

Seismic Shift

The Focus on Seismic Design in Commercial Building Projects



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Introduction

Seismic design is in increasing demand in both Australia and New Zealand. Recent events and changes to design standards requires that new construction projects need to be more comprehensive in terms of their safety and structural integrity to be suitably prepared for the rigours of geological movement and other environmental hazards. New Zealand, in particular, has endured a spate of devastating earthquakes in recent years. Australia, however, is

not immune from seismic activity, as well as the ever-present risk of extreme weather and natural disasters.

Architects industry-wide should be aware of the statutory requirement of incorporating effective seismic design into projects that require it, as well as knowing the options available to them.

Sudden Movement

For a long time, people have suffered the impact of earthquakes due in part to our lack of understanding of these events. Their magnitude and unpredictability make them an incredibly difficult scenario to deal with. But while the events themselves may be unavoidable, nowadays the damage caused need not always be so extreme. As research and skills have developed in recent decades, so too has the capacity for buildings to be designed to withstand more violent movement.

Whilst specific design requirements for seismic events have long been stipulated in building codes, there has not always been sufficient awareness or understanding for measures to be adequately implemented. If there is any upside at all of catastrophic events it tends to be the vast leaps forward in preparedness for future occurrences.

Good building practice requires the collaborations of not only the architect and engineer, but many other design professionals. Even the best calculations cannot compensate for faults during the conceptual seismic design stage. Therefore it is important for architects and engineers to collaborate closely as early as possible¹.

Assessing seismic risk

The primary concern when it comes to structural design for earthquakes is the lateral force-resisting system of the building. In most cases, this involves roof and floor diaphragms for horizontal distribution, as well as shear walls and rigid frames for vertical bracing. Failure of these elements can result in major damage, including the possibility of total collapse².

Nobody argues that a building must remain structurally stable, post an earthquake event, however there is significant information available that suggests the most significant cost attributable to an earthquake stem from the fit-out and services



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installed within the building. Since the different parts and materials within the building move differently under the actions of an earthquake, the connection and interaction points between them are crucial. It is necessary to allow independent movement between abutting parts within a building, thus reducing the possibility of impact or disturbance.

Naturally, the risk posed to any given structure depends on a number of factors such as its location – both in relation to tectonic movement and its

proximity to cliffs, riverbanks and the like, as well as the integrity of the ground beneath³.

Similarly, the amount of people affected by its failure and its importance in functioning after an earthquake – a hospital, for instance – must also be taken into account.

For those in the industry, especially those working on large publically funded projects, it is important to be well-versed in seismic design and remain up to date with new developments.

The bottom line is that when it comes to seismic design, the architectural stakes are higher. If buildings that call for seismic requirements are not properly equipped, it could result in substantial injury or loss of life. Seismic designs aim to place the utmost importance on occupant safety.

Even if human tragedy is avoided however, the cost to repair and rebuild whole areas is significant. The rebuilding of Christchurch, for example, has climbed to an estimated \$40 billion dollar price tag⁴.

Rondo solutions

Rondo has developed superior seismic wall and ceiling systems which can be tailored to suit a project's seismic requirements.

Rondo's comprehensive seismic testing program includes full-scale independent shaker table tests at a New Zealand laboratory, as well as component testing of their own. The latter is aimed at determining critical loads and detailed behavior of systems to continue developing better outcomes.

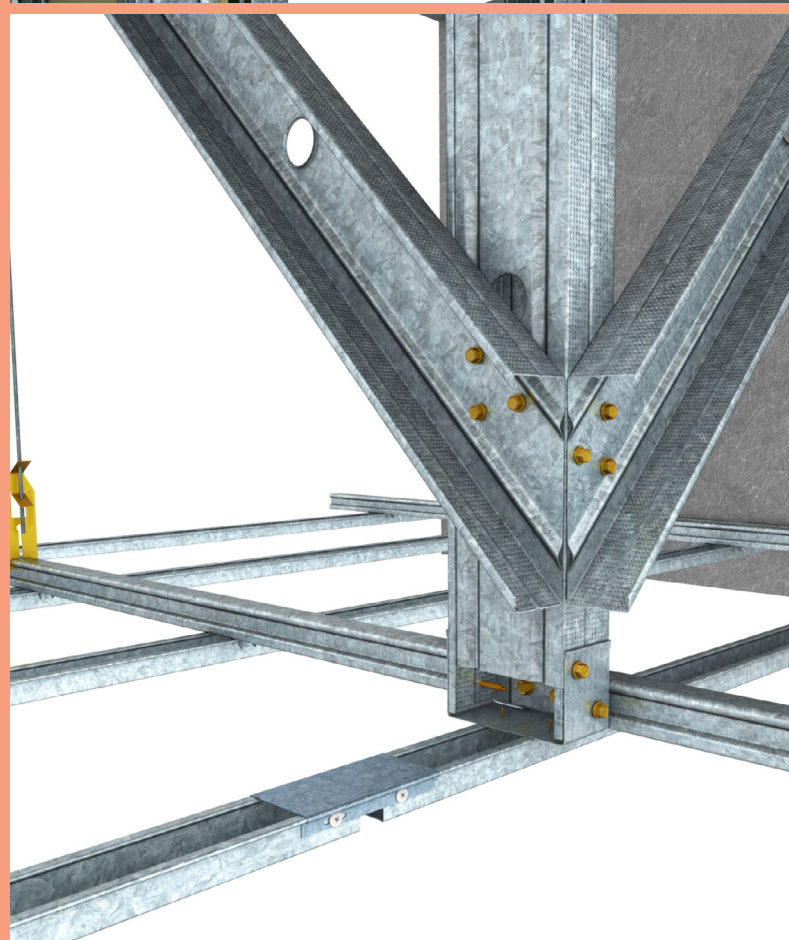
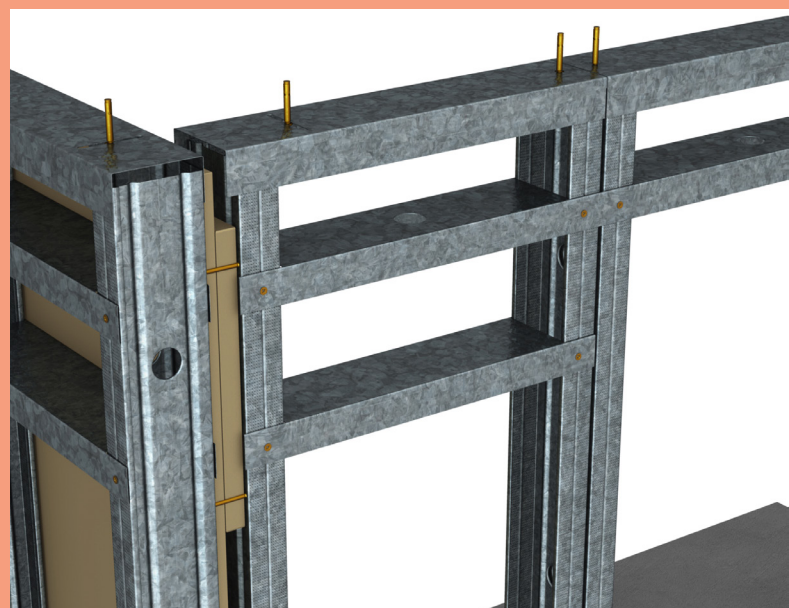
Experience and innovation

Due to Rondo's engineering expertise, their seismic wall and ceiling designs have been utilised in major projects across Australia and New Zealand. They also supply Asia Pacific and the Middle East.

On a local scale, Rondo is currently supplying seismic systems to the New Royal Adelaide Hospital and the QEII New Children's Hospital in Perth.

Other recent examples include the South Australian Health & Medical Research Institute where they supplied a DUO® Seismic Exposed Grid Ceiling System; Taranaki Base Hospital in NZ where engineers designed an internal wall framing system to accommodate seismic loads; and Kilmore St Medical Centre in Christchurch which required seismic wall and ceiling designs that would allow it to remain operational after a one-in-500-year earthquake.

Rondo offer free technical assistance, with engineers customising seismic designs to the needs of each project with an online seismic design wizard to help design Rondo KEY-LOCK® and DUO® Seismic Ceiling Systems.



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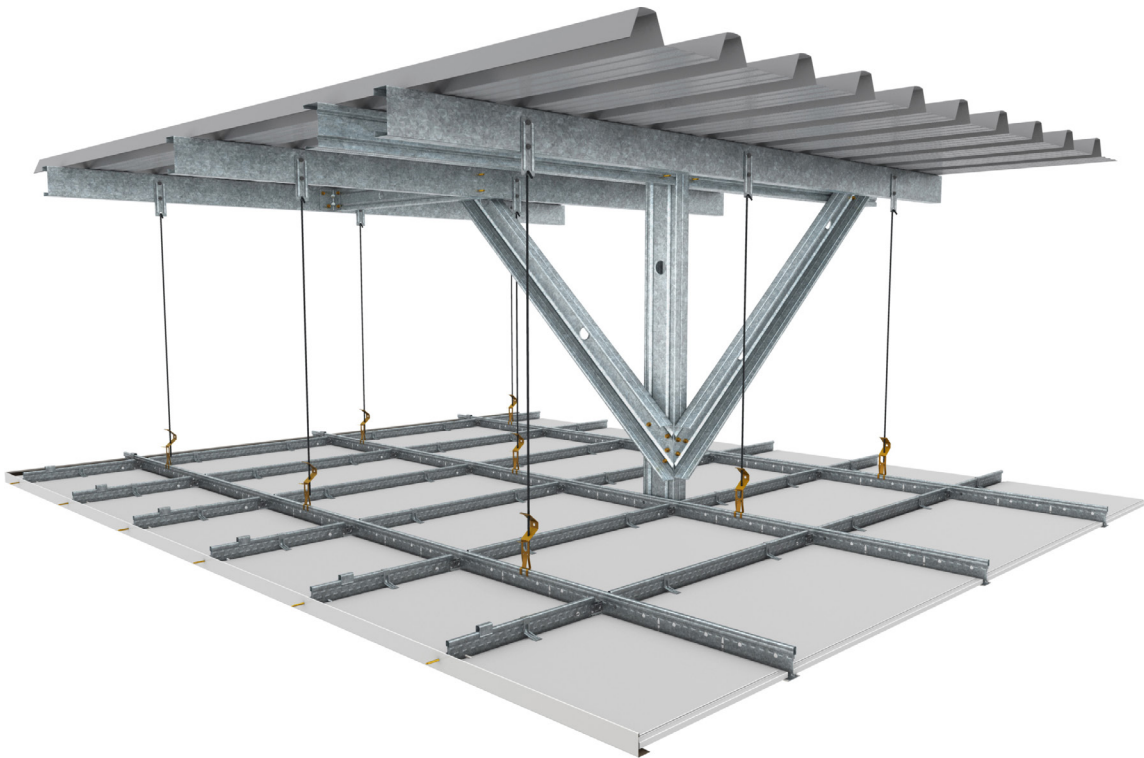
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3. Earthquake-resistant design concepts – chapter 5, Design Requirements

http://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/BSSC/P-749_Chapter5.pdf

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