Kaikoura Earthquake Technical Clearinghouse

Meeting #2 – Summary

Held at the James Cook Grand Chancellor, The Terrace, Wellington, 23 November 2016

Purpose of Meeting

The purpose of this, the second, Kaikoura Earthquake Technical Clearinghouse meeting was to share information learned from inspections and assessments of buildings in the initial days following the earthquakes as part of establishing a wider understanding of the range of impacts across different types of buildings. Individual buildings were not discussed at this meeting.

The Clearinghouse meeting was organised by the New Zealand Society for Earthquake Engineering (NZSEE), the Structural Engineering Society (SESOC) and the New Zealand Geotechnical Society (NZGS). The approximately 120 attendees were mostly structural and geotechnical consulting engineers, together with staff from WCC, CDEM, GNS Science, USAR, and Auckland, Victoria, and Massey Universities.

Key Points from the Presentations and Discussion

Introduction

- Peter Smith (President NZSEE) introduced the Engineering Leadership Group (ELG) comprising key technical society and consulting engineering practice representatives. The ELG is to:
  - Interact with and support MBIE's Building Systems Performance Group.
  - Assist IPENZ and the Technical Societies with communications.
  - Facilitate the timely gathering of building and site data.

Earthquake Science Update

- Matt Gerstenberger and Nick Horspool (GNS Science, Lower Hutt) provided an overview of the updated seismology for the Kaikoura Earthquake, and the ground shaking effects in the Wellington CBD and Hutt Valley. Forcasting of aftershocks was also described. The latest seismology information can be obtained from:

  http://info.geonet.org.nz/display/home/2016/11/14/M7.8+Kaikoura+Earthquake%3A+Latest+updates

  Further information is available from:

  http://www.eqclearinghouse.org/2016-11-13-kaikoura/

- Automatically generated spectra PGAs associated with aftershocks are available from:

  http://spectra.rapidalert.org.nz/

Building Impacts Update

- The general type of damage showing up is non-structural in buildings with longer period (1 – 2-seconds), on softer soils.
- There appears to be a small micro-zone area around Aitken Street that may have caused greater response in adjacent buildings. On the other hand little damage has been observed around Cable Street and on rock sites.

- It was noted that the GeoNet instrumentation is good on Site Subsoil Class E and D, but limited on Class C. There appears to be a significantly better performance from similar buildings that are located on Class C soils compare to E & D. GNS Science requested that potential instrument sites be identified to them, particularly for buildings whose owners are willing to have their building instrumented.
- As inspections become more invasive, structural damage becomes more apparent. Subsequent inspections are finding additional cracking that could be due to aftershocks.
- Damage associated with mid-height changes in stiffness has been seen.
- Ramps appear to be vulnerable.
- Elongation of reinforced concrete frame structures is showing up in a number of buildings, with impacts on precast floor systems. Torsional response can exacerbate the impacts. In some cases the lack of damage to contents suggest that acceleration were not that high the number of cycles may have accentuated the elongation effect. Elongations of 8 to 10mm per bay have been identified.
- Transverse cracking of Dycore has been seen beyond the seating.
- A recommendation is to look in the corner area of the slab for any cracking, noting its location, extent and width.
- The earthquake shaking of 'whole of building' is showing that laboratory testing does not identify all the issues of building behaviour and the nature of damage that can occur.
- At least one industrial building is showing damage to it's rod bracing.
- Unreinforced masonry buildings require careful assessment, even if little apparent damage; identify vulnerabilities that may be critical in an aftershock with shorter period motions. Be helpful to owners/occupants without being alarmist.
- Were repairs are required it is important to work with the Building Consenting Authority to check if a Building Consent is required or not.
- Noted that insurance excess is in the order of 5% of building value, therefore repairs could cost less than this value. Determining the insurance loss is very difficult where the building has mixed use.
- Guidance is being sought as to when further inspections are required following a significant aftershock.
- Determining residual structural capacity in a damaged building is complex and requires detailed assessment. What is the residual capacity after a number of cycles of low μ demand?
- The various facets of the reporting require a careful discussion with the client to ensure that the issues are clearly articulated. A non-technical audience can put different interpretation on the use of technical language in a report.
- It was noted that some Corporates and Government Departments are being very conservative in their approach to building occupancy.
- Celebrate the success of past retrofit with building owners and others.
- With the reduction of aftershock activity, society will return to normal activities very quickly, but risks remain and can be quite high.
- Sharing of technical data and cooperation of those involved with the assessment of buildings is very important for the public good.

- In any discussions with the media it is important to ensure a consistent message is being conveyed. The Societies are working with the Comms section of IPENZ to achieve clarity of the messages sent into the public domain. It is important to work in a collegiate manner.

Health and Safety matters

- Maintain awareness of heightened Health & Safety matters.
- Look after staff; they can be under considerable stress.
- Wear dust protection when opening and looking up into ceiling spaces.

Wellington City Council's Critical Buildings Team

Dave Brunsdon spoke on the activities of Wellington City Council's Critical Buildings Team. The scope and primary focus of the Critical Buildings Team is to:

- Assist Wellington City Council with decision making.
- Assist to actively identify other buildings that may be vulnerable.
- Provide linkage to consultant carrying out assessments and design of retrofit solutions.

If there is an issue with a building that the CBT should be aware of, the Group can be contacted via: 021 946 138

engineeringsupport@wcc.govt.nz

An Initial Building Categorisation is being used by the CBT. The categorisation is:

- **Cat. A1**: Buildings at risk of collapse in aftershocks.
- **Cat. A2**: High probability of façade failure in aftershocks.
- **Cat: B**: Inspection status unknown
- **Cat: C**: Currently closed but under engineering oversight.

For the assessment process, engineers are encouraged to use the MBIE Rapid Building Assessment forms.

Agreements and Actions from Meeting

Acknowledgement that the Kaikoura Earthquake Technical Clearinghouse has a key role to play in:

- facilitating the exchange of information amongst engineers;
- facilitating the exchange of information between engineers and the territorial authorities;
- augmenting the efforts of affected territorial authorities; and
- facilitating the exchange of information amongst researchers and between them, engineers, and the territorial authorities