

Maximum of Maximums

Kate Lahey explains the thinking behind 'maximum of maximums' planning with FEMA's Deputy Administrator for Protection and National Preparedness, Timothy Manning.



If a category-five hurricane landed in Miami, Florida, bringing winds of at least 250km/hour and a five-metre storm surge, three million households would need to be evacuated. That's potentially five million people in urgent need of shelter.

So how would United States authorities manage it?

The answer is, by following the plans they've already prepared for this almost-inconceivable event.

Emergency shelter for five million people is the kind of capability that the Federal Emergency Management Agency (FEMA) now works towards under its new policy of 'maximum of maximums' planning. The term itself comes from weather modelling.

FEMA's Deputy Administrator for Protection and National Preparedness, Tim Manning, said, 'It's the idea that through a number of different iterations of analysis you take the larger set of values from all the different models and average them together.'

FEMA had come to realise that its disaster planning worked well for 'average' disasters, but beyond that, it failed catastrophically, he said.

The USA's response to disaster had traditionally been designed to adapt and scale up or down within the 'normal' confines of a disaster, Mr Manning said.

'When you get something that's so far beyond anything you've dealt with before, the normal systems can't

compensate. So we needed a way to identify the real maximum variables we would have to deal with in any particular very large disaster, build to that level of capability, and then we would have it,' he explained.

By planning for the most extreme event imaginable, anything that occurs to a lesser degree is, therefore, within the scope of the USA's response capabilities.

Australian officials, Mark Crossweller, Director General, and Diane Podlich, Director Engagement from Emergency Management Australia, discussed this new approach with their US counterparts at a meeting in Seattle in June this year. The meeting was held to exchange ideas, plans and information under a Memorandum of Understanding between Australia and the USA on emergency co-operation. Australia is now considering the USA's 'maximums' planning approach.



Mark Crossweller, Director General, Emergency Management Australia met with FEMA Administrator, Craig Fugate in Seattle to share information and ideas on emergency management.

Some of the work the USA has done has included taking historical events and working out what the impact of those would be if they occurred today, with present-day populations and infrastructure. One of these was a magnitude nine earthquake and resulting tsunamis from the 1700s. The earthquake occurred in the Cascadia Subduction Zone, a 1 000km fault line that runs from California north to British Columbia in Canada. If such a quake were to happen today, the modelling done for US authorities predicts it would kill



Mark Crowther and Craig Fugate sign the 2013–14 work plan on emergency management co-operation.

more than two million people and seriously affect about four million.

Over the past two years, the states of California, Oregon, and Washington, in partnership with other organisations, have been using this scenario to develop the *Cascadia Subduction Zone Earthquake and Tsunami Plan*¹.

Massive disasters in the USA in recent years, including *Hurricane Katrina* and the terrorist attacks of 11 September 2001, were part of the reason FEMA has shifted its approach, Mr Manning said.

‘In the wake of *Hurricane Katrina* was the largest sheltering operation in the history of the United States. We had people in all 50 states in shelters and we flew evacuated people by aircraft all over the continent. We’d never considered doing anything like that before,’ he said.

Preparing for the ‘maximum’ was also something that many people working at state level (including himself in his previous role as the Secretary of the New Mexico Department of Homeland Security and Emergency Management and Homeland Security Advisor to the Governor) had been discussing for many years, he said. The policy is now in its third year of operation.

In the United States, emergency management practices have often evolved separately from county to county, city to city, and state to state. Individual cities and towns, for example, have their own police departments. As of 2011, figures from the National Fire Protection Association indicated there were more than 30 000 fire departments in the USA.

In this landscape, orchestrating a massive, co-ordinated response to an extreme event takes some work. To help the entire nation prepare in a uniform way, FEMA has tied new criteria to grant money it allocates to local and state governments, which compels anyone receiving the grant to prepare their own community for its ‘maximum of maximums’ event.

Without making legislative changes, FEMA has sped up the adoption of the maximums philosophy by using the grants as incentive. Mr Manning said the grants comprised the vast majority of funding for planning and operational work.

All states and territories, as well as the 30 or so biggest cities in the United States, now use this approach to receive grant funding. Other counties have begun to plan for their own maximum of maximums without the grant funding as it is becoming a standard procedure.

Mr Manning said FEMA began this task by identifying 13 core activities under its National Preparedness Goal that were needed for every major disaster response. These included shelter, mass care, and evacuation.

FEMA modelled a variety of major disasters, including a category five hurricane in Miami, the magnitude nine earthquake, and a nuclear terrorist attack in New York City. It then compared the needs for each scenario to determine which one would require the largest response effort in each category, such as a need to shelter five million people. It then began building a national capacity to meet that need.

‘You look across all these different threats and hazards and all the different communities that might be hit, and you come up with, let’s say, if the hurricane hits Miami, we’ve got three million families, that’s potentially five million people we need to shelter long term.

1 The Oregon State plan is at www.oregon.gov/OMD/OEM/plans_train/docs/CSZ/1_csz_plan_final.pdf.

'Then we look at earthquakes and we look at all the different disasters around the country and none of them come up to that number. We'd have a million here, 600 000 there, 1.6 million in this other area from another disaster. So we look at the maximum one—the Miami hurricane, where there are three million, four million families and that becomes our maximum sheltering target,' Mr Manning said.

FEMA has also shifted to a whole-community approach to emergency management: the idea that preparedness is everyone's responsibility and government is there to support the public. So building these enormous capabilities is not an investment the government makes alone, if at all.

'When we identified sheltering needs for example, it doesn't mean that the government has to build that capacity by itself. It may simply have to organise all the volunteer agencies, the NGOs, the Red Cross and similar groups that are out there that will do this work.

'We just have to work together to say "this is the actual target we're trying to meet, what can you do?";' he said

At the Seattle meeting, US officials spoke of a new way of building this capacity through volunteers, non-government organisations, and the private sector. For example, the US has 28 heavy-lift urban search and rescue teams and about 12 'Type 2' teams. However, US authorities recently discovered there were some areas of the country these teams would not be able to reach in an effective timeframe, due to their locations. To overcome this, they have now cleared the way for private teams, trained to do mining rescue, to operate in these areas.

For the cities and states preparing their own disaster responses, the strategy is the same. They are asked to determine the worst-case scenario for their community then build a response plan to it, using their own resources as well as mutual aid agreements with other communities.

Each state or city plans around the core capabilities using what FEMA calls the Threat Hazard Identification Risk Assessment (THIRA) approach. Mr Manning said THIRA set a process to figure out the various threats and hazards that may exist in a community, and the impacts of them on the community's core capabilities. Once the process is followed, each community or state should know what its different targets are for shelter, search and rescue, mass care, and emergency medical services.

'And that's where we are now,' he said.

The policy has other benefits. It fine-tuned the planning itself and helped to ensure training programs are necessary and relevant, Mr Manning said.

'For the last 20 years or so we've used the all-hazard approach to emergency management; the idea that we don't plan for a particular hazard we just plan to use all of our capabilities for anything that might happen.

'The trick is that without some idea of what it is you're worried about (hazard specific) you can't do that fine level of planning.

'The old way of planning was more a catalogue of authorities than it was an actual plan. So, shifting the way we do things—to put some level of detail and know that across all the different earthquakes, typhoons, hurricanes, tornadoes, whatever it may be—the worst search and rescue mission I can expect to have to do is going to be, say, 4 000 people.

'I now have more detailed planning done on how to do that,' he said.

This planning would include choosing which teams to use and determining the amount of work they could achieve in an appropriate time frame, then, how to access more teams if necessary. For example, a city might have enough rescuers to search for 500 people, but not for the other 3 500 people who would also be missing under its scenario. The extra teams could be sourced by agreements with other cities and states, under mutual aid planning, he said.

This kind of planning gave emergency managers an 'implementable and actionable plan' without focusing solely on a specific hazard – such as an earthquake plan would, he said.

'It's the best of both worlds,' he said.

Training programs are also expected to become better tailored to the USA's needs under this system. 'It really allows us to prioritise things and get a much higher level of fidelity in what we train to,' Mr Manning said.

Training until now had been somewhat demand-based. Courses that are popular are those that run more often. But the popularity of a course doesn't always reflect the need for so many people to be trained in it, and it doesn't indicate where training deficits might exist. Until recently there hadn't been a national system that allowed authorities to see, across the board, what training was required, Mr Manning said.

'If we have a good understanding of what the search and rescue mission requirement is across all the states around the country and then nationally, we know how many people need to be rescued and we can estimate our capability requirements.

'We know how many teams are needed. If a Type 1 search and rescue team means a certain number of people with equipment and training to do a particular mission, and clear 'this' much square footage of a building in a (time) window, then I know that I need x-number of search and rescue teams. This means I need x-number of people with a particular training. I can now design my training calendar throughout the year and do budgeting based on the number of people we need to deliver a certain kind of training.

'It's something we've never been able to do before. It gives us a much clearer window into the needs of the responders across the country,' he said.

Modelling for the 'maximum of maximum' scenarios occurs at different levels across different jurisdictions. The system was designed to make it easy for local governments to follow without the need to source extremely detailed data.

Much of the complex disaster work is done through the National Infrastructure Simulation and Analysis Centre. In addition, city officials may, for example, draw on some academic support, as well as their own knowledge in the area especially related to known risks and building codes.

'It would require really detailed modelling to achieve a fine-grained understanding of the potential behaviour of a structure, but if you're looking across the entire community, there's a margin of error you can work within (without the detailed modelling).

'The idea is: if the results are that I need 10 search and rescue teams, I could spend more time on getting very detailed modelling and I might find out I need 10 and a half, or 11, or nine. That margin of error is not of operational concern at the scale of actually responding to the disaster because there's so much safety built into the whole process,' he said.

State and local governments could access FEMA grants to help with modelling, and FEMA also supported the work through the science and technology directorate in the Department of Homeland Security and through its partnership with the National Laboratories and other academic communities.

FEMA is also working to create common terminology for use during disasters across the USA. A division called the National Integration Centre is devoted to this cause.

'Not everybody calls the same thing the same thing. On the west coast of the United States, if you're a firefighter and you ask for a tanker on a wildfire, a tanker is an airplane that drops water from the air and a truck with a tank on the back is called a tender. In the east coast of the United States, a tanker is a truck with a tank on the back,' he explained.

Search and rescue teams also have different names and these are among the terms now standardised so that when aid agreements are in place, everyone knows what they're getting.

'In the case of the tanker, that's actually one that has officially been settled for many many years, going back into the '70s,' Mr Manning said. It was now an example of how common terminology and tradition could co-exist.

Hurricane Sandy, which became a 'superstorm' by landfall in the US, was one of the first tests of how well this new planning performed, although Mr Manning said it was still too early for comprehensive assessment of the new system - particularly as other work had been occurring in parallel.

'The concept of 'maximum of maximums' is a consolidation of successful ideas into a new policy idea in emergency management.

'The actual doing of it, the planning and implementation work has been happening for years but in a disconnected way so we've knitted it together.

'What we saw with Sandy and the Boston bombing is the success of the work that's been happening over the past 10 years. Equipment has been bought, planning has been done, the incident command system and the concepts of common terminology have been established. The idea of planning using an 'outlier' event that we wouldn't normally have considered in the past has definitely delivered some successes,' he said.

The hardest part of bringing in the new system has been instilling the change in philosophy and steering the cultural shift that goes with it, Mr Manning said.

'Aside from the fact that it's largely reorganising efforts already undertaken, it still requires a higher level of detail initially. That should eventually become maintenance of the system but at the beginning there's a good deal of new work to be done. This means there's a lot of education at this stage,' Mr Manning said.

Much of the work involved discussing the concept with FEMA's partners to explain what the aims are and to convince others of the value. Once people understood how the system could work, it became easier, he said.

'That's a level of co-ordination and effort that hasn't been done in the past. In the very beginning there was considerable scepticism because there have been other attempts by the US Government, by FEMA and the department to institute a regime of coordination and monitoring so we know what everybody's doing. It wasn't really a tool to help everybody work together. It was always a one-way street.

'Once we were able to show everyone that really what we're doing wasn't a new idea from Washington that we're going to push into the states, this was an idea that the states have had for years that we've brought to Washington, that really turned the tables and we've been able to get to work,' said Mr Manning.



FEMA's Deputy Administrator of Protection and National Preparedness, Timothy Manning (left), after Hurricane Sandy. He says the response to Sandy shows that FEMA's new approach to preparedness is succeeding.