EDITORIAL

This issue brings together 18 technical papers written about the effects of the 22nd of February 2011 Christchurch Earthquake and its aftershocks. This so-called "aftershock" of the 4 September 2010 Darfield Earthquake produced some of the largest peak ground accelerations, especially in the vertical direction, recorded anywhere previously.

Fortunately there were no fatalities due to the Darfield Earthquake but in the Christchurch 'quake there were 182 deaths, many of these caused by the collapse of two multistorey reinforced concrete buildings. Although it appears that these buildings were designed and complied with the existing Codes, when they were designed, the extreme ground motions (which easily exceeded the demand considered in designing these buildings) resulted in collapse. Currently a Royal Commission is investigating the reasons as to why these buildings failed so dramatically and their final report is due to be released in April 2012.

As was expected, many unreinforced masonry (URM) buildings sustained a lot of damage while some collapsed as a heap of bricks. Many of these have been demolished including some heritage buildings. A small number of URM buildings and churches had been strengthened over the last 3 decades and on the whole most of these performed well with mainly superficial damage. There has been much discussion since February as to the percentage of a new building's strength these earthquake prone buildings should be retrofitted to.

Liquefaction and lateral spreading caused considerable damage to structures built near the coast (East) and in the vicinity of the River Avon, which winds through Christchurch. Many houses and commercial buildings (including those built according to the current standard) on these sites were heavily damaged requiring demolition and these sites are unlikely to be rebuilt on.

Modern post 1985 buildings behaved very well in most cases but there was significant damage to "non-structural" elements including precast stairs, suspended ceilings and exterior cladding and glazing systems. Questions are being asked as to how much non-structural damage owners should expect to their modern buildings during a major earthquake? It is very likely that our design Standards will also aim to control non-structural damage in addition to the structural failure in their future revisions.

This issue also contains papers about how the lifelines in Christchurch performed. The electricity reticulation was brought back up remarkably quickly but the water and sewerage systems in the eastern suburbs were destroyed in many places and will take years to rebuild.

We would like to thank the multiple authors who produced their papers in a very short timeframe and the reviewers who gave their valuable time in an effort to publish this issue as soon as practicable after the February earthquake.

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