

Earthquake Resistance

Exceeding the New Zealand Building Code

The primary objective of the New Zealand Building Code is to prevent loss of life and injury to *people*. Building damage may occur.

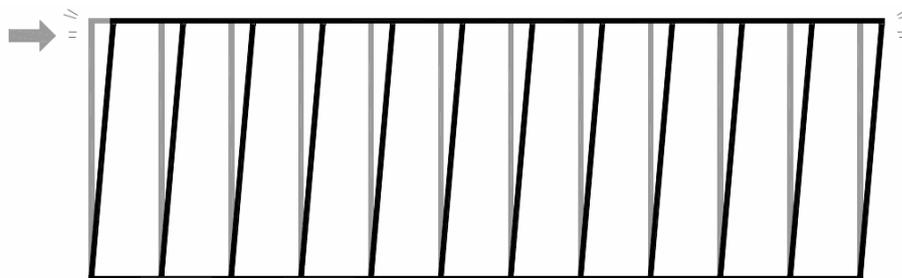
By careful consideration of construction methods, building design and bracing, it is easy to build well above the minimum New Zealand Building Code requirements for earthquake resistance.

General design and construction

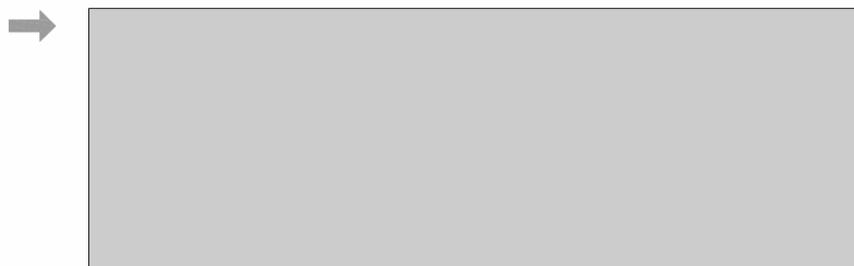
Houses built with lightweight wall cladding and lightweight roof cladding perform better during an earthquake than using heavy brittle construction materials such as concrete, masonry and brick. Simple rectangular shapes perform better than 'L' or 'T' shaped floor plans. Keep large openings in walls to a minimum where bracing cannot be added.

Strength and stiffness

Strong stiff walls will deflect less during an earthquake and therefore reduce damage to the building. Metrapanel exterior structural walls and internal non structural walls are both strong and stiff, providing minimal in-plane deflection during an earthquake.



Stud wall



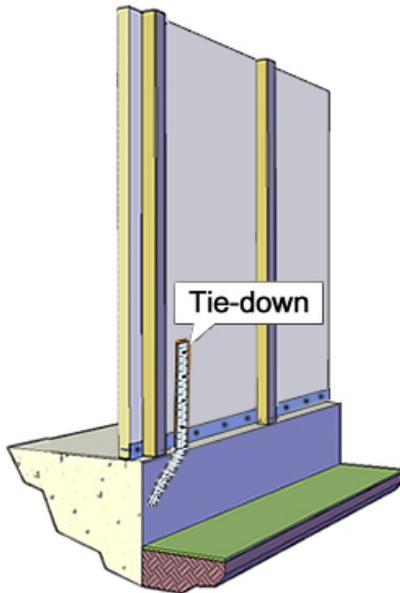
Metra wall

The Metrapanel system has inherent bracing capacity in all wall elements. Due to the high internal strength of Metra wall panels the bracing capacity is not limited by the wall panel itself.

Wall to floor connections

During an earthquake, there may be considerable compression, tension and horizontal shear forces exerted on the wall to floor connections. Strong wall to floor tie-down connections are critical to prevent overturning, sliding and uplift. Bracing capacities of walls can easily be increased with the inclusion of additional base fixings to provide greater resistance to overturning, sliding and uplift.

In high earthquake risk areas, additional Metra tie-down devices may be used to connect walls to floors at building corners and at each end of exterior bracing walls. Metra tie-downs are available for embedding into concrete foundations with connection ratings of 6kN, 12kN, 20kN and 30kN.



Metra compared to standard stud walls with plasterboard

Comparing a 7m long exterior wall for earthquake bracing units between Metra panel and a standard timber frame and plasterboard wall, Metra achieves more bracing units.

100x50 Stud framing and plasterboard GS1(10)	385 bracing units
Metra wall panel with 6kN fixing at each end	672 bracing units

Summary

For a relatively small cost, earthquake damage can be reduced by installing strong stiff walls with secure tie-down connections to the foundation. The Metrapanel construction system provides a strong wall bracing system for housing that exceeds the bracing requirements of the New Zealand Building Code.