



Severe Wind

Severe wind can occur alone, such as during straight-line wind events and derechos, or it can accompany other natural hazards, including hurricanes and severe thunderstorms. Severe wind poses a threat to lives, property, and vital utilities primarily due to the effects of flying debris or downed trees and power lines. Severe wind will typically cause the greatest damage to structures of light construction, particularly manufactured homes.

SW-1 Adopt and Enforce Building Codes

FEMA Resources/Publications

FEMA P-85, P-804

Adopt regulations governing residential construction to prevent wind damage. Examples of appropriate regulations are:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting standards from International Code Council (ICC)-600 *Standard for Residential Construction in High-Wind Regions*.
- Reviewing building codes and structural policies to ensure they are adequate to protect older structures from wind damage.
- Requiring or encouraging wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced pedestrian and garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles.
- Requiring tie-downs with anchors and ground anchors appropriate for the soil type for manufactured homes.
- Prohibiting the use of carports and open coverings attached to manufactured homes.
- Requiring the use of special interlocking shingles designed to interlock and resist uplift forces in extreme wind conditions to reduce damage to a roof or other structures.
- Improving nailing patterns.
- Requiring building foundation design, braced elevated platforms, and protections against the lateral forces of winds and waves.
- Requiring new masonry chimneys greater than 6 feet above a roof to have continuous reinforced steel bracing.
- Requiring structures on temporary foundations to be securely anchored to permanent foundations.

SW-2 Promote or Require Site and Building Design Standards to Minimize Wind Damage

FEMA Resources/Publications

FEMA P-499, 550

Damage associated with severe wind events can be reduced or prevented if considered during building and site design. Examples include the following:

- Using natural environmental features as wind buffers in site design.
- Incorporating passive ventilation in the building design.
- Incorporating passive ventilation in the site design. Passive ventilation systems use a series of vents in exterior walls or at exterior windows to allow outdoor air to enter the home in a controlled way.
- Encouraging architectural designs that limit potential for wind-borne debris.
- Improving architectural design standards for optimal wind conveyance.
- Encouraging wind-resistant roof shapes (e.g., hip over gable).

SW-3 Assess Vulnerability to Severe Wind

In order to better understand and assess local vulnerability to severe wind, consider actions such as:

- Developing and maintaining a database to track community vulnerability to severe wind.
- Using GIS to map areas that are at risk to the wind hazard associated with different hurricane conditions (e.g., Category 1, 2, 3, etc.) and to identify concentrations of at-risk structures.
- Creating a severe wind scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop severe wind mitigation priorities.
- Using Hazus to quantitatively estimate potential losses from hurricane wind.

SW-4 Protect Power Lines and Infrastructure

The regular maintenance and upkeep of utilities can help prevent wind damage. Possible strategies are:

- Establishing standards for all utilities regarding tree pruning around lines.
- Incorporating inspection and management of hazardous trees into the drainage system maintenance process.
- Preemptively testing power line holes to determine if they are rotting.
- Inspecting utility poles to ensure they meet specifications and are wind resistant.
- Burying power lines to provide uninterrupted power after severe winds, considering both maintenance and repair issues.
- Upgrading overhead utility lines (e.g., adjust utility pole sizes, utility pole span widths, and/or line strength).
- Avoiding use of aerial extensions to water, sewer, and gas lines.
- Using designed-failure mode for power line design to allow lines to fall or fail in small sections rather than as a complete system to enable faster restoration.
- Installing redundancies and loopfeeds.

SW-5 Retrofit Residential Buildings

FEMA Resources/Publications

FEMA 320, 361, 453, P-499, P-804

The following types of modifications or retrofits to existing residential buildings can reduce future wind damage:

- Improving the building envelope.
- Installing hurricane shutters or other protective measures.
- Retrofitting gable end walls to eliminate wall failures in high winds.
- Replacing existing non-ductile infrastructure with ductile infrastructure to reduce their exposure to hazardous events.
- Retrofitting buildings with load-path connectors to strengthen the structural frames.
- Installing safe rooms.
- Reinforcing garage doors.
- Inspecting and retrofitting roofs to adequate standards to provide wind resistance.

SW-6 Retrofit Public Buildings and Critical Facilities

FEMA Resources/Publications

FEMA 361, P-499, 550

Public buildings and critical facilities can be retrofitted to reduce future wind damage with the following actions:

- Improving roof coverings (e.g., no pebbles, remove ballast roof systems).
- Anchoring roof-mounted heating, ventilation, and air conditioning units.
- Retrofitting buildings with load-path connectors to strengthen the structural frames.
- Retrofitting or constructing the emergency operations center to FEMA 361 standards.
- Avoiding placing flag poles or antennas near buildings.
- Upgrading and maintaining existing lightning protection systems to prevent roof cover damage.
- Requiring upgrading of reused buildings that will house critical facilities.
- Protecting traffic lights and other traffic controls from high winds.
- Converting traffic lights to mast arms.

Education and Awareness Programs

SW-7 Increase Severe Wind Risk Awareness

*FEMA Resources/Publications
FEMA P-431, P-804*

Improve public awareness of severe wind through outreach activities such as:

- Informing residents of shelter locations and evacuation routes.
- Educating homeowners on the benefits of wind retrofits such as shutters, hurricane clips, etc.
- Ensuring that school officials are aware of the best area of refuge in school buildings.
- Instructing property owners on how to properly install temporary window coverings before a storm.
- Educating design professionals to include wind mitigation during building design.

Other severe wind-related mitigation actions may also apply to other hazards. See the sections entitled “Multiple Hazards” and “Tornadoes” for other possible ideas.



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