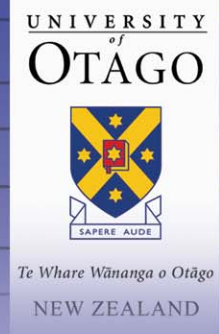


Impact of the Recent EARTHQUAKES on the Christchurch Animal Research Area



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Introduction:

The Canterbury area was recently hit by two significant earthquakes - the first on the 4th of September 2010 (measuring 7.1, with the epicenter based 45 km to the west of Christchurch) and the second on the 22nd of February 2011 (measuring 6.3 with the epicenter based 10 km south-east of the city center). Each of these earthquakes had a significant impact on the Christchurch Animal Research Area (CARA) housed within the University of Otago, Christchurch (UOC), and the Christchurch Hospital buildings. While both earthquakes caused internal structural damage in the CARA facility, the February quake resulted in far greater and more extensive damage, with the UOC facility becoming uninhabitable for researchers, and the building itself being "Yellow Stickered" and accessible to essential personnel only.

Impact on CARA Complex:

September 2010 Earthquake

The September earthquake occurred at 4.35am on a Saturday morning, and due to the distance from CARA, was not felt as strongly as February's quake. However, when entering the facility later that day, it could be seen that plaster had come off walls and cracks had appeared in both walls and floors. Because the building is attached to the Christchurch Hospital, power had been reconnected, but there were warnings regarding the reticulated water and the possible presence of E. coli. Consequently, all water for the animals was boiled until official clearance was given. Water was also stockpiled to cater for one week's supply in case of further quakes and water restrictions. Food stocks could be freighted in from Dunedin when needed, so this was not a problem. Over the following days, entry to the facility was restricted to basic animal husbandry until the building was given a complete clearance for all personnel.

February 2011 Earthquake

The earthquake which occurred at 12.51pm Tuesday, 22nd February, caused significantly greater damage to the CARA facility, and previous damage was greatly exacerbated (Figures 1- 4). The cinder blocks of the internal walls were broken and dislodged (Figure 5), large chunks of plaster were shaken loose from walls (Figure 6), numerous cracks were apparent in the render, and tiles had fallen from the ceiling. In addition, power was lost and water supply was cut.

Figures 1 & 2



Figures 3 & 4



Figures 5 & 6



Extensive cracking was also evident in the floor of the facility's main corridor with some cracks running the length of the hallway. Others cracks were not fully visible until repair work was started and paint was removed. Removal of the lino floor covering in the main surgical theatre connecting to the corridor also revealed numerous cracks throughout. Cracks in both rooms have subsequently been filled with epoxy resin (Figures 7 & 8).



Figures 7 & 8

Impact on Rodent Racking:

During the earthquakes, rodent racking was moved violently across the rooms. As our racking are on castors, this allowed them to move with the swaying and shaking of the building. Although the rodent cages moved around on the racking, no cages were displaced from the shelves to the floor.

Many cages, however, had their lids dislodged, causing food to be thrown onto the floor along with the cage identification cards. Other cages had the sipper lids of their water bottles shaken off which resulted in the soaking of the litter and the animals inside. The dislodgement of cage lids also allowed multiple rodents to get loose in all rooms. However, as all animals had been tagged previously, returning them to their correct cages was reasonably straightforward.

Impact on Animals:

At the time of the September and February earthquakes our facility housed several sheep, as well as rabbits (~19 New Zealand Whites), mice (~ 600 C57BL/6, ~100 Balb/C) and rats (~185 Sprague Dawley, ~ 50 Transgenic m (ren2)-27). No animals suffered any physical injuries during either quake (although three sheep had to be euthanised - one because it was being operated on at the time of the February quake and the other two as the experimental procedure could no longer proceed), and apart from the Balb/C mice, no behavioural changes were noted.

Following the two main earthquakes and resultant aftershocks (6919 as of 16th June 2011, including a further earthquake on June 13th, which was equivalent to February's destructive 6.3 quake), the Balb/C mice began displaying signs of aggression which included tail twitching, rearing onto their hind legs, biting and increased cage fighting. Prior to the September earthquake, our strain of Balb/Cs were easy to handle and showed little, to no, cage fighting or aggressive tendencies towards either each other or their handlers. Experimental male Balb/Cs on a high fat diet exhibited the highest increase in aggression, especially towards cage mates, and as a result had to be housed separately. In addition, self-mutilation occasionally occurred, leading to these animals having to be removed from experiments and euthanised.

No adverse effects were noticed in regards to breeding or parturition in either rats or mice, and there were no signs of increased cannibalism. Litter sizes, growth rates and weights of weaners remained consistent with pre-earthquake levels.

Due to the extensive damage that occurred during the February earthquake, no animals were able to be housed in the facility. The rodents were housed in our Physical Containment 2(PC2) facility.

Lessons Learnt from September 4th which improved response to February 22nd:

1. Storage of water - at least 1 week's supply for all animals (as our facility is small compared to many this is more practical for us than it might be for larger facilities).
2. Strategically placed torches in case of power outage.
3. Access to an external facility that can both sterilise and store animal food stocks.
4. Clearly defined lines of communication between facility staff and management, building maintenance, external servicemen and freighting companies.
5. Involvement of the Head of the CARA Animal Users Group, who liaised between facility staff and researchers, proved invaluable after the February earthquake. This allowed CARA staff to concentrate solely on animal welfare and husbandry issues.

Acknowledgements

A special mention must go to fellow members of CARA, whose response during these trying times was of the highest quality. Even though staff members' homes had suffered damage, they continued to enter the facility to maintain essential services to the animals and ensure their welfare. This was done despite the tenuous nature of the building, infrastructure and city of Christchurch at large, and their commitment to the animals' welfare cannot be understated.

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