TORNADO!

A tornado is a violent, counterclockwise rotating air column that makes contact with the ground with winds varying between 80 and 200 mph. The most destructive tornadoes have catastrophic winds well above 200 mph; however, the majority of tornadoes have winds of 110 mph or less. If the rotating air column does not reach the ground it is called a funnel cloud. Towering thunderstorm clouds, cumulonimbus clouds, also called super-cell thunderstorms, spawn tornadoes and funnel clouds because of the extreme wind shear within and above the thunderstorm cell.

Hurricanes that make landfall in South Carolina can also produce swarms of tornadoes under the right front quadrant of the hurricane as the hurricane moves over land. Most of these hurricane-related tornadoes are small and short-lived but still have the potential to damage buildings, blow down trees and rip down power lines well inland from the coast. On September 7, 2004, the remnants of Hurricane Frances triggered a record one-day total of 43 tornadoes over South Carolina. Most of the tornadoes touched down in the Midlands and the Pee Dee.

Normally, South Carolina experiences a dozen tornadoes statewide every year. Orangeburg, Florence and Horry counties experienced the most tornadoes during the last 50 years. The most infamous Palmetto State tornado was the April 30, 1924 "Horrell Hill" tornado that touched down in Aiken County and remained on the ground for 135 miles into Florence County. This half-mile-wide killer storm narrowly missed Columbia but unfortunately killed 67 people and injured 678.

Tornado near Broadway at the Beach in Myrtle Beach, July 6, 2001. Photo by Jimmy Card, Pawleys Island, SC

Tornadoes can appear in many shapes and sizes. In the United States, the average tornado is 500 feet across, and can stay on the ground for five miles or longer. Tornadoes can have winds of more than 200 mph, span more than a mile across, and rumble on the ground for tens of miles. Long lasting tornadoes that have path lengths of 100 miles or longer are actually swarms of tornadoes that have formed in quick succession. Weak tornadoes can be only a few feet across. Most tornadoes take on the appearance of a narrow funnel. A very large tornado can look like a large wedge stuck into the ground, and is known as a wedge tornado. Wedge tornadoes can easily have a damage path a mile wide or more.

Tornadoes can also have a wide range of colors. Tornadoes that form in a dry environment can be nearly invisible, marked only by swirling debris at the base of the funnel. Water vapor condensing in the rapidly rotating air column whitens the tornado's funnel. Tornadoes that pick up little or no debris can be gray to white. Slow moving tornadoes that ingest a lot of debris and dirt are usually dark gray to black.

Tornadoes in the dissipating stage can resemble narrow tubes or ropes, and often curl or twist into complex shapes. Multiple-vortex tornadoes can appear as a family of swirls circling a common center, or may be completely obscured by condensation, dust, and debris, appearing to be a single funnel. Dust, heavy rain, and hail are all factors that can reduce the visibility of tornadoes. Tornadoes at night are extremely dangerous. Tornadoes occurring in these conditions are especially dangerous, since only radar observations, or the sound of an approaching tornado, serve as any warning to those in the tornado's path.

Tornadoes are ranked using the National Weather Service's Enhanced Fujita (EF) scale that uses the damage the tornado produces to estimate the winds. Measuring the wind speeds of a tornado is extremely difficult and extremely dangerous. Most wind instruments are destroyed by the very winds they are trying to measure. Recent use of Doppler radar mounted on trucks has produced the first accurate measurements of tornado winds. The EF scale ranks tornadoes from EF0 (65-85 mph) to EF5 (>200 mph). This new scale was implemented for the first time in February 2007. Prior to this the National Weather Service used a simpler, more subjective Fujita scale that also ranked tornadoes on a scale from zero to five. During the 2004 Hurricane Frances tornado outbreak that spanned a two-day period September 6-7, there were 26 F0s, 17 F1s, 3 F2s and one very strong F3 tornado. The F3 tornado demolished several mobile homes, severely damaged cinder block stables in Kershaw County, and flipped a large horse trailer up onto a stable's roof.

Flying debris causes most tornado injuries. Large tornadoes have thrown debris more than 40 miles. Cars have been thrown more than a mile. EF5 tornadoes regularly tear up road pavement, leaving nothing behind but bare dirt. Another chilling characteristic of an EF5 tornado: there is no debris, just bare foundations and concrete slabs remain after the powerful twister removes the shattered houses and throws the debris far from the path of the tornado. Tornadoes throw building materials such as boards and shards of plywood with enough force to pierce walls and even large appliances such as refrigerators.

Tornadoes are a lethal fact of life. Tornadoes are most common in "Tornado Alley" that runs through Texas, Oklahoma, and Kansas. South Carolina also experiences violent tornadoes every spring. National Weather Service forecasters in Greenville-Spartanburg, Columbia, Charleston, and Wilmington, North Carolina, maintain an around-the-clock tornado watch for tornadoes in South Carolina. Forecasters can only, at best, give 15-20 minutes of warning before the ferocious winds strike during the day. At night, tornadoes are even more lethal when people are sleeping and cannot hear the broadcast warnings unless they have a weather alert radio that automatically sounds an alarm when the National Weather Service issues a local tornado warning. These weather alert radios are inexpensive, easy to use, and should be a part of every South Carolina household's emergency kit.

Tornado Safety Do's and Don'ts:

If you see a tornado:

- Take shelter in a basement or tornado cellar immediately!
- Take shelter in a bathtub, closet or under a staircase if no basement available.
- Stay away from all windows! It is a common myth that opening windows will prevent damage by equalizing the inside and outside air pressures. The overwhelming force of the tornado's winds and flying debris, not the pressure difference, demolishes houses.
- A mobile home offers absolutely no protection!
- Vehicles also offer no protection! Leave your vehicle and seek shelter immediately.
- Do not take shelter under a highway overpass. They can be struck by lightning and also act as funnels that increase the wind intensity.