

TORNADO, WINDSTORM

DEFINITION – A wind storm can occur during severe thunderstorms, winter storms, coastal storms, or tornadoes. Straight-line winds such as a downburst have the potential to cause wind gusts that exceed 100 miles per hour. Based on 40 years of tornado history and over 100 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania. (FEMA, 1997). A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes or tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of high wind velocities and windblown debris. According to the National Weather Service, tornado wind speeds can range between 30 to more than 300 miles per hour. They are more likely to occur during the spring and early summer months of March through June and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small, short-lived tornadoes can inflict tremendous damage. Destruction ranges from minor to catastrophic depending on the intensity, size, and duration of the storm. Structures made of light materials such as mobile homes are most susceptible to damage. Waterspouts are weak tornadoes that form over warm water and are relatively uncommon in Pennsylvania. Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries (NOAA, 2002). Based on NOAA Storm Prediction Center Statistics, the number of recorded F3, F4, & F5 tornadoes between 1950-1998 ranges from <1 to 15 per 3,700 square mile area across Pennsylvania (FEMA, 2009). A water spout is a tornado over a body of water (American Meteorological Society, 2009).



MITIGATION ACTIONS FOR RESIDENTS

- ▶ **Personal Preparedness** – It is important to plan for disasters. Families may not be together or at home. Consider completing the following to be prepared.
 - **Family Emergency Communication Plan** (FEMA) serves as a comprehensive checklist for household disaster preparedness. [FEMA Family Emergency Communication Plan Checklist](#)
 - **Family Disaster Plan** (American Red Cross) – Communication networks and electricity could be disrupted. Planning in advance will help ensure that all the members of your household know how to reach each other and where to meet up in an emergency. [American Red Cross Family Disaster Plan Template](#)
 - **Emergency Kits** – It is always a good idea to have an emergency kit on hand. Consider basic items as well as special needs.
 Build a Kit (Ready.gov) [ready.gov Build-a-Kit](#)
 Survival Kit Supplies (American Red Cross) [American Red Cross Survival Kit Supplies Checklist](#)
- ▶ **Emergency Alerts and Warnings** – To receive emergency alerts and warnings, refer to the following websites, mobile apps, and other resources.

TORNADO, WINDSTORM

- **American Red Cross Mobile Apps** (Apple App Store, Google Play, or text to “90999”
[Mobile Apps - The American Red Cross](#)
- **South Central Alert** – This service allows residents and businesses in an eight county area to be notified of an emergency situation and important alert messages in a variety of ways, including on their cell phones, home and work phones, by text messaging and e-mail.
[South Central Alert - Sign Up](#)
- Monitor police news feeds, weather, and news on social media or websites. Receiving periodic updates is vital.
- ▶ **Safe Rooms** – Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks.
- ▶ **Anchoring Manufactured Homes** – Damage and injury can be prevented by anchoring manufactured homes and exterior attachments such as carports and porches.



MITIGATION ACTIONS FOR MUNICIPALITIES

- ▶ **Adopt the York County Hazard Mitigation Plan** by resolution or develop and implement a municipal hazard mitigation plan. [York County Hazard Mitigation Plan](#)
- ▶ **Prepare a Continuity of Operations Plan** to ensure that essential functions continue to be performed under a broad range of circumstances, protecting residents and minimizing business interruption. Consider what capital improvements are needed to adequately protect business or properties. [FEMA Continuity of Operations Brochure](#)
- ▶ **Prepare an Emergency Operations Plan** which describe who will do what, as well as when, with what resources, and by what authority – before, during, and immediately after an emergency. [FEMA Guide for All Hazards Emergency Operations Planning Guide](#)
- ▶ **Coordination** – Develop pre-disaster Memorandums of Agreements or Memorandum of Understanding with adjacent jurisdictions. Build partnerships (neighborhoods, emergency management/first responders, businesses, utility service providers, and local government agencies to strengthen response and recovery.
- ▶ **Public Education and Outreach** – Educate residents regarding risk and impact of hazards, how to prepare and protect themselves and their property. Facilitate funding for mitigation measures and technical assistance programs that address measures that citizens can take. Conduct tornado drills in schools and public buildings and distribute shelter location information.
- ▶ **Construction Standards and Techniques** – To strengthen public and private structures against severe wind damage, communities can require or encourage wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts,

TORNADO, WINDSTORM

laminated or impact-resistant glass, reinforced pedestrian and garage doors, window shutters, waterproof adhesive sealing strips, interlocking roof shingles, or passive ventilation. Also, architectural design can make roofs less susceptible to uplift. Engineered construction can accommodate foundation design, braced elevated platforms, and the ability of a structure to withstand the lateral forces of winds. Promote natural environmental features as wind buffers in site design.

- ▶ **Promote/Provide Safe Rooms** – Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.
- ▶ **Require Anchoring of Manufactured Homes** – Damage and injury can be prevented by anchoring manufactured homes and exterior attachments such as carports and porches.
- ▶ **Protect Power Lines and Infrastructure** – Establish standards for tree pruning around lines, and burying power lines.