

New Approaches to Old Disasters

Husaan Iqbal

In the wake of treacherous super storms arriving on land more frequently than ever before, cities with millions of dwellers have come face to face with the destructive wrath of hurricanes, tornadoes, and earthquakes. While we may blame global warming, many politicians and bureaucrats have fought vigorously against any efforts to stop it. Instead of waiting for long-term outcomes to solve immediate problems, it is in everyone's best interest to search for preventative solutions now.

Only a month after Hurricane Sandy made it into the record books, talks began on how to avert damage in the future in the largest city in the country. Along with New York, other coastal and high weather traffic cities across the country and across the globe are facing the same questions. Much like strategies that could have prevented Hurricane Katrina from wrecking New Orleans, the notion of building sea walls, levees, and flood gates for the New York metropolitan area has been talked about by climatologists for years¹. Although the cost of such behemoth projects may come with many uncertainties and insane budgets, considering them should not be seen as farfetched.

On the other side of the world, Fiat hydraulic engineers have been working hard since 2003 to complete a large-scale public works project to save Venice, Italy. Rising water lines with the help of annual floods have been threatening to sink the ancient flooding city. Set for completion in 2014, mobile flood gates are being installed off shore with embedded permanent sea walls to break up surges headed for dry land².

In Chicago, city developers are using permeable pavement in parking lots and bike lanes so storm water can drain through the tiny cracks of the pavement into the soil to reduce water build up and filter runoff rainwater³. More noticeable now than ever before is the greenery in and around New York City, with gardens and farms on city rooftops along with initiatives to make the city greener and absorb rainwater⁴, but they were no match for Sandy.

The Metropolitan Transportation Authority of New York had been in the process of raising sidewalk vents above the curb line to prevent flooding into the city subways. Once Sandy hit, transit workers using specialized pump trains were able to clear flooded tubes by pumping water into the Hudson River. With the help of the Army Corps of Engineers, the city had most of its car and subway tunnels restored within weeks⁵.

A defense project was in the works to protect America's tunnels from terrorist attacks by the Department of Homeland Security, which could have prevented flooding. Engineers at the Pacific Northwest National Laboratory teamed up with West Virginia University and ILC Dover, a spacesuit

manufacturer, to develop a giant inflatable plug that could help stop storm water from entering tunnels. Unfortunately, this project is still in the testing stage⁶.

Besides hurricanes and typhoons, other natural disasters such as earthquakes are also raising awareness of the need for building safer structures to withstand violent movement. While it is common for builders to use dampening systems to reduce or eliminate swaying of high rises, Japan is at the forefront of this seismic technology. During its recent earthquake, in March 2011, which caused a tsunami and a nuclear meltdown, Japan's cities were able to withstand the tremors. Geotechnical engineers had used earthquake-resistant building standards, requiring seismic isolation techniques, which left many high rises virtually untouched. The taller a high rise is, the more intense the swaying can get towards the top, but if the building can be decoupled from the foundation, with rubber and steel bearings between the building's frame and base to allow movement, vibrations become less of a factor. This in turn keeps furniture in place inside and the building's metal and glass take less stress outside⁷.

To prevent loss of lives, Japan has also made it safer for commuter trains to halt before an earthquake wave reaches the tracks and derails the trains. Using earthquake-warning systems, computers can sense primary waves of earthquakes that come before the secondary more destructive ones to provide alerts of upcoming conditions. Similarly Otis, the largest manufacturer of elevators, uses sensors that stop elevators' vertical movement and releases the door locks so passengers can escape the suspended elevator during earthquakes.

Since many locations around the world see natural disasters returning for a second or third bite, developers are now prepared to use disaster mapping technology to identify common flood zones and where the ground would give when an earthquake occurs. Open source and crowd source mapping with mobile applications have allowed civilians to supply local information and geo-tagged photos to pinpoint areas of disaster. Most recently this technique was used in Haiti after the earthquake of January 2010, which helped U.N. relief workers to reach bruised areas of the island⁸.

Research and development have helped save lives from natural disasters across the globe. Although every approach comes with a cost, new prevention systems can ultimately pave the way for safety and a future sense of security.

Notes

¹ http://articles.washingtonpost.com/2012-12-08/national/35701529_1_andrew-cuomo-hypothetical-storm-superstorm-sandy

² http://en.wikipedia.org/wiki/MOSE_Project

³ <http://www.concretethinker.com/casestudies/Chicago-Green-Alleys.aspx>

⁴ <http://opinionator.blogs.nytimes.com/2012/05/23/in-urban-jungles-green-roofs-bring-relief-from-above>

⁵ <http://green.blogs.nytimes.com/2012/10/29/for-new-york-the-issue-of-steps-not-taken/>

⁶ <http://www.nbcnews.com/technology/futureoftech/giant-inflatable-plug-could-protect-subways-floodwaters-1C6876355>

⁷ http://web-japan.org/trends/11_sci-tech/sci110728.html

⁸ <http://newswatch.nationalgeographic.com/2012/07/02/crisis-mapping-haiti/>

Nominating faculty: Professor Malek Brahim, Mechanical Engineering Technology 2335, Department of Mechanical Engineering Technology, School of Technology and Design, New York City College of Technology, CUNY.

Cite as: Iqbal, H. (2013). New approaches to old disasters. *City Tech Writer*, 8, 76-77. Online at <https://openlab.citytech.cuny.edu/city-tech-writer-sampler/>