can, get under a sturdy piece of furniture, like a table. If you live in a mobile home get out. They offer little protection against tornadoes. Get out of automobiles. Do not try to outrun a tornado in your car, leave it immediately. If you are outside, go to a ditch or low lying area and lie flat in it. Stay away from fallen power lines and stay out of damaged areas.
Tornado Safety Tips:
- After a tornado -

Stay indoors until it is safe to come out. Check for injured or trapped people, without putting yourself in danger. Watch out for downed power lines. Use a flashlight to inspect your home.
Create a Family Disaster Plan

1. Gather information about hazards – Find out what types of disasters could occur and how you should respond. Learn your community’s warning signals and evacuation plans. Assess your risks and identify ways to make your home and property more secure.

2. Meet with your family to create a plan – Discuss your plan with family. Pick two places to meet: a spot outside your home for an emergency, such as a fire, and a place away from your neighborhood in case you can’t return home.
3. Implement your plan – Post emergency telephone numbers near phones. Install safety features in your home, such as smoke alarms and fire extinguishers. Inspect your home for potential hazards and correct them. Have your family learn basic safety measures (CPR, AED, first aid, how to use a fire extinguisher, how and when to turn off water, gas and electricity in your home. Teach children how and when to call 911 or your local emergency services. Keep enough supplies in your home for at least 3 days. Assemble a disaster supply kit.
Family Disaster Plan (continued)

4. Practice and maintain your plan – Ensure your family knows meeting places, phone numbers, and safety rules. Conduct drills. Test your safety equipment. Replace stored water and food every 6 months.
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