



POLICY ON EARTHQUAKE PRONE BUILDINGS

1 INTRODUCTION

The Mackenzie District Council, under Section 132 of the Building Act 2004, is required to adopt a Policy on earthquake prone buildings within its District.

The Policy must state:

- The approach the Council will take in performing its functions (under Part 2 of the Act).
- The Council's priorities in performing those functions.
- How the Policy will apply to heritage buildings.

Attached as Appendix A is the flow chart detailing the process for assessing Earthquake prone buildings.

Within 12 months of the date of this Policy being adopted, Council will identify and classify, from our records, those buildings that could be "Potentially Earthquake Prone". In doing so, it will also take into account work that has been carried out over the life of the building. An initial desktop exercise to identify potentially at risk earthquake prone buildings are highlighted in Appendix B.

2 THE BUILDING ACT 2004

(1) Section 122 of the Building Act 2004 defines an earthquake prone building as:

1. *A building is earthquake prone for the purposes of this Act if having regard to its condition and to the ground on which it is built and because of its construction, the building –*
 - (a) *will have its ultimate capacity exceeded in a moderate earthquake (as defined in the Regulations) and*
 - (b) *would be likely to collapse causing –*
 - (i) *injury or death to persons in the building or to persons on any other property, or*
 - (ii) *damage to any other property"*
2. *Subsection 1 does not apply to a building that is used wholly or mainly for residential purposes unless the building –*
 - (a) *comprises two or more storeys, and*

- (b) contains three or more household units.

A “moderate earthquake” is defined in the Building Code Regulations to the Building Act 2004 as:

For the purposes of Section 122 (meaning of earthquake prone buildings) of the Act, moderate earthquake means in relation to a building, an earthquake that would generate shaking at the site of the building that is of the same duration as, but is one third as strong as, the earthquake shaking (determined by normal measures of acceleration, velocity and displacement) that would be used to design a new building at that site.

Council Building Control Staff estimates, that of Mackenzie’s building stock, as defined by Section 122 of the Act:

- **10% were built prior to 1930 and have had no major structural upgrade.**
- **60% were built or undertook major structural upgrade between 1930 and 1980.**
- **30% were built or undertook major structural upgrade after 1980.**

- (2) Section 112: Alteration to Existing Building.

There is no requirement under Section 112, to require structural upgrading, however Council would draw to the owner’s attention under the PIM process that the building had been classified earthquake prone.

- (3) Section 114 Change of use, extension of life and subdivision of buildings, and Section 115 Code compliance requirements – change of use.

There is a requirement under these sections to upgrade any building to current code standards “as nearly as reasonably practicable”. In such cases, Council will require:

- (a) an assessment from an appropriately qualified structural engineer
- (b) that the building be upgraded as far as is reasonably practicable to meet or better 66% of current performance standards under the Building Code

2 ASSESSMENT CRITERIA

The Mackenzie District Council will use the New Zealand Society for Earthquake Engineers document “Recommendations for the Assessment and Improvement of the Structural Performance of Buildings in Earthquakes”.

3 EARTHQUAKE HAZARD IN THE MACKENZIE DISTRICT

The Mackenzie District Council commissioned a report on geological hazards facing the Mackenzie, associated with a rupture along the Alpine Fault. The report was prepared for Council by Geotech Consulting Limited in 1998. The report details earthquake hazard as assessed under the Modified Mercalli scale, not the Richter Scale therefore there is a differing degree of earthquake magnitude between the two scales. This report is attached as Appendix C and forms part of this Policy.

For the purpose of this Policy, Council has adopted three classes of at risk buildings, based on building materials and workmanship, and two types of window construction and water tanks that has the potential to be damaged during an earthquake event.

The following table details building, window and water tank types and definition.

Type	Construction definition
Type I building	Weak materials such as mud brick and rammed earth; poor mortar; low standards of workmanship.
Type II building	Average to good workmanship and materials, including some reinforcement, but not designed to resist earthquakes.
Type III building	Buildings designed and built to resist earthquakes to normal use standards i.e. no special damage limiting measures undertaken (mid 1930's to c.1970 for concrete and to c.1980 for other materials).
Windows Type I	Large display windows, especially shop windows.
Windows Type II	Ordinary sash or casement windows.
Water Tanks Type I	External, stand mounted, corrugated iron water tanks.
Water Tanks Type II	Domestic hot-water cylinders unrestrained except by supply and delivery pipes

The Geotech report identified the following implications for buildings for the scale of earthquake events considered under the Modified Mercalli scale and associated with a rupture along the Alpine Fault:

MM VII: Albury and Cave areas

- Un-reinforced stone and brick walls cracked
- Buildings Type 1 cracked and damaged
- A few instances of damage to Buildings Type II
- Unbraced parapets and architectural ornaments fall
- Roofing tiles, especially ridge tiles, may be dislodged
- Many reinforced domestic chimneys broken
- Water tanks Type I burst
- A few instances of damage to brick veneers and plaster or cement-based linings
- Unrestrained water cylinders (Water Tanks Type II) may move and leak
- Some Type II windows cracked

MM VIII: Foothills areas Fairlie and Twizel

- Buildings Type II damaged, some seriously
- Buildings Type III damaged in some cases
- Monuments and elevated tanks twisted or brought down
- Some pre-1965 infill masonry veneers damaged
- Weak piles damaged
- Houses not secured to foundations may move

MM IX: Mount Cook, Headwaters of Lake Pukaki and Tekapo

- Very Poor quality un-reinforced masonry destroyed
- Buildings Type II heavily damaged, some collapsing
- Buildings Type III damaged, some seriously

- Damage or permanent distortion to some Buildings and Bridges
- Houses not secured to foundations shifted off
- Brick veneers fall and expose frames

4. OVERALL APPROACH

Council assesses earthquake prone risk in this context of four main components:

- 1 The structural integrity of the building.
- 2 The number of people in it.
- 3 How long the people are in it.
- 4 The use of the building for priority planning (eg, emergency services buildings)

In practical terms the life of a commercial building involves a series of major and minor renovations over the “life” of the building. The intensity of occupation (numbers of people over a given time period) normally decreases as the building ages and uses change. An intensification of the occupancy of the building in most cases will involve a “Change of Use” as defined by the Building Code.

4.1 Program of Policy Implementation

- (1) The Council believes it must:
 - (a) Ensure that its citizens, and in particular building owners, are aware of the scale and probability of the earthquake risk in the Mackenzie area.
 - (b) Encourage ongoing and incremental improvement in the performance of the Mackenzie building stock in relation to earthquake risk.
- (2) The Council concludes, with respect to risk from earthquake prone buildings in the Mackenzie, that:
 - It is prudent to plan to sensibly minimise risk, especially for emergency services buildings where it is essential to have structurally sound buildings in case of an emergency situation.
 - Significant numbers of injuries or fatalities are only likely to result in or near buildings of poor structural integrity from the worst scenario of an event with a fairly high probability of occurring in the building’s life (50 years).

4.1.1 Process to Identify Earthquake-Prone Buildings

- 1 Council staff will carry out a relatively simple desktop examination of its building stock to determine which buildings have the potential to be earthquake-prone and worthy of closer consideration. Building age and construction materials and use by the public will be key indicators in this preliminary survey.
- 2 Owners of any building that fail the desktop evaluation, will be notified and discussions held with them to advise of the implication of having earthquake-prone status for their building.
- 3 Buildings that the desktop exercise suggests may be earthquake-prone will be subject to an on-site initial evaluation process (IEP) by Council Building Control staff. The

objective of the evaluation is to identify, as closely as possible, aspects of the building that may be earthquake prone within Council's jurisdiction.

The New Zealand Society of Earthquake Engineers (NZSEE) has developed an initial evaluation process that Council Building Control staff will use to assess earthquake-prone status of buildings.

- 4 For all buildings that the IEP indicate are likely to be earthquake prone, Council will advise, and discuss the implications with the owner. Although an IEP provides only a moderately accurate assessment of the performance of a building, there will be some buildings whose evaluation indicate with little doubt, that they are earthquake-prone without the requirement for further detailed assessment. If Council was to be satisfied, that a building was indeed earthquake prone, it would be appropriate to issue the owner a notice under section 124, requiring action to reduce or remove the danger.
- 5 Where an initial evaluation indicates that a building is likely to be earthquake prone but the precise earthquake prone status of the building may be in doubt due to the complexity of the issues, the owner shall be advised that a detailed assessment of the building is needed, to determine more precisely whether the building falls within the Building Act's definition of earthquake-prone.

An engineering consultant suitably experienced in this aspect of structural design shall carry out this assessment. The cost of the detailed assessment shall be borne by the Council. A copy of the report shall be given to the affected property owner for their information. If the building was found to be earthquake prone, Council shall issue a notice under the provisions of section 124 of the Act.

- 6 From the information gathered throughout the assessment process, Council shall establish and maintain a list of priority buildings requiring the earliest attention. Any emergency services buildings will be high priority for Council to remedy. Council will encourage all owners to address the hazards associated with the building.

5 TAKING ACTION ON EARTHQUAKE PRONE BUILDINGS

Where a building is classified as earthquake prone, Council will:

- 1 Make an appropriate note on the Council's property file.
- 2 Consider any appeal from the owner as to the classification. The appeal shall be lodged with the Council within 30 days of receiving the notice, or within an agreed period of time negotiated between the owner and Council.
- 3 Where a building is classified as earthquake-prone a note on any application for a PIM, or a LIM, will occur.
- 4 Require structural upgrade of the building in terms of the **Change of Use** criteria under the Building Act 2004 (Section 115).

Council will follow the procedure set out in Sections 124-130 of the Building Act 2004.

6 SOCIAL, ECONOMIC, ENVIRONMENTAL AND CULTURAL IMPACT OF POLICY

The Council believes that by adopting a Policy based on education and sharing of knowledge and intervention only as a last resort, an improvement in the earthquake performance of Mackenzie's non-residential building stock will be achieved in a way that is:

- Socially acceptable
- Economically viable
- Environmentally sustainable
- Culturally sensitive

In that a degree of risk is accepted, and acceptable, but that sensible procedures are in place to identify, control and reduce the level of risk.

7 APPLYING THE POLICY TO HERITAGE BUILDINGS

Where a building is identified as potentially earthquake prone from Council records and the building is also classified as Category I or Category II by the Historic Places Trust, or Category X,Y or Z in the District Plan, the Council will notify the building owner and the Historic Places Trust of its initial assessment, and take into account any submissions from the Trust and the building owner before making a decision on the earthquake prone classification.

Council will take into account the heritage value of the building, any particular structural characteristics of the building and characteristics of its use with respect to risk to people and property from earthquakes.

Council may then decide to classify the building as earthquake prone in accordance with this Policy.

The Council shall also apply this process to building consent applications involving Sections 112, 114 and 115 of the Act.

8 EXEMPT STRUCTURES FROM THIS POLICY

Council and Transit New Zealand infrastructure covered by an asset management plan provided:

- Transit NZ make available to Council any seismic strength and retrofit reports on bridges in the District, together with any reviews and updates as and when they occur.
- Council carries out a annual District bridge inspection programme to assess structural integrity.

Appendix A

Flow Chart Detailing Process of Assessing Earthquake Prone Buildings.

Appendix B

List of Earthquake Prone Buildings from Initial Desktop Assessment.

List of Earthquake Prone Buildings: Initial Evaluation

To be Appraised	Pass	Further assessment required	Priority
Albury Tavern – Albury	Y		P1
Gladstone Hotel – Fairlie		Y	P1
Mackenzie DC - Office Building	Y		P1
Mackenzie DC – Hall Complex	y		P1
Fairlie Hotel		Y	P1
Fairlie High School	Y		P1
St Joseph School	Y		P1
Fairlie Primary School	Y		P1
Fairlie CBD Buildings		Y	P1
Fairlie St Johns	Y		P1
Fairlie Museum		Y	P1
Fairlie Fire Station	Y		P1
Fairlie BP Garage	Y		P1
Fairlie Churches		Y	P1
Motels- all towns	Y		P1
Kimbell Hotel	Y		P1
Kimbell Motel	Y		P1
Halls – all of District	Y		P1
Tekapo CBD	Y		P1
Tekapo Churches	Y		P1
Mackenzie DC Community Hall	Y		P1
Tekapo Fire Station	Y		P1
Tekapo Homestays	Y		P1
O’Sullivan	Y		P1
Tekapo Lodge	Y		P1
Camping Ground	Y		P1
Challenge Garage	Y		P1
YHC	Y		P1
Squash Club- all towns	Y		P1
Twizel CBD		Y	P1
Twizel Event Centre	Y		P1
Fire Station- all towns	Y		P1
RSA- Twizel	Y		P1
Servicemans Club- Twizel	Y		P1
Three Springs Historic Woolshed		Y	P1
South Island Rowing	Y		P1
Merdian Buildings	Y		P1
Twizel School	Y		P1
Glentanner Building	Y		P1
Mt Cook Airport	Y		P1
Hermitage Hotel	Y		P1
Glencoe	Y		P1
Doc Buildings	Y		P1
Alpine Guides	Y		P1
YHC Backpackers	Y		P1
Raincliff Camp	Y		P1
Raincliff Scouts	Y		P1

Appendix C

Geotech Consulting Limited Report on Earthquake Hazard in the Mackenzie District.