



Collaborating to keep people safe in earthquakes

About 60% of multi-storey commercial buildings in Aotearoa New Zealand use precast concrete hollow-core flooring, which performed poorly in the 2016 Kaikōura earthquake. A major industry-wide collaboration, backed by BRANZ, has led to a Building Code update and practical strengthening solutions to help keep people safe.

The collapse of flooring in several major buildings during the Kaikōura earthquake in 2016 raised alarm bells. The industry needed urgent collaborative action to address the faults in precast concrete hollow-core flooring systems and reduce the risk of building collapse during future earthquakes.

Hundreds of commercial buildings around the country have precast concrete hollow-core floors, which were near universal in building design during the 1980s and early 1990s. The widespread use of these flooring systems in areas of high seismic activity is unique to Aotearoa New Zealand. There is little existing international research to understand their expected performance or guidance for retrofitting and strengthening.

With funding from the Building Research Levy and led by Waipapa Taumata Rau | University of Auckland researchers, the *ReCast floors* project gathered a large team of experts from around the country. Their aim was to understand the likely behaviour of precast floors during earthquakes, including already-damaged floors, and develop retrofit methods for improving the performance of existing flooring.

Collaborators included MBIE, Toka Tū Ake | Earthquake Commission, Me Heke Ki Pōneke | Wellington City Council, Property Council New Zealand, Te Ao Rangahau | Engineering New Zealand, Concrete NZ, Te Kāhui Inihua o Aotearoa | Insurance Council of New Zealand, and the New Zealand Society for Earthquake Engineering as well as BRANZ researchers.

This collaborative project has effectively stopped precast hollow-core concrete flooring being installed in new buildings. The findings were used as evidence to update the Building Code, making current hollow-core concrete flooring practice non-compliant for new builds.

To help strengthen existing flooring, the researchers have created practical and actionable solutions that can be applied across the country. With publications and seminars reaching over 3,000 engineers, the research has accelerated retrofit flooring solutions and informed new content for a postgraduate course on seismic assessments. Widespread media coverage has led to increased awareness from many Kiwis, who are demanding change from building owners and landlords.

With industry-wide collaboration and strong momentum, the *ReCast floors* project tackled a major risk in our built environment. It has delivered reliable evidence to help policy makers, engineers and building owners make informed decisions to keep people safe if disaster strikes.

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BRANZ (2022). External Research Report 74 *ReCast Floors* project. branz.co.nz/pubs/research-reports/er74-recast-floors-project