



Department of
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Department of Building and Housing (“the Department”) submission on the GNS report “Canterbury Earthquakes sequence and implications for Seismic design levels”

1. The Department considers New Zealand is very well served by GNS, with top class seismologists in tune with international best practice. Their work is an important input into the Building Code and the building regulatory framework.
2. The reports provided by the Department to the Commission in May 2011 described the current way in which New Zealand’s building regulatory environment operates, including the way in which seismic modelling is used to develop and update loading standards and related Building Code matters.
3. The interrelationship of seismicity science with the design and development of building standards is complex. The Department has a direct interest in this interrelationship. In summary, it is of the view that while understanding of seismic hazards is a key factor influencing building design standards, at this point in time greater benefit is likely to be achieved through better attention to, application of and promotion of good structural engineering principles and a better understanding of how buildings perform, i.e. we need to invest in knowledge about how to design and construct buildings to resist seismic hazards.
4. The GNS report provides a very valuable summary of seismic risk assessment and its interrelationship with the building regulatory system. As a result of some new insights that the Canterbury earthquakes have provided, the Department will consider these implications as part of its current review of the Building Code System.
5. While the Department is still working through these insights, at this stage some key issues the Department will evaluate are:
 - a. The application of scale on a probability-based assessment for determining the seismic risk in establishing the design requirements. For example the seismic hazard at a particular location does not take account of the number of buildings that could be affected by a seismic event at that location. A low probability event in a region with high numbers of buildings could be considerably more devastating in terms of harm to people, property damage and importantly impact on local, regional or national economy than a larger event in a sparsely populated location.
 - b. The methodology for the derivation of the seismic hazard factor “z” needs further detailed consideration. This is a sophisticated probabilistic model that includes many assumptions such as background seismicity for unknown faults, shaking attenuation, magnitude scaling factors, underlying ground conditions, etc. Other important factors that influence ground shaking or earthquake likelihood may or may not be recognised, including directivity effects, stress drop associated with fault strength, time related seismic recurrence, etc. Understanding some of these factors is important for our general understanding of seismology.



However, the degree of sophistication of the model may be greater than any impact needed to affect the actual performance of a building in an earthquake.

6. The Department is also about to undertake public consultation on urgent changes it made to the Building Code's supporting documents for Structure (i.e. B1/AS1, B1/MM1 and B1/AS3). The changes were made to address the increased seismic risk in the Canterbury earthquake region. These changes were made to facilitate repairs and begin reconstruction work in Christchurch in a timely manner, by providing designers, engineers and affected owners with certainty about building requirements, in particular with regard to seismic risk. The two main changes were to adjust the seismic hazard factor for the region, and to adjust the definition of 'good ground' and increase the strengthening requirements for concrete slab foundations.
7. The Department will keep the Commission updated as to the results of its public consultation.
8. Other than making these general points, the Department has not made a specific submission on the GNS report, which it understands to be the focus of the hearings scheduled for 17 October. However, it will appear, and be represented by counsel, in order to listen hear to the evidence and other submissions and to respond to any questions arising in the hearing that relate to matters in its sphere of responsibilities and interest as outlined in this letter.
9. The Department will make detailed submissions at the hearings in the weeks of 7 and 14 November on matters arising in earthquake prone buildings law, policy and practice.

Yours sincerely



Dave Kelly

Deputy Chief Executive, Building Quality

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