

INFRASTRUCTURE RESILIENCE

SOME MESSAGES FROM TOM O'ROURKE'S VISIT

Professor Tom O'Rourke (Cornell University) helped stimulate thinking on infrastructure resilience issues during his sabbatical in New Zealand (March – April 2007).

The aim of the Infrastructure Resilience work is to find and put in place ways to improve protection of communities from infrastructure failures, by reducing the incidence and severity of infrastructure outages and promoting rapid restoration of services. The main focus at this stage is on identifying the things that are worth attention to move infrastructure resilience in New Zealand to the next level.

Prof O'Rourke met a wide range of infrastructure stakeholders during his visit. These included

- Several individual infrastructure providers and the New Zealand Fire Service
- The National Engineering Lifelines Committee (invitations to this meeting were also extended to a range of infrastructure providers that are not members of the NELC), and Engineering Lifelines groups in Wellington, Auckland and Christchurch
- A range of other stakeholders and officials

Prof O'Rourke also delivered lectures in Christchurch and Wellington, and contributed to the infrastructure workshop at Te Papa on 11 April. His presentations can be found on the website of the New Zealand Centre for Advanced Engineering (www.caenz.com).

The following is a high-level summary of the main themes that emerged during the visit.

MESSAGE

- Community expectations for continued infrastructure performance in the face of natural hazards and other shocks are increasing over time
 - Pressures from climatic conditions etc appear to be on the increase at the same time as assets are aging
 - Interdependencies mean that a failure in one infrastructure type (e.g. electricity) can cascade into a wider infrastructure event (e.g. queues at petrol stations, sewerage pumping)
- In general, risks should fall on the parties that can most effectively manage them
- Communities need to be more aware of risk, e.g. in relation to
 - Land use decisions
 - Accepting that there are no iron-clad guarantees of infrastructure availability in all circumstances
- At the same time, more can be done to improve infrastructure resilience in
 - Physical mitigation of network vulnerabilities

- Preparing for times of stress and
 - Responding quickly to crises when they arise
- Central government, local government and other stakeholders all have a role in working with infrastructure providers to both raise awareness and improve resilience
 - Central and local government can contribute by leadership, as an infrastructure owner and funder, by good design and implementation of regulations and by building civil defence capability
 - Engineering Lifelines Groups have proven effective for sharing information on resilience at a regional level. This collaborative model could be extended to take a more systematic approach to resilience issues amongst national utility providers
 - RiskScape, and integrated / systematic use of GIS, have potential to help us understand and respond to infrastructure vulnerability to hazards
- Infrastructure resilience can be improved in numerous ways
 - Some large investments stand out as desirable for resilience, e.g. to reduce reliance on single lines and connection points
 - But some quite simple initiatives might also have a big impact
 - And it's not just about assets, it's also about the performance of the institutions and alignment of the incentives they face in both preparing for times of stress and responding to crises – improvements in this area tend to be relatively inexpensive
- DPMC is presently considering how best to advance the ideas raised
 - This work, which will involve other agencies, will progress over the coming months.