Living in perilous times

Catastrophe models are helping insurers and communities prepare for natural disasters, AIR Worldwide President Bill Churney says

By Wendy Pugh

DESPITE THE BUSHFIRES, CYCLONES and hailstorms to hit Australia in recent years, the country may in fact have had a lucky run when it comes to natural disasters.

"There is a 20% chance in any given year in Australia of having a $10 billion loss or higher," Bill Churney, the President of international catastrophe modelling company AIR Worldwide, says.

"Australia has been fortunate not to have a very significant natural disaster, but if one were to occur today, given the level of exposure it could make prior historical events look quite small by comparison," he tells *Insurance News*.

Cyclone Debbie, which hit Queensland in late March before also causing storms and floods in New South Wales, has been the costliest recent event, with losses reaching $1.4 billion by late July, according to the Insurance Council of Australia.

Events that could cause higher losses include large-scale hail or wind catastrophes in a metropolitan area such as Sydney, a tropical cyclone striking densely populated regions or an earthquake hitting vulnerable built-up environments.

US-based AIR Worldwide, which produces models for more than 100 countries, has examined various Australian scenarios and is expanding the range of risks it studies.

The group has added an Australian severe thunderstorm model to its suite of local products. Updates to bushfire, tropical cyclone and earthquake models were also outlined last month at a seminar in Sydney, presented with parent company Verisk Analytics.

Next year releases for Europe will be a major focus, while New Zealand's earthquake model is undergoing an update, with data from this decade's catastrophes to be incorporated into a new version scheduled for 2019.

The group globally is putting out up to 10 updates and new offerings each year. Other areas of focus in the Asia-Pacific region include Japan, where it is this year releasing an inland flood model.

"One of the things we need to do is every few years or so do updates and expansions to those models to ensure they are consistent with data from recent events, or new scientific knowledge, or to try and expand their scope and breadth," Mr Churney says.

The models incorporate local knowledge and data, along with input from global events, while post-disaster information is collected as part of the validation in an evolutionary process.

Globally significant events such as the Christchurch earthquakes yield claims information and observational data that then influence modelling in other countries such as Australia and the US. Improved satellite images and greater access to more specific on-the-ground data are among inputs that are enhancing results.

"This concept of big data is something that is not new in the catastrophe modelling field, but as we gather more information – and it is easier to gather information – the models can become more realistic and better representations of what actually happens," Mr Churney says.

The concept of probabilistic modelling has gained traction with insurers as computing power and data quality has improved, and the sector has established a track record for helping the industry to understand its risks.

AIR started in 1987 but didn't really find its feet until Hurricane Andrew barrelled into the Florida coastline in 1992. The catastrophe was the costliest natural disaster in US history, at that time, in terms of insurance payouts.

The extent of the hefty losses caught many insurers by surprise, pushed a number into insolvency and highlighted the need for a better understanding of ramifications from low probability, high severity events.

Modelling became part of the new paradigm, aiming to give a realistic view of potential hazards and impacts on exposed properties so risks could be better managed.

AIR, headquartered in Boston, expanded its US offering in the wake of Andrew, spread its wings overseas and launched an earthquake model in Australia in the late 1990s.

Mr Churney, 46, an economist by background, joined AIR in 2002 and later became chief operating officer, with responsibilities including global business development, consulting and client service activities. He took on his current role at the start of last year.

The benefits of modelling for the insurance industry and for building disaster resilience in the community in general have been clearly demonstrated over the years, he says.

"One of the things with natural disaster risk, is that a lot of it in the world is still uninsured, and insurance has proven time and

One eye on disaster: AIR Worldwide President Bill Churney

Costly catastrophe: damage following Sydney's 1999 hailstorm

again to be the best way for individuals, businesses and countries to respond to natural disasters," he says.

"One of our ambitions is hopefully to use the work that we do to improve that education so people recognise the need for insurance, embrace it and it helps them get back on their feet after something tragic happens."

According to Munich Re, overall losses from worldwide natural catastrophes in 2016 totalled $US176 billion dollars, while insured losses were $US50 billion.

The most perilous year in recent times was 2011, when a series of major catastrophes included the devastating earthquake and tsunami in Japan, the Christchurch earthquakes and flooding in Thailand.

Data published by the New York-based Insurance Information Institute estimated insurance losses from those three events alone totalled $US72 billion.

Despite the impact, the insurance industry was better prepared to financially manage the risks from the catastrophes compared with the Hurricane Andrew period, when modelling was in its infancy and losses wiped out a number of companies.

"Only one insurance company globally went insolvent, so to me that is testament to both the development of the models but also how the insurance companies have used them," Mr Churney says.

Natural hazards modelling by AIR includes both rare events that are often overlooked or discounted as well as those that are an acknowledged risk that comes with living in some regions.

In Australia, earthquakes are an example of a low probability, high-risk event where modelling provides a stark warning of the possible implications.

Modelling data includes regional information on construction types, with many Australian suburbs filled with masonry veneer and double-brick homes that are more vulnerable than wooden buildings to seismic events.

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The insurance risk is also potentially significant as earthquake is one of the multiple perils normally included in household policies, even though most people would not give the risk a second thought.

In the US, a more tectonically active country where the earthquake threat has a higher profile, there is low uptake of separate cover to insure against the danger.

Although not front and centre in most residents' minds, there have been reminders in Australia that the threat is a real one.

Newcastle's earthquake in 1989 ranks among the country's worst disasters, and would cost more than $7.6 billion if it happened today, according to AIR Worldwide estimates. Mr Churney says a seismic event in Australia could easily trigger losses of $20-$30 billion.

"You are not going to see earthquake risk in Australia with the frequency that you see tropical cyclones, hailstorms, bushfires," he says. "But even relatively low magnitude events, if they occur in areas like Perth, Adelaide, Melbourne, Sydney could cause extensive amounts of damage."

By contrast, AIR's new severe thunderstorm model looks at risks from Australia's most frequent atmospheric peril, and one which has accounted for a third of the costliest natural catastrophes in the country during the past 50 years. Sydney's 1999 hailstorm remains Australia's most expensive natural disaster when it comes to insurance losses.

AIR warns the loss potential is increasing as property replacement values rise in the densely populated capital cities, while the number of insurable exposures is growing as development expands into previously unpopulated areas.

The model includes data from the Bureau of Meteorology's severe storms archive, sourced from reports from trained weather spotters. To compensate for bias from eyewitness reporting, AIR says it employs a hybrid physical-statistical method to simulate hail, straight-line wind and tornadoes in physically realistic locations, including areas that may have escaped damage during the brief historical record.

In general, the models provide a reality check against people's natural tendencies to become overly optimistic or pessimistic about the chance of events happening based on their own experience and short memories.

Rising risks often result from complacent development in bushfire prone areas or on flood plains after a long disaster-free period.

"That is certainly one of the values of the models – to serve as a reminder that major losses can occur. Just because you haven't seen it in the past 10 or 20 years doesn't mean that it might not happen tomorrow," Mr Churney says.

"We are very much anchored by what has happened in the recent past and the models provide a more objective way to counter some of those perceptions."

Globally, the last decade has been relatively benign for natural catastrophes, with the exception of 2011, contributing to a decline in reinsurance pricing and encouraging more insurers to look at expansion into new geographies and emerging liability risk areas to kick-start earnings.

AIR Worldwide diversified into terrorism modelling after the US September 11 attacks and has extended its interests to include crop perils and potential impacts from global pandemics.

In the past 18 months it has increased its focus on cyber risk and other casualty line events, responding to client demand for improved information.

The group this year acquired UK-based Arium, which helps companies model liability losses for a variety of potential risks, such as those that emerged when dangers from asbestos and tobacco exposure became clear.

"The reality is that if you look back over the last 20 years, there have been more insolvencies from losses in casualty or liability portfolios than there have been from a natural disaster point of view," Mr Churney says.

"This framework they are developing is getting embraced quite well in the Lloyd's market and the US market, and we are starting to talk about it a bit further here in Australia."

Compared to the geographic perspective of natural catastrophes, "liability storm tracks" reflect the economic links between sectors and along supply chain.

Mr Churney says AIR will continue to put most of its focus on natural catastrophe risks, while expanding the analytical capability it offers clients and becoming a broader "extreme event" modelling company that includes the cyber, casualty and life and health areas.

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Work is also underway on applying artificial intelligence and machine learning to improve processes.

Climate change is expected to become an increasing focus, with AIR this year releasing a report on the latest research and potential impacts on extreme weather.

"The insurance industry has not been overly focus.ed on the impact of climate change," he says. "Most policies are one year in nature, so I think there is a view that the industry can adapt over time.

"But I would say [that] over the past couple of years we have had more and more companies come to us and say, we are trying to think out five or 10 years into the future and we would like to bring in an understanding of how climate change will make a difference in how we run our business over that timeframe."

Mr Churney's address to the Verisk seminar coincided with a calm and sunny Sydney winter's day, where natural disasters would be far from the mind of most people going about their business.

But the risks are there, have always been there, and their implications are often increasing. Mr Churney says the models are a reminder that a range of catastrophes can happen. They give insurers greater clarity as they account for potential events in their pricing, reinsurance protection and capital allocations.

"One thing that catastrophe modelling teaches you is don't just look to the recent past to have a sense of what might be coming in future," he tells *Insurance News*.

"What we do in developing models is fundamentally helping the world to better prepare for extreme events." □