



Health & Safety

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The Canterbury Earthquake

On Saturday morning 4 September 2010 a magnitude 7.1 earthquake, centred at Darfield to the North East of Christchurch, violently rocked the city centre and its surrounding suburbs.

The earthquake caused significant damage to older brick buildings and un-reinforced facades in and around the city CBD. Luckily no lives were lost which has been mainly attributed to the fact that the earthquake struck in the early hours of the morning.

It must be remembered that, although the city centre was all but deserted at that time of the morning, most people were asleep in their homes. A comforting finding is that residential buildings performed very well and that most material damage was confined to contents, un-reinforced chimneys, and block or brick veneer claddings. Where structural damage has been significant, it has been mainly due to subsidence resulting from liquefaction of deep and very soft soils.



Violent shaking of soft and wet soils causes lighter silt particles and water to rise to the surface through cracks in pavements and around house foundations. Significant increases in ground water level have been recorded and many occupants described water and silt rushing around their homes "like a river" immediately following the earthquake.

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It is on these soft soils that structural damage has been greatest, particularly to brick veneer homes on un-reinforced concrete slabs. Subsidence and lateral spread (ground cracks opening up) caused slabs to slump and break, and the rest of the structure to follow. Engineers are working with builders, house removal companies and insurers to establish technical feasibility of reinstatement. The repair of many such structures will be expensive if possible at all.

Further discussion has centred around whether we should continue to build houses on soft liquefiable soils. If we tighten the criteria then how much flat land near waterways, around Canterbury or anywhere else in New Zealand, becomes unsuitable for residential development? Is it not a question of "what" rather than "whether" we should build on such land? Some favour mandating reinforcing steel in all house slabs to better control cracks and reduce repair costs, but this doesn't



Broken residential un-reinforced concrete slab and consequential damage to internal linings due to lateral spread



School hall broken in half
due to subsidence

stop subsidence. Although older houses with a concrete perimeter footings and timber floors on shallow piles suffered similar movement, they will be easier and cheaper to repair. On the positive side the performance of modern timber framed houses on good ground gives us confidence that current Building Code requirements, and timber framed building standards such as NZS3604, are working well. Minor damage was observed, often limited to superficial plasterboard sheet or joint cracks. A GIB® Bulletin has been prepared to assist home owners and builders with repairs (see www.gib.co.nz).

It is important to note that scientists have placed this earthquake at a little more than half the ultimate design event and, although this was a genuine “test”, there is no room for complacency. Analysis is continuing and a clearer picture will surely emerge after all insurance claims are processed and as repairs are being completed. In the meantime we wish all affected people in Canterbury a speedy recovery and return to a life of quiet and peaceful normality.