



Global Building Resilience Guidelines

Background

Buildings being constructed today face the prospect of experiencing different and potentially more extreme weather than in the past, and possibly in geographic areas where such events have not occurred before or with such intensity.

Building codes make provisions, reference technical standards for design and construction to take account of most weather-related natural hazards, including those generated by climate (except for extreme temperatures, which has only recently become more apparent with the impacts of heat stress). These provisions are usually based on minimum performance levels typically informed by historic data generated by past events. This information is primarily used to determine appropriate design criteria for the primary purpose of safeguarding occupant health and safety, not protecting the building itself.

Based on risk to public health and safety and potential for structural property damage, four climate related natural hazards have been identified as initial priorities: extreme wind, such as hurricanes, typhoons, cyclones and tornadoes, wildfire/bushfires, extreme precipitation (leading to flooding) and extreme temperatures (even though these events do not necessarily have an association with property damage). It is also important to consider the potential and impacts of multi-hazard events.

In all circumstances it is also important to note that where codes and standards are applied, they cannot guarantee a weather-related natural hazard event will not result in the loss of life or injury, nor that building performance will be maintained through its design life, but they can mitigate the overall impact when such an event occurs.

Purpose

The Global Building Resilience Guidelines (Guidelines) consists of fifteen principles that provide a basis for advancing *building resilience* through building codes. They are intended to help inform the development of building codes and standards that incorporate future-focused climate resilience. The Guidelines are relevant for all building code and standards writing bodies, who will determine how best to apply them having regard to their own jurisdictional circumstances.

The guidelines are available as a free download at www.globalresiliency.org.

PRINCIPLES



1. Urgency

The need to respond to the associated impacts of climate change and extreme weather events on buildings and building occupants is more urgent than ever.



2. Clarity of objectives

Building resilience requires attention to the changing climatic conditions buildings will face over their lifecycle and impacts on their expected operation following an extreme weather event. The importance of building codes focusing on occupant health and safety remains.



3. Robust climate science

Building code development will benefit from an evidence base that utilizes official climate forecasts in the local jurisdiction or models based on peer-reviewed scientific research and ideally provide a demonstration of various future state possibilities.



4. Risk clarity

Risk informed thinking and decision making is important in providing support for design decisions to balance cost, energy performance, greenhouse gas emissions and resilience, where changing risks can be balanced against certainty of performance for building development and maintenance.



5. Forward-looking

A baseline assessment of current technical construction standards, where they exist, enables a comparison to be made with modelling and scenarios for future climate to help determine if they remain adequate or if new ones need to be developed.



6. Durability

Understanding building design life is important not only to assist in determining minimum necessary technical construction standards, but to also calibrate the technical design requirements. This will help improve the resilience of buildings with a benchmark of durability that avoids unnecessarily harsh requirements and therefore costs.



7. Holistic approach

Building codes can contribute to improving building resilience as part of a broad suite of regulatory and non-regulatory measures. In some cases this will be inter-dependent and take account of multi-hazard weather related events.



8. Affordability

Building codes and standards consider, where possible, a regulatory principle of setting minimum requirements necessary to achieve the level of desired performance, while doing so cost effectively. This should also achieve the objective of improved building resilience, throughout the design life of a building, to the effects of weather-related natural hazard events under a range of future scenarios.

9. Existing buildings

Identify strategies to encourage existing building owners to bring their buildings up to a higher standard of resilience for the types of future weather-related natural hazards they may experience based on their location and climate projections.

10. Building maintenance

Encourage property owners to engage in the need for planned periodic and specified maintenance of their buildings and promote essential resilience features embedded within buildings to ensure their ongoing performance.

11. Compliance

Effective regulatory systems will incorporate appropriate resources to properly enforce the building codes and standards, as well as promote an ethic of compliance.

12. Implementation

Complement any regulatory measures to improve compliance and support technical solutions with a wide range of education and practitioner capacity building tools.

13. Monitor and evaluate

Routinely monitor the need to maintain the currency of building codes and standards in response to updated climate science and projections.

14. Engagement

Employ a clear and uncomplicated communication strategy that embraces and simplifies risk-based information; uses a common, credible and consistent set of evidence; and caters to the many and varied views of those with an interest in this subject.

15. Emissions reduction

Building code development can make an important contribution to mitigating the causes of climate change with subsequent long-term benefits for building resilience.

DEFINITION OF BUILDING RESILIENCE

Based on an assessment of the existing definitions of resilience and the need for a definition specific to the climate-focused work relating to buildings, the Global Resiliency Dialogue has used the following definition of *building resilience* to guide the development of the Principles:

“Building resilience: The ability of a building and its component parts to withstand current and future climatic conditions (including wildfires/bushfires, extreme wind, extreme precipitation and extreme temperature), to minimize the loss of functionality and recovery while sustaining damage proportionate to the intensity of the events experienced, and preserving the intended level of performance at the time of construction over the proposed design life of the building.”

THE GLOBAL RESILIENCY DIALOGUE

The goal of the Global Resiliency Dialogue (the Dialogue) is to identify solutions to help address the global challenge posed by the impact of increasingly frequent and extreme weather events and hazard risks (including heatwaves) on building occupants and buildings. It aims to:

- share the latest in climate science and technical leading building practices to help inform the ongoing development of international building codes that improve the resilience of buildings and structures
- enhance the utility of existing building codes to respond proportionately to rapidly changing and predicted extreme weather events such as flooding, storms, cyclones/hurricanes and wildfires/bushfires and heatwaves.

The Dialogue believes it is increasingly necessary for codes and standards to respond to the latest research and data from both the building and climate/environmental science perspective. This will help maintain an expected level of safety, amenity and an appropriate level of climate resilience. The Guidelines have been developed because there is a recognized need to understand good practices for climate-resilient buildings in communities that may suffer from a deficit of professionally trained architects, engineers, and other practitioners. Therefore, these guidelines are written for a broad audience, including those involved in needing to set building code provisions where there is limited capacity and with little experience in the building and construction industries.

The Guidelines are the product of a collaborative of building code development and research organizations from Canada, Australia, New Zealand and the United States. This group worked collectively to engage with local interests and participate in coordinated surveys to source a body of information as input to the Guidelines. The survey outcome reports and the full Global Resiliency Dialogue Report, from which the Guidelines are based on, can be found online at: [Global Building Resilience Guidelines](#).

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Disclaimer: *The guidance in this document is for informational purposes only and does not constitute technical advice for building projects. Always engage design and engineering professionals to ensure that any intervention is appropriate for the specific needs and conditions of a project.*