



23 September 2011

Earthquake risk in Wanganui

Hundreds of earthquakes occur in New Zealand each year. Many of them are so deep that only a few cause damage and injury. However, a severe earthquake could occur at any time.

Wanganui has been accredited as an International Safe Community, recognising safety as a universal concern and a responsibility for all. We want to ensure our community is prepared for a major earthquake and knows what may occur and what to do.

How are earthquakes measured?

- Richter Magnitude
 - Measures the energy released by an earthquake (the strength of the earthquake at its source)
- Modified Mercalli (MM) Intensity Scale
 - Measures the effects of an earthquake on people and their environment (how it feels and its impact)

| NZ Modified Mercalli Scale | Description |
|-------------------------------|---|
| MM 7: Damaging | General alarm. People experience difficulty standing. Furniture and appliances are shifted. Substantial damage to fragile or unsecured objects. A few weak buildings are damaged. |
| MM 8: Heavily damaging | Alarm may approach panic. A few buildings are damaged and some weak buildings are destroyed. |
| MM 9: Destructive | Some buildings are damaged and many weak buildings are destroyed. |
| MM 10: Very destructive | Many buildings are damaged and most weak buildings are destroyed. |
| MM 11: Devastating | Most buildings are damaged and many buildings are destroyed. |
| MM 12: Completely devastating | All buildings are damaged and most buildings are destroyed. |

The intensity of an earthquake is not measured by the size of the earthquake on the Richter scale. The following table shows how the 2010 and 2011 earthquakes were felt in the Christchurch CBD.

| Date | Epicentre | Depth | Richter magnitude | MM |
|------------------|-----------------------|-------|-------------------|---------|
| 4 September 2010 | Darfield, 40km W Chch | 11km | 7.1 | MM 7-8 |
| 26 December 2010 | AMI Stadium? | | 4.9 | MM 7-8 |
| 22 February 2011 | 10km SE of Chch | 5km | 6.3 | MM 9-10 |
| 13 June 2011 | 10km SE of Chch | 6km | 6.3 | MM7-8 |

Could a large damaging earthquake strike Wanganui?

Wanganui is in an area of New Zealand that is at moderate risk of suffering a damaging earthquake. This is based on our knowledge of historic earthquakes, and of earthquake faults throughout New Zealand. Until the recent Christchurch earthquakes, the risk in Wanganui was about the same as Christchurch. Due to the recent earthquakes and the discovery of new fault lines near and is currently being reviewed by GNS.

Large damaging earthquakes have affected Wanganui in the past and we should expect to suffer a large earthquake at some point in the future. Statistically, Wanganui can expect to experience a MM 9 earthquake every 270 years.

Wanganui earthquakes of intensity greater than MM 7 since 1840

| Date | Epicentre | Richter magnitude | Mercalli maximum intensity | Earthquake effects in Wanganui |
|-----------------|------------------|--------------------------|-----------------------------------|--|
| 8 July 1843 | Wanganui | 7.5 | MM 9-10 | Extensive lateral spread near the river. Landslides. |
| 16 October 1848 | Marlborough | 7.8 | MM 7 | Minor lateral spread in river bed and some wharf damage. |
| 23 January 1855 | South Wairarapa | 8.2 | MM 8 | Extensive lateral spread, extensive wharf damage. Drainage of lakes/swamps. |
| 8 December 1897 | Wanganui | 7.0 | MM 8 | Loss of water supply, lateral spreading, damage to wharves, minor ground cracking in Glasgow Street. Greatest damage to businesses in Victoria Avenue. Landslides. |
| 5 March 1934 | Pahiatua | 7.6 | MM 6-7 | Aramoho and parts of Wanganui East experience strong shaking. Fissuring of river bank at Aramoho. Landslides. Break in water main at foot of St John's Hill. |

Are there any earthquake faults in Wanganui?

There are no known active faults under the city. We are more likely to be affected by a large earthquake originating from one of the major active faults that pass through the central ranges of the North Island or via the Hikurangi Trough which is a major fault that runs along the east coast of the North Island. The major earthquakes that have affected Wanganui in the past have mostly been centred some distance from this district. Earthquakes that have been centred around Wanganui in the past have tended to have relatively deep epicentres, minimising the felt effects and damage.

What could happen in Wanganui in a large earthquake?

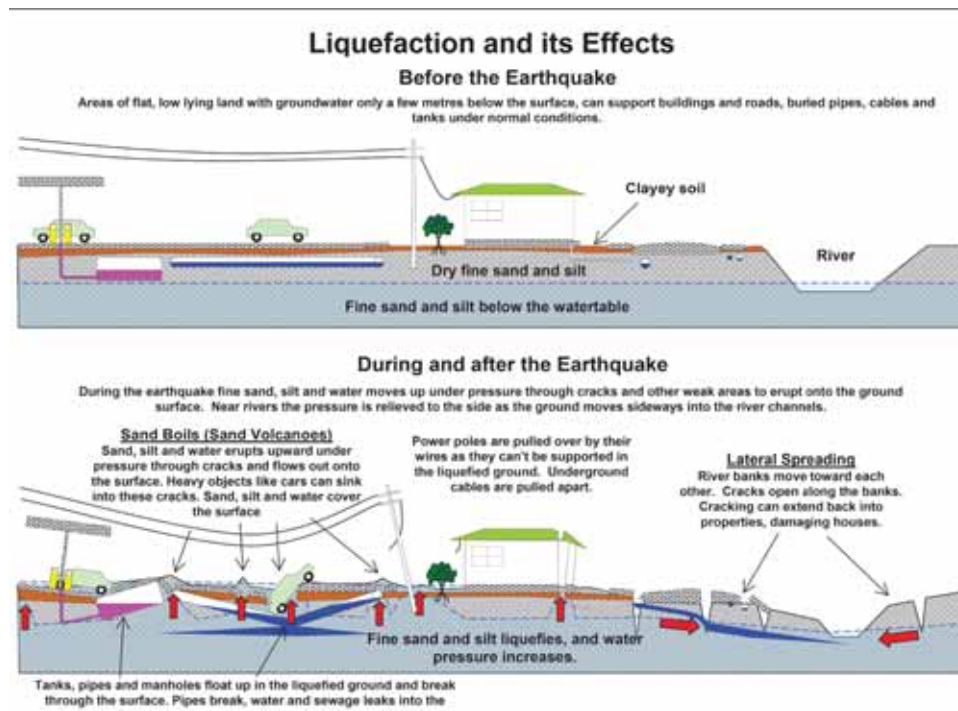
The main ground-related hazards associated with earthquakes are:

- Fault rupture
- Ground shaking
- Liquefaction and lateral spread
- Landslides

Fault rupture is when there is a tear in the ground surface and the two sides move relative to each other. This can be very damaging, but is quite rare.

Ground shaking is what we commonly associate with earthquakes. This ground shaking can cause large horizontal loads in structures, resulting in collapse of all or part of the structure.

Liquefaction occurs when fine soils close to the ground surface and under the water table lose all strength. This causes building foundations to settle, buried structures to float and pop out of the ground, and sand boils (sand ‘volcanoes’ where, under pressure, the sand, silt and water erupt upward through cracks and flow onto the surface) to occur. Land near streams and rivers also moves horizontally towards the centre of the waterway as a result of liquefaction. This is called lateral spread.



Landslides can occur on hillside slopes during an earthquake. This may be due to the additional load on the slopes caused by the shaking, or might occur following rupture of water or sewer lines.

Liquefaction, lateral spread and landslides have all been recorded in Wanganui following large historic earthquakes. Ground shaking has also damaged Wanganui buildings in the past.

A map of liquefaction susceptibility in Wanganui was prepared in the mid-1990s. This was based on historic reports of liquefaction and knowledge of the ground conditions. Further information is available from Wanganui District Council.

What should I do in an earthquake?



Civil Defence advice is that the drill practised by schoolchildren will protect people in most earthquakes. That drill is to drop, take cover under a sturdy piece of furniture, and hold on, or shelter against an interior wall away from windows, bookcases etc.

Identify safe places in your home, office or school so that when an earthquake starts you can respond quickly. An immediate response to move to the safe place can save lives. And that safe place should be within a few steps – no more than three metres – to avoid injury from flying debris.

Stay indoors until the shaking stops and you are sure it is safe to exit. In most buildings in New Zealand, you are safer if you stay where you are until the shaking stops. If you go outside after shaking stops, move quickly away from buildings to prevent injury from falling debris.

Most of us will get through an earthquake with no major injury or loss of life.

Where can I get information about what to do during a disaster and how to secure my property?

Wanganui District Council wants to ensure that our community is prepared in the event of a natural disaster. Our Emergency Management Civil Defence team can help with advice on how you and your family can be prepared. Contact us on phone 349 0001. Information is also available on the Civil Defence pages of our website www.wanganui.govt.nz.

Other useful websites:

Get Ready Get Thru www.getthru.govt.nz

Earthquake Commission: www.eq-iq.co.nz

Geonet: www.geonet.org.nz