

Managing the Impact of Weather & Natural Hazards

Council Best Practice natural
hazard preparedness



A black and white photograph of a volcanic eruption. A large plume of smoke and ash rises from a mountain, partially obscuring the sky. A helicopter is flying in the upper right portion of the frame. In the foreground, the silhouettes of trees and the roofs of houses are visible, suggesting a residential area near the volcano. A large blue diagonal shape covers the left side of the image, containing white text.

The Impact of Natural Hazards on Local Government

Every year, many Australian communities suffer the impact of weather-related and other natural hazard events. With research suggesting that the incidence, severity and cost of natural hazards is set to rise, it is not surprising that the 2015 Aon Local Government Risk Report ranks Weather and Natural Disasters as the third most pressing concern for councils.

Damage to council-owned assets is one of the more obvious impacts of such events, however disruption to the local economy, as well as degradation of the environment, can also put a strain on council operations and budgets. In addition, while many of the consequences of a natural hazard can be quantified almost immediately, some have longer term and less visible implications. For example, even though floodwaters may only make roads temporarily impassable and not cause visible structural damage, they reduce the road's life cycle, leading to an increase in unbudgeted maintenance costs.

Just as importantly, the economic cost of natural disasters does not reflect the enormous social loss from such events, which can dramatically change the dynamics of a community.

There's no 'one disaster plan' that fits all

Some natural hazards have a high probability of occurring anywhere across Australia, however others occur mainly in specific climatic, geological or topographic regions.

Likewise, the financial capacity to mitigate, provide relief and recover varies from council to council, with some in the most risk-prone areas charged with managing large geographical regions with limited resources.

The risk set keeps changing

Changes in climate have led to the emergence of new natural hazard threats such as a rise in prolonged heat waves, and an increase in coastal erosion and storm tide inundation. Likewise, although state planning schemes commonly include legislative requirements related to surface permeability and incorporate environmental measures for developments close to natural waterways, unchecked urbanisation raises the risk of storm water flooding due to a reduction in permeable surface area. In turn this heightens the potential for toxic contaminants in runoff to disturb the delicate balance of aquatic ecosystems, or restrict the recreational use of waterways.

Flood and severe weather the most prevalent hazards

In general, the biggest and most common natural hazard issues for councils are flooding and high winds. While river-based flooding is more common in regional areas, storm water floods (often the result of aging drainage systems unable to cope with larger runoff volumes due to a decrease in permeable surface area) are of concern in over-developed urban areas. Councils also often have to deal with the issue of council-owned versus state-owned drainage systems impacting on their community due to flooding. This is further exacerbated when councils have no control over the expenditure required to rectify the deficiencies of major state-owned drainage assets.

Flooding and severe weather events also present challenges with regard to the safety of council-owned trees whose roots may be weakened or rotting due to being kept wet for prolonged periods of time. In poor draining soils, or when planted in dips, such trees can be vulnerable during heavy storms leading to the potential for damage to property, injury to residents or even death. In turn, this can result in negligence claims and litigation.



Extreme heat events

In addition to bush fire hazard, prolonged long spells of hot weather have adverse effects on human health and can cause damage to infrastructure such as electricity distribution and transport systems. An aging population together with the diverse demographics and cultures within each councils' population, adds further complexity to dealing with the human health impact issues.

Green streetscapes and the planting of urban forests are a common temperature mitigation strategy being deployed by local government bodies. In some areas, councils - in conjunction with home and aged care services - are also establishing refuge-style heat wave accommodation for the elderly and vulnerable, complete with systems for transportation to and from the facility. This type of mitigation strategy is particularly relevant given that the Victorian Department of Human Services estimates that 374 heat-related deaths occurred in the week prior to the 'Black Saturday' bushfires.

The odds of another Newcastle-style earthquake?

Considering the level of seismic activity in Australia, many councils do not have in-depth analysis about earthquake risk. Although predicting earthquakes is problematic, Australia experiences a magnitude 6 earthquake every five to six years (the Newcastle earthquake of 1989 registered magnitude 5.6 on the Richter scale). Research by Geosciences Australia indicates there were nearly 3,600 smaller earthquakes between 2000 and 2010.

Most major cities are located near earthquake-prone areas, brick and masonry structures as well as any pre-1950s building, would be very vulnerable should a moderate earthquake occur in an urban area.

Cost of Natural Disasters

Due to the difficulty in assessing their impacts or predicting their timing and severity, natural disasters can be a significant and uncontrolled part of government budgets.

Between 2009 and 2015, Commonwealth Government disaster assistance rose dramatically, with a number of major disasters resulting in over \$12 billion being paid or committed to the States.

While bushfires in NSW in October 2013 resulted in the loss of 208 homes and more than 120,000 hectares of bushland, a substantial portion of the Commonwealth assistance can be attributed to three incidents:

- **The Black Saturday bushfires in Victoria (7 February 2009)** - 173 fatalities and damage resulting in insurance costs of \$1.1 billion
- **The Queensland Floods (December 2010 to January 2011)** - 38 fatalities and damage resulting in insurance costs of \$2.4 billion, and
- **Cyclone Yasi in north Queensland (February 2011)** - damage resulting in insurance costs of \$1.4 billion.

Other recent disasters of similar magnitude include Cyclone Tracy in 1974, the Newcastle earthquake of 1989 and the Sydney hailstorm of 1999.

Planning For The Impact of Natural Hazards

Best practice natural hazard preparedness

The key steps to preparing for natural hazards and developing an effective mitigation strategy include:

- 1 Developing and nurturing a risk culture within the council
- 2 Understanding the natural hazard risks prevalent within the council's boundaries
- 3 Identifying the priority of each hazard based on its predicted frequency and severity
- 4 Using this information to inform land-use planning and responding appropriately in existing developed or committed areas to reduce potential for future harm, such as land-use restrictions within state planning schemes, developing special building standards such as the bushfire attack level standards incorporated within the Building Code of Australia (BCA), constructing levees - and the like
- 5 Ensuring trained personnel are available, such as a Municipal Emergency Response Officer (MERO), and that they have access to the right equipment and resources
- 6 Raising community awareness of risks and supporting a community reliance on the council's ability to mitigate risks and act on their outcomes should such risks occur
- 7 Ensuring that disaster plans include a range of scenarios and are regularly reviewed, tested and updated
- 8 Having sufficient coverage in place for risks that are insurable

The need for constant re-evaluation

The increasing incidence of high-profile hard-to-predict weather events underscores the need for constant re-evaluation of disaster plans and mitigation strategies. With flooding alone, Australia has experienced two to three "once in 100 year" events in the past 10-15 years, characterised by the Queensland floods of 2010-2011, which saw three quarters of that state declared a disaster zone.

There is also clear evidence that heat waves in Australia occur more often, last longer and are more severe. In the past decade hot weather records have occurred three times more frequently than cold weather records.

In such a changing environment, the use of predictive analysis tools by councils for planning effective natural hazard management strategies is invaluable.

Avoiding Groundhog Day scenarios

While some of the recommendations presented by the Productivity Commission's Natural Disaster Funding draft report of 2014 remain contentious, its proposal for an increase in mitigation funding is a much-needed step in reducing the future cost of disaster recovery.

At present, under the like-for-like rebuilding rules of the Natural Disaster Relief and Recovery Arrangements (NDRRA), many councils do not have the additional financial capacity to rebuild damaged assets to a more disaster-resilient standard. As a result, Groundhog Day scenarios are not uncommon, where rebuilt assets are simply damaged or destroyed again when the next natural disaster strikes.

While the Queensland Government, in partnership with the Australian Government, has established a Betterment Fund that is open to local government authorities, it is clear that significant additional mitigation funding is required Australia-wide.



Commercial insurance in natural hazard mitigation

Transferring risk and reducing premiums through tailored solutions

The Productivity Commission's Natural Disaster Funding draft report of 2014 recommended that state and local governments should partner with insurers to ensure that where available and appropriate, adequate private insurance is accessed. It has also recommended improved information sharing by councils of flood mapping and other risk analysis data with insurers, which should lead to a reduction in premiums.

While many councils do not insure infrastructure assets, the vast majority of those that have coverage, utilise mutual insurance schemes. In Aon Australia's experience, those councils that have explored the commercial insurance market for bespoke and tailored solutions, have generally enjoyed substantially better pricing, and more appropriate and up-to-date cover. In addition, they have been able to lock-in this cover on a long-term basis, providing pricing certainty.

With councils facing a number of financial challenges, the current competitive insurance market environment (which is driven in part by increased capital and new entrants), makes it prudent to review risk transfer decisions and examine the role commercial insurers can play in lowering the total cost of insurance risk.

Benefitting from big data, analytics and innovation

Aon Australia utilises a range of sophisticated tools to develop forecasting models that help our clients develop a better understanding of their risk environment and the financial implications of a catastrophic event.

The Combined Hazard Information Platform (CHIP) catastrophe risk-profiling tool developed by Aon Australia, allows us to develop a holistic view of peril risk that can be presented by site, a selection of risks, or across a portfolio. Drawing on seismological, meteorological, hydrological and other data, the individual CHIP reports provide detailed natural hazard information including flood exposure at various average return intervals, proximity of the asset to major areas of bush, and the distance to the coast in high cyclone risk areas, as well as other relevant natural hazard risk metrics.

Understanding the natural hazard exposure of a council's assets enable it to:

- Develop mitigation strategies for natural peril risk
- Prioritise mitigation efforts around critical exposures
- Enhance negotiations with risk carriers using quantitative support
- Better inform risk engineering assessments
- Investigate portfolio management strategies
- Advocate for state-based changes to planning schemes and building codes.

Aon Australia also operates all commercially available catastrophe models covering earthquake, cyclone, bushfire and flood. These models offer a means for financial risk quantification and are becoming increasingly important in establishing the level of cover required for catastrophe based insurance. More information about Aon Australia's catastrophe modelling capabilities can be made available upon request.

**For more information,
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