

## PROMOTING SAFER BUILDING PRACTICES

Promoting safer building practices is part of the mission of the Center for Natural Hazards and Disaster Research at the University of Oklahoma. The following recommendations were assembled in consultation with experts from engineering, architecture, meteorology at OU and from business, real estate, homebuilders, insurance industry, and both federal and state governmental agencies.

Severe weather can take the form of straight-line and tornadic winds, hail, flooding, and lightning. Surviving structural damage due to severe weather in commercial and residential structures requires improved architectural planning and engineering design for severe-weather resistant structures. Incorporating wind resistant features into a new home is easier and more cost effective than retrofitting an existing home. The time to invest in a stronger-built home is when it is being built. Designing a home that can withstand higher wind speeds increases the home's resistance to tornado damage and reduces disruption to the homeowner's routine. It can also help protect irreplaceable personal property. Additionally, using impact-resistant windows and doors helps make the home more resistant to theft, which provides added incentives to home buyers to choose homes that have special features designed to withstand the weather that is typical in their region such as Oklahoma.

Wood is the most prevalent building material in residential construction in Oklahoma making many homes vulnerable to wind damage. Different construction materials and techniques have been shown to better withstand severe weather hazards. These construction materials include light gauge steel (LGS) and insulated concrete forms (ICF). Experience has given insurers, designers, engineers and builders valuable insights into how homes are damaged or destroyed by catastrophic events. The Institute for Building and Home Safety (IBHS) has identified the vulnerable features in home construction and has incorporated these concepts into the "*Fortified . . . for safer living*" program. The most relevant features are:

- **Windows** - Windows are a first line of defense against windstorm damage. When windows are lost, the full force of the wind and rain enters your home, destroying interiors and contributing to the loss of the roof and walls. Impact resistant windows or shutters can protect against wind-borne debris.
- **Garage doors** - Garage doors have been shown to be an important failure initiation point during a major windstorm. If this happens, the subsequent damage to your home will be severe. Upgraded garage doors and tracks, as recommended by the "*Fortified . . . for safer living*" program, should substantially reduce this risk.
- **Entry doors** - Entry doors are another major weak point in a building under siege by nature's wrath. Steel doors, reinforced door frames and other steps can provide a home with added protection against the risks it may face.
- **Roofs** - Properly installed hurricane straps and other roof restraints will lend much greater strength to a home during a serious windstorm event. The choice of roofing material, too, in areas prone to wildfires can have a major impact on survivability.
- **Gables** - Gable ends of roofs must be thoroughly braced to prevent the wind from compromising roof strength and structural integrity during windstorms.
- **Exterior Walls** - When properly anchored, sheathed and reinforced, these walls should help reduce the risk of collapse.
- **Exterior structures** - Carports, porches and patios should be securely anchored to prevent them from breaking loose and damaging your home or your neighbors' homes during a windstorm.
- **Landscaping** - The placement of bushes, shrubs and other decorative plants and landscape features can have a major impact on a home's survivability in a wildfire event.
- **Exterior cladding** - Many homes with brick veneer exteriors have inadequate attachment between the masonry wall and the exterior walls. Inadequately attached, un-reinforced masonry veneer collapses easily in strong winds, potentially damaging exterior walls. Further, the masonry elements can become dangerous projectiles in the wind.
- **Masonry chimneys** - Tall masonry chimneys, a common feature in homes of the region, can collapse in relatively weak winds, with the potential to create enormous structural damage in situations where there would otherwise be little or no damage potential. Such structures must be adequately reinforced to withstand winds.

Other features to be considered for a wind-resistant home include:

- One-story house
- Hip roof style
- 5/12 roof slope (This means the roof slopes 5" vertically for every 12" horizontal run.)
- Limited overhang dimensions
- No roof projections
- Single-car garage doors
- Windows and doors located away from house corners

Maintaining the integrity of windows and doors during a windstorm is extremely important. If a door or window is blown in, it may allow the interior of the structure to become pressurized. Once pressurized, the wind inside the structure can blow out walls or blow off the roof. The roofing system and other building components can become the weak link. When the shingles are stripped off by wind, subsequent water damage or pressurizing the interior of the building can result in substantial damage.

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