Addressing Earthquake-vulnerable Buildings

Aotearoa New Zealand has a significant stock of earthquake vulnerable buildings. Many of them are legislated to be retrofitted or demolished before 2030.

When Statistics House partially collapsed in the 2016 Kaikōura Earthquake (built in 2006 with precast concrete floors) engineers reviewed damage and developed guidelines to assess similar buildings with precast floors. Precast floors are commonly used in Aotearoa New Zealand but not in the rest of the world. Making this a key focus for QuakeCoRE.

THE NEW ZEALAND CON(CRETE) TEXT

LEADING THE WORLD!

These precast floor assessment guidelines are the first of their kind in the world.

Making Aotearoa New Zealand's urban environment more seismically resilient. Reducing the likelihood and severity of future disasters by making Aotearoa’s urban environments less vulnerable to earthquakes.

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Developing holistic criteria to determine which buildings should be prioritised for strengthening.

Determining economically viable seismic retrofit solutions to help retain existing building stock and sharing these methods with the engineering community for implementation.

Developing best practice legal frameworks that encourage and require seismic resilience.

MAKING WELLINGTON AN EARTHQUAKE RESILIENT CITY

Created a building inventory dataset for seismic risk assessment and management.

Different Phases of Christchurch Cordon

Post-quake cordon protect lives and enable rapid building assessments to occur. Post-2011 Christchurch CBD had a cordon for over 2 years.

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Te Hiranga Rū QuakeCoRE: New Zealand Centre for Earthquake Resilience. It is a Centre of Research Excellence funded by the New Zealand Government.

The success of the Order was in part due to the URM Fund that was set up to assist with securing costs. Consequently, owners spent ~$9.8m with the Fund contributing ~$3m.

Building Use Category
- Residential
- Commercial
- Other
- Not assigned

Geology
- Greywacke
- Redclay
- Swamp
- Colluvium
- Old Alluvium
- Hydraulic Fill
- Young Alluvium
- Marginal Marine

Occupancy
- Building use
- Vulnerability of concrete components
- Modelling the collapse risk
- Cordoning prioritisation
- Prioritisation of strengthening/demolition
- What lies beneath - soil class
- Cultural / public use assets
- Regulatory solutions

Multiple Weighted Criteria

400 buildings surveyed

4. Building Use Category
3. Geology
2. Vulnerability of concrete components
1. Occupancy