

Resilience to Hurricane and Extreme Wind Events

New York City

 City of New York, New York, USA

Hazard(s):

Hurricane, Wind, Flood

Type of action:

Code and standards

Type of actor:

Local government

Description

In 2012, Superstorm Sandy hit New York City with extreme winds and storm surges, damaged critical infrastructure, destroyed hundreds of houses and left thousands of residents without power and with limited access to food, drinking water, and other critical services.

The frequency and strength of tropical storms and hurricanes are directly linked to climate change, and specifically to the increased temperatures in the upper layer of the ocean. Floods associated with storm surges are also linked to climate change as sea level rise increases the extent and the magnitude of coastal flooding during storms. Floods are also partially due to local factors such as land subsidence and artificialisation. Adaptation to hurricanes and storms therefore calls for a multi-hazards response to ensure resilience to extreme wind, extreme rain and floods caused by storm surges.

Resulting from lessons learned from Superstorm Sandy, the New York City Building Code was updated in 2014 with major input from [“Appendix G: Flood-Resistant Construction”](#) of the 2012 edition of the International Building Code, and the American Society of Civil Engineers 24-2005, [“Flood-Resistant Design and Construction”](#). The core elements of the update include an increase of free board requirements based on updated flood maps, an update of prescribed floor elevation for critical infrastructure (electrical infrastructure of hospitals, etc.), dry and wet flood proofing strategy, vapor and water-resistant barriers, hardened construction materials, etc.

Audience

Initiatives linked to code updates and standards crafting are targeted towards:

- **Law and policy makers**, to enable the strengthening of existing codes
- **Community leaders**, to raise awareness
- **Developers and insurers**, to understand the cost effectiveness of higher standards

Timeline

- On October 29, 2012, Superstorm Sandy hit New York City and surrounding communities:
 - 44 deaths
 - \$19 billion in damages
 - Damage to over 69,000 residential units
- In 2014, the New York City Building Code was updated from the 2008 version.
- The city is now in the process of updating the code again to its 2022 version based on the 2014 International Code Council standards.

How does the initiative address the 10 Principles?

1. Urgency

The constant work to update the building code helps prevent future catastrophic consequences from natural hazards. Responses to a disaster should not be restricted to a one-time change in regulation but should rather result in a commitment to have codes continuously evolve towards the best available standards.

2. Stakeholders

Updating a building code requires input from the whole value chain of the construction sector and the city planning. In this instance, the initiative came from the city council, which then led the update in coordination with insurers, engineers, planners, and with input from citizens and climate scientists.

3. Process

Measures taken by the updated NYC Building Code consider a systemic integration of the whole life cycle, with higher standards required for new buildings and a push for substantial improvement of existing buildings.

4. Mitigation

Increased resilience of buildings and the city to climatic hazards results in avoided reconstruction works thus avoiding carbon emissions, as well as avoiding economic downturn. It also avoids critical pollutant being carried away by storm surges, thus diminishing the risk of water and soil pollution.

5. Data

Though the building code is built upon historical hazards maps, the city understands that risks are going to change. As such, the focus has shifted towards the future for public buildings as they are required to follow additional guidelines based on climate projections developed by the NYC Panel on Climate Change.

6. Scale

Superstorm Sandy demonstrated that buildings and urban services are interdependent. Improving the resilience of both simultaneously is an essential strategy of the updated building code, as building resilience, and in particular public buildings, is highly related to community level resilience.

7. Green

Though the building code mostly addresses technological, and not nature-based solutions, it still incorporates some sustainability provisions. Nature-based solutions to mitigate floods such as mangrove and wetland restoration have to do with zoning code.

8. People

Safety and continuity of service in a context of climate change are essential. By specifically targeting critical infrastructures, this initiative protects access to food, water, and city services. Ensuring buildings resilience also protects people's livelihoods and therefore fosters community resilience.

9. Finance

The amended code directs private and public investments towards more resilient buildings and cities. Regulations are an efficient tool to enable the adaptation of the building sector.

10. Local

Thanks to historical data analysis, the updated NYC Building Code locally differentiates risk levels by establishing higher risk areas with more stringent requirements.