REBUILDING AND REPAIRING SAFER AND STRONGER POST-SANDY

As Sandy recovery continues, residents and business owners have turned their attention toward rebuilding damaged and destroyed homes and commercial operations. The Insurance Institute for Business & Home Safety (IBHS) provides the following considerations to help prevent or reduce future damage. It is important to note, however, that this paper is not intended to serve as a property mitigation manual.

PREPARE BEFORE MOTHER NATURE STRIKES

Communities cannot readily move out of Mother Nature's way, but they can undertake measures to make them more resilient. Experience has taught us that communities, homeowners and businesses prepared for severe weather events are able to recover and resume normal operations much quicker.

While the majority of damage caused by Sandy was water-related, the next storm could very well bring high winds. Home and business owners in Sandy's path may have had the common misconception that because this particular storm had relatively low wind speeds, damage would not be significant. That, of course, was not the case. A slow-moving Category 1 hurricane or less intense windstorm with a large wind field diameter can result in coastal storm surge and inundation, which is as significant as that from a fast-moving Category 2 or 3 hurricane with a smaller wind field. This means home and business owners in hurricane-prone areas, such the Jersey Shore and New York coastline, must prepare buildings to better withstand both high winds and flooding.

Preparing for catastrophes not only helps reduce property damage, it also helps preserve jobs and the local tax base. Sadly, one in four businesses forced to close for at least 24 hours by a disaster never reopens. The widespread power outages caused by Sandy shuttered businesses for many days and, in some cases, weeks. The best way to prevent a lengthy disruption is having a solid plan in place ahead of time. Open for Business® is a free, easy-to-use business continuity toolkit for small- and medium-sized businesses developed by IBHS and field tested by real disasters.

BUILDING CODES

IBHS has examined building codes in New York and New Jersey and offers critical information and suggestions to help increase building resilience for future storms. It is important to note that building codes provide the minimum acceptable life safety standards for design, construction and maintenance. Consequently, the best advice is to move beyond the code's minimum requirements when rebuilding or repairing. Stepping up to minimal engineering-based hurricane design guidance would provide substantial well-proven increases in wind resistance for the home, while only likely adding 1% to 2% to the cost of a typical house.

The International Code Council family of codes – the International Building Code and International Residential Code – do include a number of provisions that deal with flood-resistant design and construction. However, they do not include their own flood elevation maps, nor do they push for building above the minimum requirements. Instead, flood elevation refers to local flood plain management and National Flood Insurance Program (NFIP) requirements. IBHS recommends habitable spaces and utilities be located 3 feet above the minimum flood elevation requirements. Critical elements, aside from elevation, that must be considered when rebuilding and repairing buildings in hurricane-prone areas are: strength of the roof; connecting the different components of the building; opening protections for doors and windows. Outlined below are guidelines for considering each of these elements. For more detailed information about building codes, please see IBHS' paper, Status of Building Codes in New York and New Jersey: The Future of Resilience in a Post-Sandy Environment.

REBUILDING STRONGER AND SAFER

Fortunately, there is no mystery about how to create safer, stronger residential and commercial structures that are better equipped to resist hurricanes. It is important to take a holistic approach toward rebuilding by looking at your home or business as a system comprised of components that work together to better withstand Mother Nature's fury. Some of the most valuable property protection techniques are relatively simple and cost-effective when measured against the return on investment.

1. GET THE ROOF RIGHT AND KEEP IT STRONG

The roof is every building's first line of defense against hurricanes and other disasters, but also its greatest vulnerability. Every day, roofs are exposed to weather and other elements that may contribute to decay and deterioration, which increases the risk of damage during an event like Sandy. Getting the roof right starts with design, materials selection and installation at the time a home or business is constructed or re-roofed. Specific recommendations:

- Use ring shank nails instead of smooth nails or staples to attach the roof sheathing, which will double the strength of a residential roof. This improvement costs about $100 for an average home.

Using ring shank nails (shown above) will double the strength of a residential roof.

- Effectively sealing the roof deck by covering all the joints and seams in the roof sheathing with self-adhering roof tape will prevent wind-driven rain from getting inside, if the roof cover is damaged. This improvement costs approximately $500 for an average home.

- For commercial roofing, ensuring the roof elements are securely anchored to the roof deck, particularly around the perimeter, and that flashing is robust and well attached is critical – and relatively inexpensive.

- It is equally important to conduct regular maintenance and repairs to prolong the useful life of a roof, and to make sure it does its job in protecting your home and/or business from weather damage.

"The roof is every building's first line of defense against hurricanes and other disasters, but also its greatest vulnerability."

2. CREATE A CONTINUOUS LOAD PATH FROM ROOF TO FOUNDATION

- This requires connecting the roof to the walls, the walls to the floors, and the first story to the foundation using connections and systems that are specifically designed to tie the building together. This will strengthen the entire structure and greatly reduce the chances that it will come apart during high-wind events. This is best accomplished when the building is being built or when a major renovation or repair is undertaken.

- Don't settle for conventional connections and building practices – make sure the designer and builder are using sound engineering-based connections. This will ensure you get the most out of the strength you are already paying for, or have paid for, in the walls and roof structural elements. Connections are almost always the weakest links.

3. PROTECT WINDOWS AND DOORS TO KEEP WIND AND WATER OUT

- Windows and doors should meet wind design pressure requirements for the area. Impact-rated windows are the only window systems designed and certified to protect your building from wind pressure and windborne debris without any additional exterior protection system such as shutters.

- Impact-rated windows are passive protection systems that are in place 24/7. They do not need to be activated during other busy storm preparations. They also provide protection against unexpected weather events.

- If you can't afford impact-rated windows and doors, you should at least obtain shutters for these openings in your walls. Make sure permanent anchors are in place and everything is labeled. This will allow for quick installation when a hurricane threatens. This is particularly important for older buildings, which do not have a well-developed continuous load path tying the structure together and anchoring it to the foundation.

4. PROPERLY ELEVATE YOUR HOME OR BUSINESS FOR EFFECTIVE FLOOD MITIGATION.

Proximity to water is the top risk factor for flooding. This includes coastal storm surge such as that caused by Sandy; rising river waters as occurred during Hurricane Irene; and overtopping, breaching or opening of dams, levees, and other flood control mechanisms as was the case during Hurricane Katrina. It is always a best practice to locate property far away from bodies of water, but if your home or business must be near water, the building must be elevated above expected flood and surge levels.

- Home and business owners should use the post-Sandy rebuilding opportunity to elevate buildings above minimum base flood elevation standards established by the Federal Emergency Management Agency (FEMA) and used in the NFIP.
- FEMA recently issued revised advisory base flood-elevation maps. It is important to note that FEMA recommendations are not the law. Towns still must incorporate the guidance into local zoning and building ordinances.
- IBHS strongly recommends that municipalities in areas at high risk of flooding adopt the FEMA standards as the minimum level of protection. Elevating at least three feet above the base flood elevation or FEMA advisory base flood elevation standards would be optimum.

Property owners above are shown removing items that were damaged by flooding during Sandy.

An aerial view of Sandy's strong storm surge that caused extensive damage along New Jersey's barrier beaches.

IBHS conducts building science research on full-scale houses and commercial structures at its unique, multi-hazard Research Center, in order to fully and accurately evaluate various construction materials and systems. For more information and guidance about how to make homes and businesses more resistant to natural catastrophes and severe weather events, visit DisasterSafety.org.

> **"Proximity to water is the top risk factor for flooding."**

IBHS is a non-profit applied research and communications organization dedicated to reducing property losses due to natural and man-made disasters by building stronger, more resilient communities.

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