New metric shows that when building in areas prone to natural disasters, it pays to make informed decisions

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Debris and damage from Hurricane Ivan in Pensacola, Florida, Sept. 17, 2004. Credit: Jocelyn Augustino/FEMA/Wikimedia Commons

Hazard-induced maintenance costs can be significant over the lifetime of

a building. Researchers at the MIT Concrete Sustainability Hub (CSHub) are developing new methods to calculate the benefits of investing in more hazard-resistant structures. Jeremy Gregory, executive director of the CSHub recently presented one metric, the CSHub's Break-Even Hazard Mitigation Percentage (BEMP), to officials in Florida and Georgia—states that can see millions in property damage due to hurricanes.

"The BEMP evaluates the cost-effectiveness of mitigation features for a building in a particular location by factoring in the expected damage a conventional building designed to code would endure over its lifetime, and comparing it to a more resilient, enhanced building design," says Gregory. "In areas prone to natural disasters, more spending on mitigation is justified—the BEMP helps to identify how much extra spending is recommended."

The southeastern United States was hit hard by weather patterns resulting from Hurricane Matthew in October. Georgia has sustained some $90 million in insured losses to date, and total claims are expected to rise. Florida was spared Matthew's worst effects, but the state is regularly witness to the destructive power of such storms and there's a lot at stake: The insured value of residential and commercial properties in Florida's coastal counties now exceeds $13 trillion.

Gregory spoke to officials and members of the building community in Atlanta, Georgia, and Tallahassee, Florida, this month during roundtable discussions about building resilience, the BEMP, and hazard mitigation. He also presented the topic to journalists and industry professionals during a recent webinar.

"Structures in coastal areas states like Florida and Georgia are prone to damage from high winds and hurricanes," says Gregory. "Through previous case studies we've demonstrated that investing in more hazard-

resistant residential construction in some locations can be very cost-effective, especially in costal states where the impact of hurricanes can have devastating economic effects."

One case study showed a BEMP of 3.4 percent for in the coastal city Galveston, Texas, meaning for a $10 million midrise apartment building, $340,000 could be spent on mitigation, and costs would break even over the building life. The highest BEMP calculations are in cities in southeastern Florida, where the values are approximately 8 percent.

Too often, building developers make decisions about materials or building techniques to keep initial costs down. Although the resulting structures are built to code, those codes often fail to factor in the long-term costs or impacts on future owners and communities. One of the goals of this research is widespread adoption of codes and standards that incorporate hazard mitigation into building design.

"Hazard mitigation efforts offer benefits to society at large," says Gregory. "Builders or short-term owners might have to invest more up front, but—by decreasing recovery costs and lessening the impact on lives—insurance agencies, taxpayers, and future occupants benefit in the long run. Because of these long-term benefits, this is a concept that it makes sense for state officials to get behind."

More information: Research Brief: A Break-Even Hazard Mitigation Metric: cshub.mit.edu/news/research-br … rd-mitigation-metric

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