

Discussion Paper: Building Management after Earthquakes

Dear Commissioners

This is commentary to the Royal Commission on the Canterbury Earthquakes; on the *Discussion Paper: Building Management after Earthquakes* is the joint effort of Tim Weight, Manager Central Building Control (BSE Operations Leader during both Christchurch activations) and Patrick Cummiskey, Special Projects Policy Advisor.

This commentary will be retrospectively reported to the RDO committee.

Building Safety Evaluation Framework

1. Main objective of building safety evaluation (BSE) should be to ensure that safety is the paramount concern for those that enter affected buildings, as well as the safety of the public at large. The incorporation of other aims, such as other items for hazard identification, chattel recovery, or preservation of heritage elements could potentially be included. The risk, however, is that by adding additional items for BSE staff to consider, that the core focus of safety (and the efficiency of the overall process) is hindered.
2. From our perspective, the key concern arising from Canterbury around the BSE operation was that little of the process had been formalised by local authorities prior to the event. Not enough staff were familiar with the specifics of the system (such as what each colour of placard meant), and documentation was merely copied and modified from the draft Department of Building and Housing (DBH) guidelines. The issue with green placards was one of the most noticeable areas of concern; however, they did at least in residential areas work well by allowing the occupants to remain in their homes as an interim measure.

The building evaluation model is an international standard with considerable input from the New Zealand Earthquake Engineering Association. The model is good, but requires, in light of the experience in Christchurch, consideration on more detailed procedures to manage the placarding of buildings. To address these and the other failures with the system, it is our recommendation that the framework and its operation be a nationally consistent procedure that all territorial authorities and associated agencies are required to adhere to.

After an earthquake, there is considerable pressure from the business community to allow access to their buildings. It may be practical in the case of even yellow-placarded structures to allow better temporary access than was provided, provided appropriate safety precautions are taken.

3. Control of the framework should be under the Ministry of Civil Defence, although its development should be a joint process between them, the Ministry of Business, Innovation & Employment, Local Government authorities, and the engineering community. Its development needs to be both a national and local affair.

The groups in New Zealand with the greatest expertise are the NZ Society of Earthquake Engineering, IPENZ, and territorial authorities. These groups can provide the building evaluation framework with certainty of operation and should all participate in the development and execution of the framework.

The outcome should be a nationally consistent framework that all participants can fit into, that can be run in the same manner as an emergency service or utility is under the Co-ordinated Incident Management Framework.

Being involved with both civil defence emergencies in Christchurch it was clear that the learning's from the building evaluations undertaken in the first civil defence emergency were implemented in the second civil defence emergency.

4. Using volunteer engineers with a strong management support overview provided a good outcome for emergency building evaluation. Using senior CPEng engineers to allocate and mentor other engineers on a daily basis provided a quality evaluation process in Christchurch in the February earthquake. It seems doubtful that the country could reasonably afford to do away with voluntary participation in this process, so liability waivers should remain. During the Canterbury response all engineers attended a debrief at 6.00 pm each night to provide technical feedback to the engineering inspection teams. This sort of process should be formalised as part of the framework.

Two CPEng engineers were allocated to each inspection team with usually two other less experienced engineers as well. Another practical option (not implemented in Canterbury) would be to have a 3-person team made up of a CPEng, a non-CPEng or building official, and a non-technical communications person for scene management.

To achieve the support received from IPENZ members' nationally, the liability waiver form is a must. It provided the engineers with a certainty in their decision making process. What more focus needs to be placed on is what the process delivers and how that is communicated to participants and the public as a whole.

5. When a state of emergency is not declared, any inspections would be undertaken under the provisions of the building code related to dangerous buildings. It would be beneficial though to consider a legislative change to see that the placarding process is mandated for under both the CDEM Act and the Building Act. Under the Building Act it could then function effectively as a large-scale issuing of s124 Dangerous Building notices, where the authority is concerned about life-safety but does not yet have enough information/resource to carry out a full assessment of each building.

The Placard System

1. The placards placed at the first inspection were a quick evaluation of any obvious damage to commercial and residential buildings. This created in some peoples' minds a false sense of the structural integrity of their buildings (commercial). A full engineering review is required before any public access can be allowed. An emergent issue was that the rewards provided by support agencies for having a red placard created issues with red placards being removed from other buildings to collect the reward for residential property owners. It was a very positive message if

The Canterbury implementation of the BSE framework was an after-the-fact use of the DBH draft document. Therefore, all the materials and process for its execution had to be put together on-the-go. One of the results from this was that the placards were of plain paper, and environmental deterioration was inevitable. A poor understanding of the building stock by many led to multiple placards (sometimes varying) for some buildings. Unfamiliarity with the process meant a lot of placards were not properly filled out, and there was a poor understanding of what each of the three colours meant. There is no inherent problem with the colouration or the distinction between the three classes of placard, but people need to understand the point behind the process for it to work properly. We cannot afford to move away from what is a reasonably consistent base framework around the three colours, and therefore the focus needs to be on properly educating users pre-event, and reminding the public post-event.

If you instruct commercial property owners not to enter their building you will always get some who are driven by the desire to re-open as soon as possible without full consideration of the risks to their staff and customers.

These same issues would be encountered elsewhere in the country in similar circumstances. The pressure of individual financial circumstances will always ensure this will occur.

2. Engineers undertaking inspections for their clients did not appear to use a different placard system. However, working for a client rather than for civil defence should continue to require engineers to provide a considered outcome on the integrity of the building. Engineers would in this instance, be working under the IPENZ code of conduct. We do not support the use of any placarding system that move away from the three-colour North American framework.

If a review is undertaken on a specific building, it is the duty of the building owner to provide the territorial authority with a copy of this updated evaluation, include in the placard wording and instruct IPENZ that a full report, if undertaken, must be provided to the territorial authority. Failure to do so should be held as an offence under the CDEM Act or Building Act.

3. Information sharing while the civil defence emergency was in place provided participants with some surety of their liability in providing this information. Once the civil defence emergency is lifted there is a reluctance on the part of the different agencies involved to share information, which may have been commercially sensitive.

To encourage or require information sharing between insurance companies, building owners, and other agencies, pre and post disaster, would require legislative direction and is a move that we would support.

While we do not have a firm picture on the whole CDEM operation, a key concern also exists around how data is collated and managed after a placard has been issued. There is still a lack of an appropriate standardised database that could be used to collate this information, something that should be resolved at the national level.

4. Due to the wide range of construction, age of construction, and varied use of building materials, engineering inspections were conditional on the skills and experience of those taking part.

Training courses run by IPENZ, as well as part of normal tertiary training for an engineering qualification should be provided, as well as the opportunity for regular upskilling in the area of earthquake building evaluation. To have a skilled evaluation group is an asset to the country for such future earthquake instances.

5. If the original seismic capacity, structural plans and general building information (age, height etc) of a building is known pre-disaster, it can provide a measure of assurance to engineers when undertaking an inspection and seismic evaluation of the current condition. The extensive damage in Christchurch to older buildings of brick construction is close to that estimated previously on the expected outcome of the earthquakes of the magnitude which occurred in Christchurch. The challenge to provide an accurate evaluation report on the condition of a building is obviously exacerbated by continuing and ongoing aftershocks. It is not possible in this instance to prescribe or determine a specific inspection criteria or accurate outcome for a building evaluation.

As there is no standard Detailed Engineering Evaluation at present, it would be beneficial for IPENZ/NZSEE to develop a basic template/guide for what can be considered a DEE, and some consistent format for its presentation (we must bear in mind that there are a variety of methods for carrying out a DEE and that it is not a one-size-fits all like the Initial Evaluation Process).

Barriers to Action & Recovery

1. There is a clear association between the civil defence emergency provisions and the Building Act. In relation to dangerous buildings, the challenge for the territorial authority is to know about and receive updated information from building owners after a civil defence emergency. It should be mandatory for building owners to provide the territory authority with all updated information received by them from their consultants to ensure the public records are accurate. A legislative change to allow for BSE placarding under both the CDEM Act and Building Act would also solve this problem.
2. Buildings must be secured against inappropriate access dependant on their placarded condition. Green, while allowing access, should still be treated with caution and users informed about risks before they enter. Yellow should allow access only to those with good reason (utilities, emergency services etc.) who are taking appropriate safety precautions, and have listed their intent to do so with Civil Defence or the local authority. Red should be closed to all except appropriately qualified inspection teams and only accessed under absolutely necessary conditions.

If a building is extensively damaged then heritage considerations must be put aside. Safety to users and other adjacent buildings can provide the appropriate criteria for demolition (partial or complete). Where an immediate hazard is not present, work should be undertaken with reasonable haste to erect any shoring measures. Failure to take sufficient action in this regard may require pre-emptive demolition or deconstruction work, regardless of heritage concerns. Therefore, it would be prudent to consider the pre-disaster preservation of heritage structures to a greater extent than it presently is.

Zone and building cordons should be the responsibility of the territorial authority, under the umbrella of the Ministry of Civil Defence. It be more practical for a government agency to maintain a large stock of fencing at locations across the country (for day-to-day use by authorities) to reduce costs. During a disaster, this stock can be made available and the local authority can coordinate its use for cordoning zones and buildings in a consistent manner.

3. The challenges to re-open buildings in Christchurch were exacerbated by the age of the building stock and the continuing and ongoing aftershocks. The challenges were exacerbated by pre-verification from the insurance industry on final outcomes for insurance payouts and re-insurance issues.

With the large number nationally of engineers and building inspectors involved in Christchurch this has provided in the medium term, a stock of experienced people in case of a further emergency elsewhere.

4. The biggest challenge of any recovery phase is the combined buy-in of all concerned to achieve a positive and progressive outcome.

Strong decisive leadership is a prerequisite to achieve this outcome. This was ably demonstrated in San Francisco after the 1987 earthquake. Their outcome is a very liveable city in many regards with some excellent community outcomes, although from a recent visit and discussion with city officials, more still could be done to encourage/force private owners to upgrade pre-disaster, as many have not done so.

Without strong decisive leadership, with a good decision making criteria behind it, any recovery will take longer than it should. Therefore, with the continuing aftershocks in Christchurch any actual permanent re-build could be some years away. However, this does not mean that planning for the future should be put on hold.

Building Safety Evaluation Models, Resourcing and Planning

It must be borne in mind that most problems with the BSE process (and indeed many processes in the government regulatory field) are a result of a lack of information, and poor technology and processes for the capture, management, and dissemination of what information we do get. Scenario modelling can only work as well as one has the background data to run through the model, and to gather that data in the first place government agencies need software that can appropriately manage that data.

The examples of pre- and post-disaster aerial mapping of affected areas is not necessarily applicable for New Zealand, as all the countries (Haiti, China, Turkey & Iran) have poorly implemented building codes where hundreds if not thousands of buildings suffer complete collapse, rather than façade collapse as was the key problem in Christchurch.

Remote sensing using building sensors may be practical in the near future with the decreasing cost of sensors, but its widespread adoption and use for anything other than critical facilities is unlikely to occur soon.