



IBHS RESEARCH



IBHS ASKS, “WHAT IF?”

Making Section 8 Housing FORTIFIED



IBHS Asks, “What if?”: Making Section 8 Housing FORTIFIED

Science-backed roof retrofits across a portfolio of Section 8 multifamily and single-family housing in hurricane-prone states would reduce expected losses by 30%-50%.

The US Department of Housing and Urban Development (HUD) provides federal rental assistance to households with low incomes, seniors, and people with disabilities. As of 2022, more than 5.2 million American households received federal rental assistance to afford housing¹.

These same households are less likely to prepare for disasters, evacuate safely, avoid physical or psychological trauma, or recover quickly and fully. For these populations, a resilient home—one able to withstand severe weather—is particularly important (Figure 1). And yet, for too many people, a resilient home is simply not available.

Solutions exist to make all housing—including housing in HUD’s rental assistance program—more resilient to severe weather. Based on decades of research by the Insurance Institute for Business & Home Safety (IBHS), FORTIFIED is a voluntary construction and re-roofing program designed to strengthen properties against

severe weather. Available for both single-family homes (FORTIFIED Home™) and multifamily housing (FORTIFIED Multifamily™), the FORTIFIED program features three levels of increasing resilience. Buildings with a FORTIFIED Roof™ designation have a roofing system that provides better protection against hurricanes, severe convective storms, and straight-line winds. FORTIFIED Silver™ and FORTIFIED Gold™ designations provide even more protection.

Recognizing the deep need to strengthen the resilience of federally supported housing, HUD developed the Green and Resilient Retrofit Program (GRRP) in 2023 to provide grants and low-cost loans to eligible property owners serving households with low incomes, seniors, and people with disabilities. The grants and loans allow property owners to make properties more resilient against the effects of climate hazards, reduce carbon emissions, utilize renewable energy, and/or make properties more efficient. FORTIFIED is one of the resilience solutions funded by the GRRP.



Figure 1: Photograph of a Habitat Strong house (center) following Hurricane Michael (2018) in Panama City, Florida. This home was built to FORTIFIED Gold™ by Habitat for Humanity. It suffered only minor siding damage and likely experienced peak gust wind speeds of 140–150 mph.

¹ <https://www.cbpp.org/research/federal-rental-assistance-fact-sheets#US>

To better understand the value of FORTIFIED for affordable housing, IBHS conducted an idealized study to explore the loss reduction potential if all roofs for Section 8 multifamily and single-family housing along the Atlantic and Gulf coasts were retrofitted to the IBHS FORTIFIED Roof standard. The FORTIFIED Roof standard focuses on:

- increasing roof sheathing uplift resistance using ring-shank nails and an enhanced nailing pattern,
- sealing the roof deck to minimize wind-driven rain intrusion in the event of roof cover damage, and
- enhancing sealant details for edge shingles during installation to prevent roof cover damage in the areas which experience the highest wind uplift forces.

Two different catastrophe models were used to conduct an idealized study using the portfolio of Section 8 housing—both multifamily and single-family structures—along the Atlantic and Gulf coasts. Each catastrophe model’s North American hurricane stochastic event set was used to generate the expected damage and loss statistics. Model runs were provided by a major property reinsurance company. These event databases simulate tens of thousands of hurricanes, their typical tracks, and impacts at landfall over time. Damage functions were then used to relate the severity of a specific hazard, such as hurricane winds, to a specific degree of damage and ultimately to estimate the financial loss because of the resulting damage. The large sample size of modeled storms over a longer time frame enables loss statistics to be calculated. Damage functions can also be adjusted to replicate the performance of different construction practices, including more resilient options such as the FORTIFIED standard. This allows comparisons between conventional construction, resilient retrofits, and more resilient new construction.

For the purposes of this idealized study, the locations of Section 8 housing were applied within the two different catastrophe models. In the absence of detailed information about each individual structure, the structures

were modeled to be representative of typical 1990s pre-modern building code construction. The hurricane event set was used to simulate the history of hurricane impacts. The portfolio was modeled a second time but under the scenario that all structures were retrofitted to the FORTIFIED Roof standard. The hurricane database was run again to estimate the loss reduction potential offered by the improved performance of FORTIFIED. This was done for both multifamily and single-family structures within the Section 8 portfolio. The result is a comparison in total loss reduction potential as measured by the relative performance across the severity of storms contained in the database. The relative performance improvement can be assessed by exploring the differences in losses between the current portfolio and the “what if” scenario with structures retrofitted to the IBHS FORTIFIED Roof standard. Within the catastrophe model framework, wind speed severity is expressed as the annual probability that a given wind speed occurs at each structure’s location during a landfalling hurricane. This can also be shown as a “return interval” (i.e., a 5% annual probability event equates to a 1 in 20-year event). The smaller the annual probability (higher the return interval), the more severe the wind speed exposure from the event.

FORTIFIED Roof Retrofit Loss Reduction Potential

For multifamily structures, the total loss reduction potential ranged between 30% and 50% for the two models. Figure 2 provides the mean results from the catastrophe models. The greatest loss reduction potential occurred with 5% (20-year return interval) and 2% (50-year return interval) annual exceedance probability for tropical cyclone wind. These types of events are representative of more frequent but lower severity hurricanes with sustained winds of less than 100 mph. The benefit of using a FORTIFIED Roof retrofit option for Section 8 multifamily housing peaked between sustained winds of 80 mph and 100 mph. At these wind speeds, damage to components and cladding materials such as shingles and

siding is most common, while structural damage is not. The FORTIFIED Roof standard, especially when used as a retrofit option, is designed to mitigate damage in this type of event.

The loss reduction potential was very similar, as expected, for single-family Section 8 homes (Figure 2). The total potential loss reduction ranged from 30% to 50% for the two models, with a peak loss reduction of 35%-50% for the 5% probability winds (20-year return interval event). For 1% probability winds—featuring higher wind speeds—model loss reduction values began to converge with a range of 30%-40%.

Section 8 Multifamily Housing: FORTIFIED Roof Hurricane Loss Reduction Potential

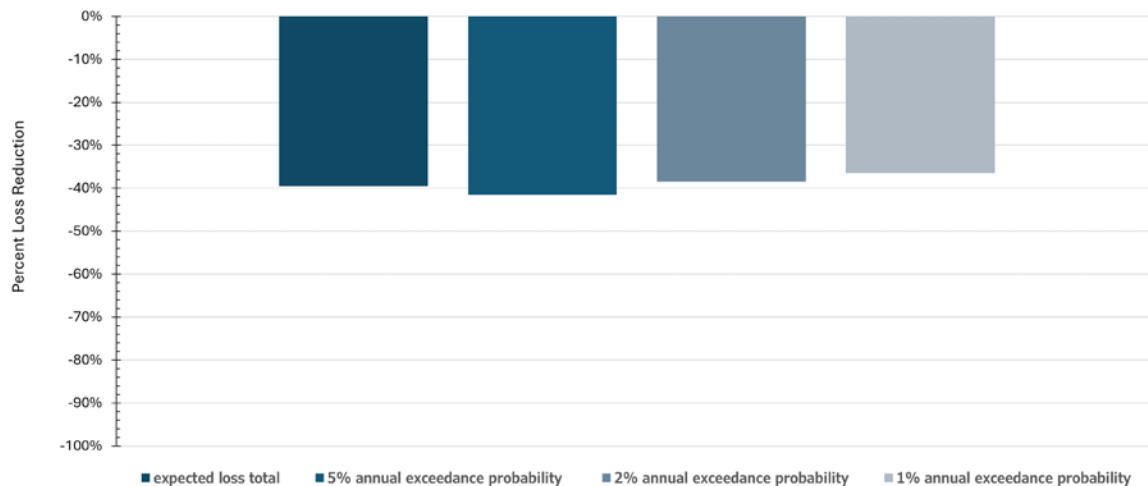


Figure 2: Simulated mean hurricane loss reduction potential for Section 8 Multifamily structures using a FORTIFIED Roof retrofit.

The results provided in this idealized study highlight the tremendous potential for reducing damage and financial loss to Section 8 housing if retrofitted to the IBHS FORTIFIED Roof standard.

From both a financial and policy perspective, FORTIFIED retrofits have strong benefits.

- For Section 8 property owners, the expected loss reduction from FORTIFIED may provide better access to affordable insurance options and reduce the likelihood of paying the named-storm deductibles in hurricane-prone areas, which are often higher-dollar amounts than other types of deductibles.
- For Section 8 residents, more resilient housing lowers the risk of displacement that can disrupt lives, educational opportunities, and jobs.
- For policymakers, resilient retrofits that improve housing's ability to withstand severe weather can better deliver "quality" homes that are more likely to withstand hurricanes and other forms of severe weather and keep families housed.