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Ask the Experts

Building design innovations are needed to mitigate hurricane damage to properties

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The 2018 hurricane season has begun with predictions of a trend of more intense storms. Worse, hurricanes are moving more slowly than in the past, making them more dangerous for everything in their path.

Hurricane Harvey's impact on Houston last year showed the greater threat to cities of slower storms, dropping a catastrophic 40 inches of rain in four days on the Houston metropolitan area, causing $125 billion in damage.

Even New York City is vulnerable to severe damage from big storms, a tough lesson learned in 2012 from Hurricane Sandy. From the Rockaways in Queens to Manhattan, Sandy flooded apartment buildings, hospitals and senior living facilities, knocking out power and hot water and threatening lives.

We can't change the weather. But we can take steps to reduce risks of storm damage to the buildings in which we live and work, as well as schools and hospitals.

Emphasis should be placed on designs to reduce the threats to multifamily, commercial buildings and public structures from the destructive forces of hurricanes.

Innovative building design is part of the bigger picture, combined with increased public investment to make our infrastructure more resilient. Regardless of costs and political challenges, power grid improvements are crucial, as demonstrated by the ongoing power problem in Puerto Rico months after Hurricane Maria devastated the island.

Property and casualty insurers should offer incentives for building or retrofitting structures with systems designed to mitigate storm damage, particularly from flooding.

Municipal Zoning and Code policies on square footage and height allowances should be revised to allow retrofitting of older buildings with emergency power generators that are required in new construction.

Public officials, developers and architects can play a major role in improving building design to mitigate storm and flood damage.

Flood mitigation systems for New York City office and residential buildings can be part of new construction, as well as retrofitted into existing buildings, thereby reducing much of the damage caused by hurricanes in Manhattan and elsewhere in the City. In addition to enhancing the appeal of buildings equipped with such systems to commercial and residential tenants, property owners may qualify for reduced insurance rates, reflecting the protection offered by these flood mitigation systems.

Design Solutions

Our hardest hit areas when it comes to storm surge and flooding has always been a concern for architects and planners. In the past, placing all mechanical equipment on the ground floor and not excavating a basement was thought to be good enough. We now must rethink this strategy using innovative designs that add to the resiliency of first floor mechanical rooms. When combined with fast response times to emergencies, these strategies can greatly improve the livability of multifamily buildings in flood zones, while helping to expedite emergency evacuation.

Source: Aufgang Architects

Flood Louvers to Protect the Ground Floor

Continuous flood louvers along the ground level of the building allow flood waters to enter and recede unimpeded by solid walls. Inflatable flood barriers can be deployed from their stowed away location hidden below the floor or sidewalk. When inflated, these barriers create areas for emergency evacuation of tenants by boat.

Boiler Room Protection

The boiler room is a critical space that provides both heat and hot water to the residents. A flood mitigation solution would mount the boilers on catwalk platforms safely above harm's way in the event of a flood. The hot water storage tanks, which are self contained and not vunerable, are mounted on the floor below.

Reducing Flood Risk to Electrical Systems

Water sensitive systems and equipment, such as electric meters and panels, are mounted at ceiling level, away from flooding threats. A catwalk accessed by an open stair is used to service and install all ceiling-level mounted equipment. The area under this catwalk can be used for storage of less sensitive items that do not require much headroom. In the case of a flood event and the floor-level is inundated by water all critical building systems services are protected from harm, thus ensuring the habitability of the building and safety of residents.

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