Builder

CONSIDERATIONS FOR BUILDING IN HURRICANE-PRONE REGIONS

Fortifying the roof and wall systems and ensuring proper installation of wind-rated window and door products are essential in areas commonly impacted by hurricanes.

Flooding and wind damage from hurricanes is becoming increasingly common in the United States. In 2020, 14 hurricanes formed over the Atlantic basin, including six "major" hurricanes—classified as a category 3 or above. In 2022, eight hurricanes formed over the Atlantic, including major storm Hurricane Ian.

The frequency of damage highlights the resiliency of built structures as an important central element. And, according to research from CoreLogic, homes directly on the coast are not the only ones that could be at risk as climate patterns change.

In 2023, CoreLogic identified more than 32 million single-family residences at a moderate or more significant risk of sustaining damage from hurricane-force winds. Research suggests that by the year 2050, more powerful storms, a rise in sea level, and warmer atmospheric temperatures will give hurricanes a greater capacity to hold more moisture and to penetrate farther inland to locations previously shielded from consequential damage. As such, greater cognizance to resilient practices will be expanded with more areas at risk of hurricane damage.

Doug Faron, co-founder and managing partner at Shoreham Capital, a private firm focusing on multifamily, single-family, and build-to-rent communities in the Sun Belt region, says the construction industry is getting more thoughtful about resilience and aware of best practices to produce a more resilient structure.

"I think those that are focused just on reduced cost and pinching pennies, this is not the area to do it," Faron says of resiliency. "Whether or not you're going to get hit with that storm event, just being able to insure your product alone is going to be expensive if you aren't building properly or thinking about resiliency when you build."

According to damage data published by Auburn University's Structural Extreme Events Reconnaissance (StEER) network, roofs—including roof covers, substrates, and structures—windows, and walls are the most common elements of a home to be damaged by wind. The data shows that between 26% to 50% of the roof cover on a single-family home is typically damaged in an extreme windstorm, according to StEER.

"We look at many things throughout the design process, such as how certain roof profiles and slopes work best in high wind environments," says Richard Leischner, regional director of architectural services in the Florida area for Taylor Morrison. "We also carefully select building materials and practices that perform best and thrive in these environments, including selections that meed the Florida Product approval requirements."

Faron says when considering resiliency, a lot of considerations are baked into code as municipalities "are getting better at thinking" about what happens when homes are built in

storm-prone areas. Shear walls and strapping are important for hurricane resiliency; shear walls can help prevent a house from tipping, and strapping helps prevent wind from ripping parts of the house from the structure. In its "Designing for Natural Hazards" series, the Department of Housing and Urban Development (HUD) says the installation of window shutters to protect from wind-borne debris should be prioritized in the building process.

Simple considerations, such as wind ratings for window products and roof tiles, are important, as is the proper installation of those products. Odeh Kheir, regional director of value engineering and architectural services for Taylor Morrison, says the incorporation of wind-resistant features, such as reinforced roofs, impact-resistant windows and doors, and hurricane straps or clips connect to the roof, are of essential importance. Kheir says roofing materials such as metal or tile roofs are recommended, as the materials perform better in high-wind situations compared to asphalt shingles.

"I think what's critical is using the higher-rated products, making sure the shell and the connectivity between the various products—roof, window, truss—to the structure are all working in unison to create the best possible interface against what we're typically facing with a high wind event," Faron says.

When considering flooding, another common hurricane concern, elevation is most important. Building outside of flood zones on elevated lots is a first step to fortification, helping prevent water from entering a home.

"When it comes to flooding, we review the base flood elevation for that location based on the data we have from FEMA and the local jurisdiction. Then, we identify if there is a freeboard requirement within the jurisdiction, which is typically one feet higher than the base flood elevation," says Leischner. "This lets us know what the minimum height of the finished floor in the habitable portion of the home should be to best avoid flooding under normal conditions."

Swales—areas of land that are lower down to create a natural barrier—can be made in the construction process to help divert the water from flooding as well. Leischner says areas of a home that may be in a flood area, such as a garage, must be designed with flood vents and flood-resistant materials to allow water to cross flow through the space in the event of a flood. Site design and drainage are also important considerations, especially during extended periods of heavy rain in a short period of time, according to Leischner.

When building in Florida, Faron says Shoreham Capital favors concrete block construction over stick framing, even in areas where stick-frame construction is permitted.

"Concrete block rather than stick construction is proven to be much more resilient to high winds and storm events. Not only from an operational, resiliency perspective, but also from a cost," Faron says. "We think for us, building with concrete block—especially in Florida—for the foreseeable future is rewarded both in terms of resiliency and cost to carry."

Leischner says Taylor Morrison's homes in its Jacksonville market are constructed with frame materials on the first and second floors, while homes in the Tampa, Orlando, Port St. Lucie, Sarasota, and Fort Myers/Naples markets are construction with concrete block walls on the first floor and frame materials on the second floor.

Faron adds builders and construction firms should consider alternative materials and methods to build that could be employed while only changing cost marginally. Builders can consider options for building types, materials, and methods that might improve resiliency and analyze cost differentials.

"I think there's an awesome opportunity to use a slightly different product that costs the same [or] slightly more that creates real benefits from a resiliency perspective," he says. "I think you maybe don't choose to do everything, because I think building a fortress everywhere might be cost prohibitive, but I think there are some simple changes you can make that really help the end product, both cost of carry and resiliency."

HUD says proper decking and flashing installation for roof decks, covers, and underlayment should also be prioritized as well as installing roof coverings specifically designed for high-wind zones. Continuous load path connections, sheathing, a weather-resistant barrier, and wind-rated windows and doors are all also recommended to improve wall system performance against wind damage.

"It's [also important to consider] the construction methods, how do all of [the materials] come together?" Faron notes. "You could have a really resilient window, but if you don't caulk in properly around it and have leaking around it, [the window] does you no good. It's not only those materials, but it's the construction types and quality."

Leischner says the inspection process is particularly important as, oftentimes, when items have failed, "it is discovered that it was due to an installation issue rather than the product itself." The training of personnel and subs, familiarization with building codes, and communication with vendors are also simple, non-building technique related practices that can help ensure resiliency is addressed in the construction process.

"Resiliency as a general concept is something everybody throughout the country should be thinking, but those considerations are very different depending on what your natural disaster risk might be," Faron says. "It's our hope that as much as there might be increased storm events in the future, as long as we're building to stronger code, we should have a product that works well."