

By Dael Climo, Build Deputy Editor

# Weathering the weather

As evidence about the impact of climate change on the global built environment grows, countries are investing in ways to cope with the destructive effects of extreme weather.



In 2012, Hurricane Sandy damaged 72,000 buildings.

**THE INTERGOVERNMENTAL PANEL** on Climate Change says the cost of extreme weather is rising rapidly and could reach US\$4 trillion by 2020.

Some of the increase is due to greater exposure from building on the coast, but wherever buildings are located, the incidence of damaged and destroyed buildings is rising. ‘Once in a lifetime’ events appear to be becoming regular occurrences.

Over the past few years, the US, UK and Australia have all suffered major property losses from damaging storms, and all are now funding projects to improve the resilience of the built environment.

## **US developing computer models**

Super storm Hurricane Sandy hit the New Jersey coast in 2012, costing US\$50 billion. The storm damaged 72,000 buildings and destroyed 500 outright. In its wake, a building resilience task force has recommended and implemented significant changes to New York City’s building code.

These include elevating rebuilt homes in areas deemed flood-prone and requiring fire sprinklers to be installed. There is a proposal that new and replacement doors and windows are wind resistant and a recommendation that homes be anchored to foundations. Tall exposed structures would be redesigned to

better handle wind, and coastal residences would be required to be elevated.

The US Government has tasked the National Institute of Science and Technology (NIST) to research the impact of extreme weather on buildings and how they can recover rapidly after a disaster.

In February, NIST announced funding for a Community Resilience Center at the University of Colorado to develop NIST-CORE - the NIST community resilience modelling environment.

This is an open-source computer model enabling quantitative comparison of different resilience strategies that will provide the scientific basis for developing resilience tools for the built environment.

As the program is developed, its performance will be tested against data gathered from past disasters. Eventually, it will be able to learn from one analysis to the next – a capability that currently doesn’t exist in any other risk or disaster resilience model in the world.



Floods in southern England in 2014 cost over £1 billion.



Brisbane was one of 90 towns affected in the 2011 floods.

### **UK set up BRE Centre for Resilience**

In 2014, the UK experienced the wettest winter on record, thousands of homes in southern England were flooded and total costs reached over £1 billion.

Action is being taken, with BRE hosting Resilience 14 last November. This event focused on practical ways to defend the UK's built environment against weather-related damage.

The BRE Centre for Resilience was also established in 2014 with the stated aim of recognising the imperative need to factor resilience in to the built environment.

The Centre enables the building industry to research, learn, develop new standards and create the next generation of materials, products, designs and innovations.

Long term, it will not only benefit the UK but also be a global resource for government, local authorities, environment agencies, industry and the public.

In April 2015, an associated 3-year programme into improving the resilience of buildings and infrastructure to floods, wind damage and overheating associated with climate change got under way. It will focus

on developing standards for flood-resilient repairs and technical guidance to help contractors deliver cost-effective methods.

Another project will examine wind loading on buildings - more than 90% of building wind damage occurs at wind speeds below the basic design wind pressure, and this serious performance gap will be addressed.

The problem of overheating in urban developments will be tackled by using scientific data to review the potential risk for apartments to overheat.

### **Australia developing rating tool**

While bushfires have long been a reason for property loss in Australia, increasingly, severe storms are also taking a toll. In 2012, the Insurance Council of Australia set up the Australian Resilience Taskforce to increase the resilience of the built environment to weather.

Its establishment followed a A\$5 billion payout in building damage costs for declared catastrophes in 2011. These included a series of floods in Queensland affecting 90 towns and severe flooding in Victoria impacting 1,730 properties.

The Insurance Council of Australia has funded the development of a building resilience rating tool (BRRT). This estimates the resilience of a building by calculating expected costs for damages to the building based on the construction materials, the design, structure and the hazard risk profile of the area.

At present, the tool, which was developed by Edge Environment, covers stand-alone housing. A future version will incorporate strata and commercial construction.

Edge Environment is also currently developing a mobile app for property owners. This takes simple design and construction inputs from the user and communicates in non-technical language where the resilience hot spots are for their dwelling.

The BRRT app covers the natural hazards of flood, wind and hail, with a planned expansion to bushfire to be included by mid-2015. ◀