BUILDING PERFORMANCE

RESOURCE

Seismic Risk Resource For Commercial Building Tenants

APRIL 2024

Ministry of Business, Innovation and Employment (MBIE)
Hīkina Whakatutuki – Lifting to make successful

MBIE develops and delivers policy, services, advice and regulation to support economic growth and the prosperity and wellbeing of New Zealanders.

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Information, examples and answers to your questions about the topics covered here can be found on our website: www.building.govt.nz or by calling us free on **0800 24 22 43**.

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Contents

1. Purpose

The purpose of this document is to help commercial building tenants make decisions about the seismic risk of the buildings they lease and occupy.

No part of Aotearoa/New Zealand is immune to earthquakes.

While some areas of the country experiences earthquakes more frequently, earthquakes can and do ultimately occur in any part of the country, just at a much lower frequency.

Even though an area may experience earthquakes less frequently, this does not mean there is no seismic risk. No matter where you are, it is necessary to consider, plan for, and manage seismic risk.

The expected seismic performance of a building, and the associated seismic risk, are both important considerations for commercial building tenants when making leasing decisions.

For commercial building tenants, the relative importance of expected seismic performance of their building will depend on various factors. This includes the nature of the tenant organisation, as well as the organisation's tolerance for life safety risk, property loss, and business disruption.

This document is designed to help you, as a tenant or someone who manages the lease, to understand the seismic performance you require from your building and how your building will perform against those requirements.

The document starts by helping you to understand your tolerance for loss and disruption based on the nature of your organisation. It then helps with understanding how to interpret information about the expected seismic performance of a building in the context of your organisation. The combination of these factors will allow you to assess whether your current building, or a building you are looking to lease, meets your expectations.

The document also provides some advice on actions you can take and ask of your building owner/property manager to manage the seismic risk of your building. It also highlights the benefits of occupying a building with enhanced seismic performance.

If you occupy a building that is deemed seismically vulnerable and are specifically concerned about continued occupation of the building, refer to *Seismic Risk Guidance for Buildings* (MBIE, 2022).

2. Who is this document for?

This document is specifically targeted at organisations that lease commercial buildings in Aotearoa/New Zealand.

This document will be useful for commercial building tenants who are:

- seeking to lease a building,
- reviewing new information that impacts the understanding of the seismic risk of the building they occupy (eg a seismic assessment report),
- re-evaluating the suitability of a current lease, or
- going through the process of renewing their lease.

While some of the information in this document may be useful for owner-occupiers, it is primarily intended for tenants of commercial buildings, not residential buildings.

This document will be most useful to tenant organisations who may have limited experience in considering seismic risk information, or who are unsure about the importance of the expected seismic performance of their building in relation to business operations. This resource is part of a wider series of related MBIE seismic risk documents.

MBIE Seismic Risk Series			
	This Document	**Related Seismic Risk Documents**	
Title	**Seismic Risk Resource For Commercial Building Tenants**	**Seismic Risk Guidance: Making building occupancy decisions**	**Seismic Risk Resource: Introduction to Low Damage Seismic Design – benefits, options and getting started**
Purpose	To help commercial building tenants on how to understand their seismic risk tolerance and inform their decisions about the required seismic performance of the buildings they occupy or are considering leasing, based on the work their organisation does.	To help building users, tenants and owners interpret and make ongoing occupancy decisions based on the outcome of a seismic building assessment, and to provide tools and language for engineers and their clients to discuss seismic assessments.	To introduce the philosophy and benefits of low damage seismic design, explain the key terms involved and what the value of a low damage seismic design approach to building design means for developers, owners, and tenants.
Target audience	Commercial building tenants	• Residential and commercial building users, owners, tenants • Engineers	Commercial building owners, developers, tenants
When may you use this document?	When you want to know whether the expected seismic performance of the building you occupy is right for your business operations.	When you are deciding whether to continue occupying a seismically vulnerable building.	When you are considering undertaking a building project, or purchasing or leasing a building, that seeks to limit future earthquake damage and support faster recovery.
Key words	Risk tolerance, lease requirements, organisational risk	Seismic assessment, building occupancy, %NBS rating	Post-event building functionality, seismic design, low damage
Date published	2024	2022	2024

3. MBIE's role

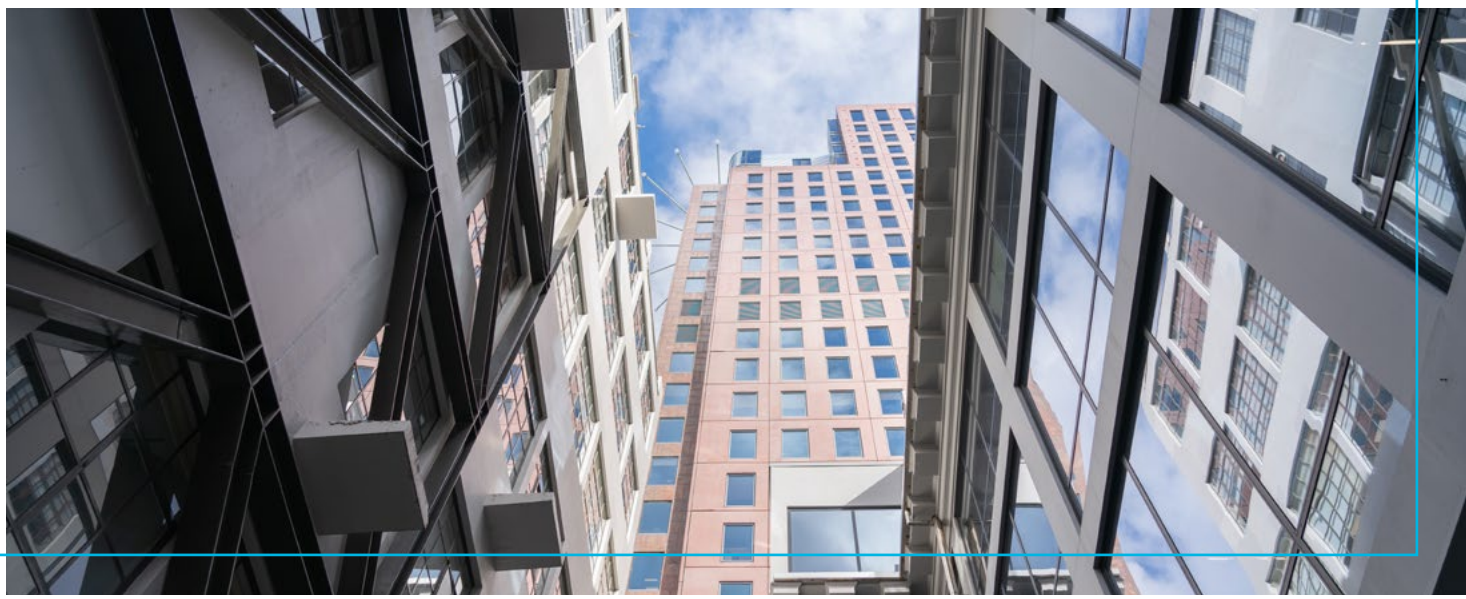
MBIE is the over-arching regulator of Aotearoa/New Zealand's building system, providing policy and technical advice on Aotearoa/New Zealand's building system, rules and standards, and implementing building legislation and regulations to meet Aotearoa/New Zealand's current and future needs.

Our role is to work with stakeholders to deliver fit-for-purpose, performance-based building regulations that protect public safety and property and helps lift the sector's performance. MBIE works with a range of people across the building sector to ensure they understand their roles and responsibilities. We do this by providing clear and effective guidelines, information, and education.

We have a range of statutory responsibilities in relation to the building system and administering Aotearoa/New Zealand's building legislation. We also work with other regulators whose legislation has an impact on the building sector.

Our work includes:

- educating and informing people on building compliance
- monitoring and evaluating the overall performance of Aotearoa/New Zealand's building system
- reviewing and updating building policy, laws and regulations
- occupational regulation (eg Licensed Building Practitioners)
- oversight of the Building Code and setting and developing standards
- earthquake building-related guidance
- supporting investigations of building or product failures
- determinations and product assurance.



4. Background

The seismic performance of buildings is not just important for protecting lives; it is also about reducing losses, continuing business operations, and protecting your organisation's reputation and interests.

4.1 Seismic risk and impacts for organisations

A building that performs poorly in a significant earthquake can have a major impact on your organisation:

- **Pose a heightened life safety risk** to your staff, customers, and other building users. Although it is rare for significant earthquakes that generate enough shaking to compromise buildings and threaten life safety to occur in Aotearoa/New Zealand, they can and do occur; the 2011 Christchurch and 2016 Kaikōura/Hurunui earthquakes serve as examples of this.
- **Cause significant property losses**, including damage to fit out, industrial or manufacturing plants and equipment, or contents and stock that you have within your tenancy. Replacing or repairing damaged items after an earthquake costs money and can take time, particularly if they are difficult to replace.
- **Disrupt business operations** through building, plant, and stock damage; lack of access to your building (eg from disruption to neighbouring buildings and/or roads); interruptions during repair works or while you obtain a new/temporary premises; or loss of service of key infrastructure supplying your building (eg power or water supply).

Relying solely on the seismic performance requirements in the Building Code will not necessarily protect you from all these impacts.

4.2 Building Code seismic performance requirements

The Building Code sets clear expectations of the standards buildings should meet. It covers aspects such as durability, protection from fire, access, moisture control, energy efficiency, and within structural stability, seismic performance requirements.

New buildings

The Building Code (contained in regulations under the Building Act 2004), provides minimum requirements for how buildings should perform in earthquakes. These requirements have a primary focus on protecting life safety, by allowing users to safely evacuate following a significant earthquake and reducing risk to those outside buildings.

However, buildings designed to the minimum seismic performance requirements under the Building Code may still suffer significant damage and be unusable following a significant earthquake; potentially to an extent that may be uneconomical to reinstate.

For most buildings, the Building Code requires structures to remain undamaged for relatively low levels of shaking that can be expected more frequently over the lifetime of a building. Building damage (and the impact on the continued use of a building) depends on how an individual building is designed, and subsequently performs, in a given earthquake. The Building Code does not address the potential damage to contents, or whether a building will be immediately occupiable or even repairable.

Existing buildings

Many buildings in use today were constructed prior to the current seismic performance requirements within the Building Code. Buildings designed prior to this time may therefore pose a higher level of life safety risk to building users than buildings designed to these seismic performance requirements.

In 2017, the current national earthquake-prone building framework and methodology was introduced into the Building Act, and was designed to identify and remediate buildings that are more likely to pose an increased risk to life safety. The owners of buildings of certain construction types and eras must complete a seismic assessment if asked to by their territorial authority. Buildings subsequently deemed earthquake-prone must have building work completed within a specified timeframe to improve the building's safety.

In line with the life safety focus of the Building Code, the remediation of earthquake-prone buildings is only focused on reducing the expected life safety risk to occupants and passersby. It is not designed to reduce potential damage or downtime of a building after a significant earthquake.

An earthquake rating of 100%NBS means the building meets the **minimum** life safety requirements of the Building Code. It does not reflect the damage a building may sustain, or whether it can continue to be used, after a significant earthquake.

For more about %NBS, refer to *Seismic Risk Guidance for Buildings* (MBIE, 2022).

Adequacy of Building Code requirements

For some organisations, the seismic performance requirements within the current regulatory framework may be adequate (whether for new buildings designed under the Building Code, or existing buildings designed prior to current Building Code requirements). However, other organisations may wish to prioritise greater assurance around expected seismic performance.

Some organisations may wish to improve the level of life safety provided by their building. Others may wish to reduce the potential for damage that will impact their ability to continue using their building after a significant earthquake. These are the types of considerations tenants may need to weigh up in making decisions about the buildings they occupy.

Building 'importance levels'

Some buildings are designed for larger earthquakes than others. A building is given an importance level (1 to 4) based on occupancy, post-disaster function, and potential environmental consequences of failure. Buildings with a higher importance level are designed for less frequent, but more sizeable, earthquakes.

Most buildings are importance level 2.

Importance level 3 buildings are designed to provide greater protection against death and injury in more significant but less frequent earthquakes, due to the large number of people that may occupy these buildings.

Importance level 4 buildings are designed to provide greater protection against death and injury, and to provide greater assurance around building operational continuity. Common examples of these buildings include hospitals and other buildings which serve a disaster response and/or recovery function.

5. Summary

5.1 Key messages

- The seismic performance of buildings is not just important for protecting lives; it is also about reducing losses, continuing business operations, and protecting an organisation's reputation and interests.
- Building Code requirements for how buildings should perform in earthquakes have a primary focus on protecting life safety, rather than business operations.
- The %NBS metric is only designed to provide a relative assessment of seismic life safety risk, not potential damage and/or disruption to use of a building.
- Risk to life safety, particularly injury, may also arise from some non-structural elements, fixtures and contents not necessarily covered in the assessment of %NBS.
- Seismic risk should be considered in the same way as other organisational risks. A key difference is that seismic risk can be managed, but not eliminated.
- Compared to more day-to-day organisational risks (eg financial, reputational), significant earthquakes are rare events. Because they occur very infrequently, risk management options should be evaluated with this low likelihood in mind.
- Commercial building tenants need to consider and manage seismic risk, which includes advocating for building owners to act.
- Commercial building tenants who depend on their building for continuity of their operations should consider buildings with enhanced seismic performance.
- Occupying a building with enhanced seismic performance may be more expensive to lease, but can reduce losses and costs, and improve your competitive advantage after an earthquake.

SECTION

6 Introduces **why seismic risk is an important consideration** for commercial building tenants. This includes the seismic hazard in Aotearoa/New Zealand, provisions within the Building Code, the core benefits of better seismic performance, and responsibilities of tenants to manage seismic risk.

7 Outlines the **factors that may impact the seismic risk tolerance** of an organisation.

8 Provides **advice on how to interpret information** about the expected seismic performance of a building, and whether this will meet an organisation's needs.

9 Describes **actions that commercial building tenants can take** to manage and reduce the seismic risk of their building(s).

10 Outlines the **range of benefits to commercial building tenants** for leasing buildings with enhanced seismic performance.

11 Lists key **principles for how to communicate seismic building risk information** to staff.

12 Provides **additional information** about seismic risk, including who to speak with, how to enact business continuity planning, and further reading.

6. Managing seismic risk of a building

Tenants need to consider and manage seismic risk, which includes advocating for building owners to act.

6.1 Responsibility of tenants to manage a building's seismic risk

It can be difficult to distinguish between the aspects of seismic risk you are responsible for managing as a commercial building tenant, and those which your property manager or building owner are responsible for managing. This largely depends on the nature and extent of your lease.

A general rule of thumb that can be used is:

- **Tenants** are generally responsible for 1) the decision to lease a given building, and 2) those risks which exist in a building as a direct result of their lease (eg what the tenant brings to the lease, such as contents and commercial fit outs), and
- **Owners** are generally responsible for risks which relate to the building, fixtures, and services in place prior to the tenancy (eg structural integrity of the building).

This means that, once in a lease, tenants are generally responsible for managing seismic risk that is the result of day-to-day operations of their business, such as that caused by building contents, fitout, or similar. In contrast, building owners are generally responsible for things related to the structure and non-structural elements, fixtures and services that are core to the building.

Even though as a tenant, you are not responsible for the performance of the building you occupy, in some circumstances, you could use rent reviews and tenancy agreement negotiations to advocate for changes to a building. This does not have to mean upgrades to the main structural elements of the building. Instead, it could simply mean requesting confirmation that the building plant items (eg HVAC systems) have been seismically restrained, or making sure any heavy ceiling tiles are replaced with lightweight tiles.

Tenants are responsible for their decision to lease a particular building. This decision should be based on the best information available to you at the time.

Seismic Risk and the Health and Safety at Work Act 2015

Tenants and building owners both have responsibilities for managing the seismic risk of their buildings under the *Health and Safety at Work Act 2015*.

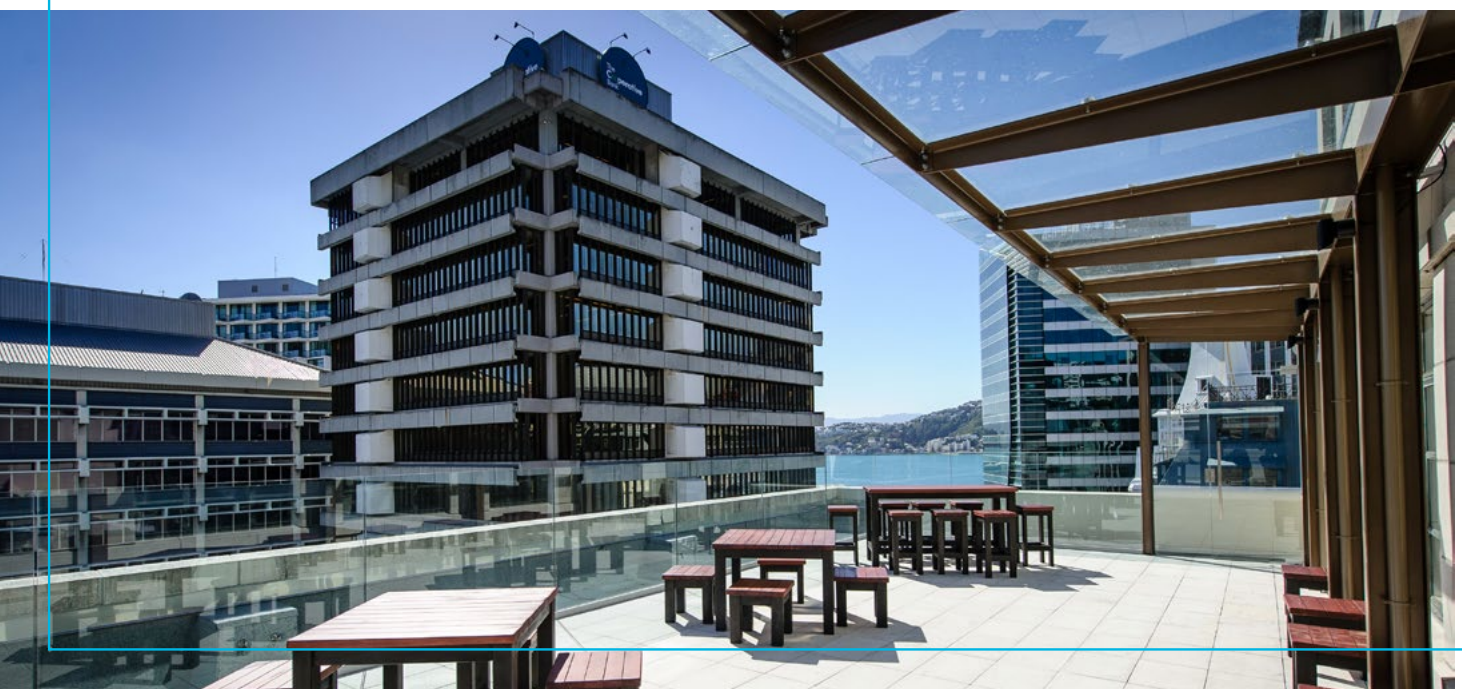
Under the Act, tenants and owners both have obligations as a Person Conducting a Business or Undertaking (PCBU). PCBUs are required to eliminate or minimise a range of workplace health and safety risks "so far as is reasonably practicable", which extends to seismic building risk.

Section 22 outlines five factors which must be considered to ensure actions undertaken to reduce risk are "reasonably practicable":

1. the **likelihood** of a hazard
2. the **degree of harm** that may result
3. **knowledge** of the hazard and means of managing the risk
4. the **availability and suitability** of risk management methods
5. the **cost** of available risk management methods (including whether the cost is grossly disproportionate to the risk).

You and your building owner/property manager need to communicate, consult, cooperate, and coordinate any activities designed to address seismic risks that have been identified.

PCBUs are also both required to stay updated on the new or emerging information and request professional assistance when in doubt. This includes a responsibility of building owners to proactively share with their tenants any new information, if and when it arises, that may impact the understanding of seismic risk within a building.



6.2 Prompts to evaluate the seismic risk posed by your building

There is always some degree of seismic risk to buildings in Aotearoa/New Zealand. However, there are certain times when you, as a commercial building tenant, may be prompted to consider seismic risk more closely.

You may be prompted to consider seismic risk more closely if you are:

- seeking to lease a building,
- re-evaluating the suitability of your lease,
- going through the process of renewing your lease, or
- reviewing new information that may impact your understanding of the seismic risk of the building you occupy.

Building owners may be required to undertake a seismic assessment under the *Building Act 2004* or may need to get an assessment completed for other purposes.

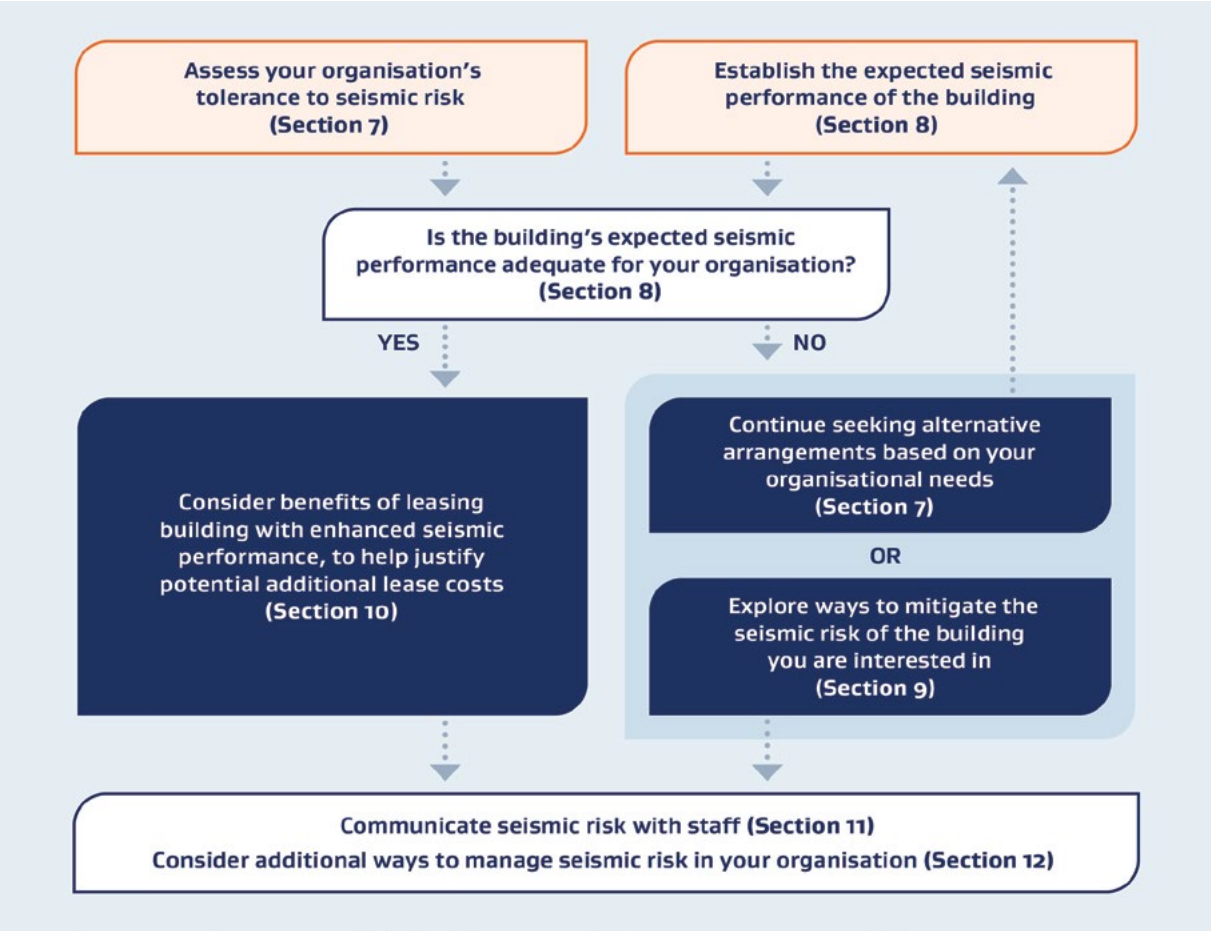
If your building owner completes a new seismic assessment where one has previously been completed, do not be alarmed. Knowledge of earthquakes and how buildings respond to earthquakes is always evolving. What we know today may evolve in the future because of new research and practice insights. Having this new information will help you make an informed choice about whether to stay in a building or not, or what you can do to manage risk within your building.

The following flowcharts show which sections of this document may be relevant.

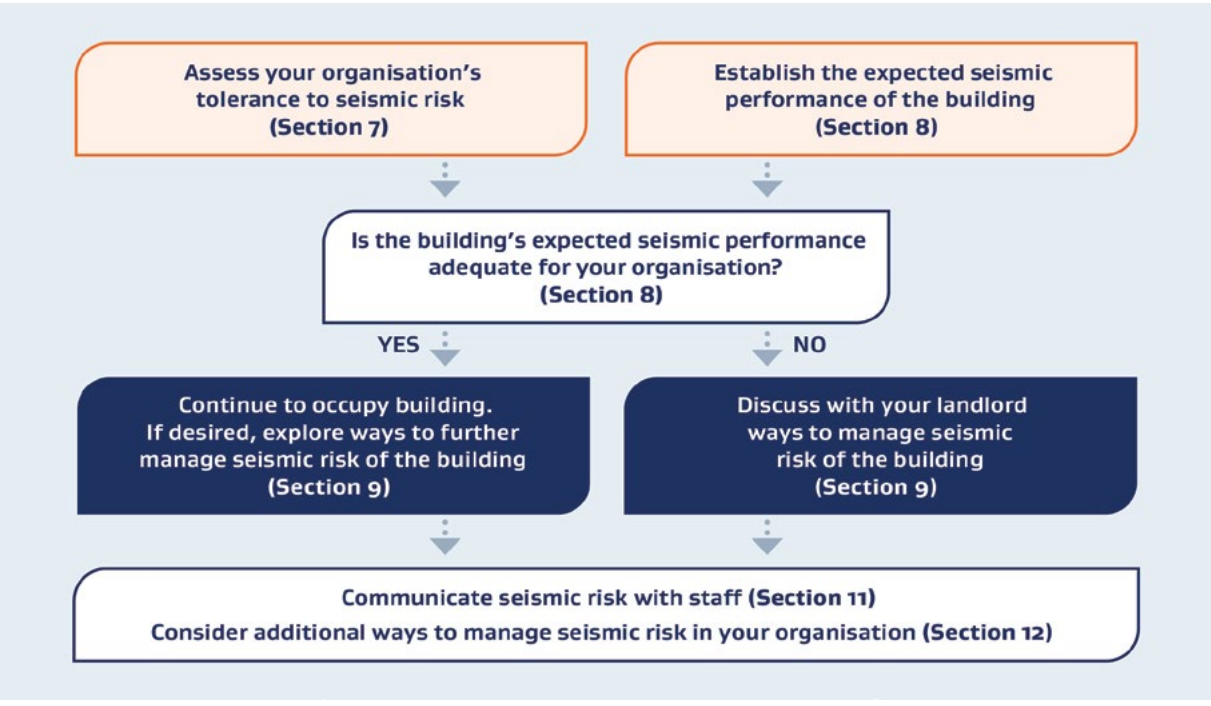
Flowchart 1 is for commercial building tenants who are seeking to lease a new or different building.

Flowchart 2 is for commercial building tenants reviewing the suitability of their current building.

Flowchart 1: Seeking to lease a new or different building



Flowchart 2: Reviewing the suitability of a current building

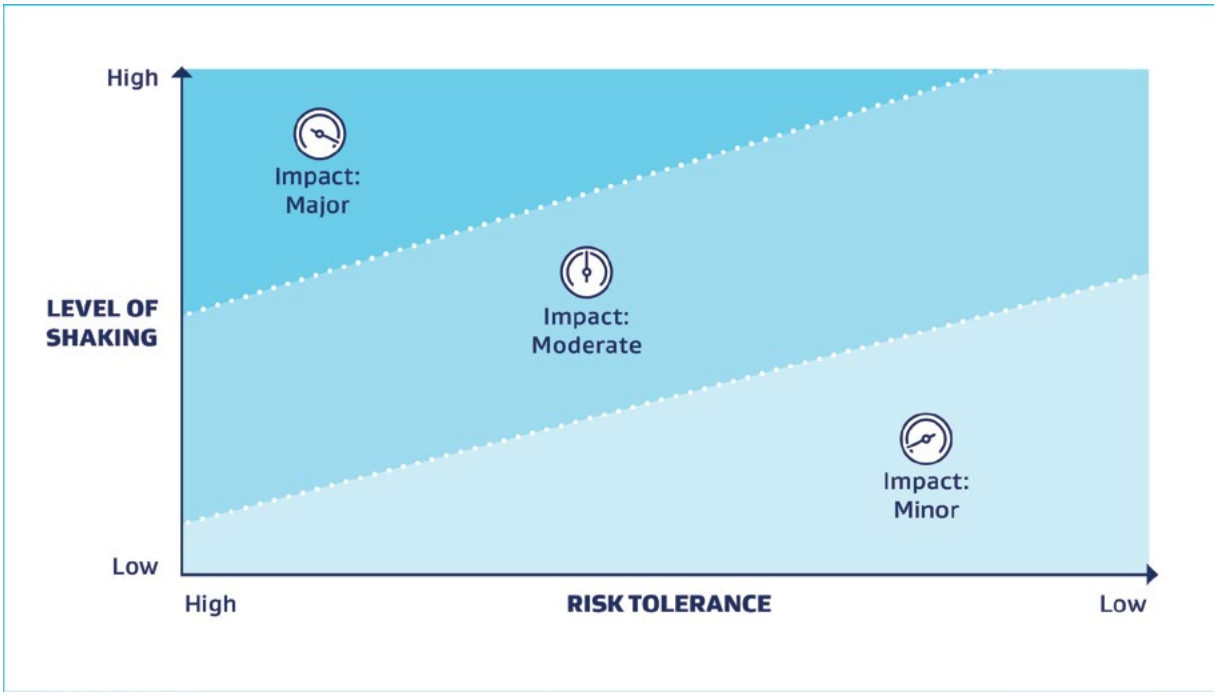


7. How to assess your organisation's seismic risk tolerance

Generally, your tolerance for seismic risk should be considered from three perspectives:

Figure 1 illustrates the degree of impact you are willing to tolerate for a given level of earthquake shaking. A higher tolerance for seismic risk means you will accept greater potential impact at lower levels of earthquake shaking, while a lower tolerance for seismic risk means you will accept less potential impact at higher levels of shaking. This can be used to illustrate risk of life safety, property loss, and business disruption.

Figure 1: Evaluating impact based on risk tolerance and level of earthquake shaking



7.1 Life safety risk tolerance

The Building Code and the Building Act establish a minimum acceptable tolerance of life safety risk, by requiring buildings to perform to a particular level in a significant earthquake. This includes requirements for both new and existing buildings (as noted in Section 5.2).

The legal minimum will generally be sufficient for many organisations. However, the life safety protection offered by new and existing buildings is likely to be different. There may be some circumstances where you wish to ensure the building you occupy exceeds these minimum life safety requirements. This is likely where you have a lower tolerance for life safety risk.

How tolerant is your organisation to life safety risk? You are likely to have a lower tolerance for life safety risk if you answer yes to one or more of the following:

- ☐ You provide service to vulnerable people at your premises (eg young, old, mobility or cognitively impaired).
- ☐ Damage to your premises could pose public health or environmental harm (eg via hazardous substance release).
- ☐ Your organisation wishes to provide staff and visitors with a safer space for other reasons.

7.2 Property loss risk tolerance

You should also consider your organisation's tolerance for property loss.

As a tenant, this includes thinking about your tolerance for losing things like building contents and/or the fit out used for operating your business. Replacing contents and/or fit out may be difficult, costly, or can take considerable time, particularly if supply chains are disrupted following an earthquake.

There are different ways to manage these risks including occupying another building with better seismic performance or insuring for these risks with things like material damage (for equipment, contents etc) and business interruption (for the loss you may experience from disruption), if this insurance is available.

How tolerant is your organisation to risk of property loss? You are likely to have lower tolerance for property loss risk if you answer yes to one or more of the following:

- ☐ You have stock/contents/plant that is difficult to replace and/or move.
- ☐ You do not have adequate insurance to cover potential losses in the event of an earthquake.

Understanding your contents insurance policy

It is important to understand your insurance policy when it comes to contents cover. In particular, you should:

- know what your policy does and does not cover (including exclusions, particularly around building fitout, and building access if safety cordons are in place)
- know whether your policy covers replacement or indemnity
- ensure valuations are maintained and up to date (if applicable).

Traditional insurance is not the only option to mitigate against potential losses. For instance, you may want to consider alternative insurance arrangements such as self-insurance or parametric insurance. Self-insurance is where a business takes on the risk of loss itself, rather than obtaining insurance through a third-party. Parametric insurance is a form of insurance where a pre-specified amount is paid out based on a particular trigger event (eg a particular level of earthquake shaking at the site of your building).

7.3 Business disruption risk tolerance

Finally, you need to consider your tolerance for business disruption. This includes your tolerance for losing access to and/or use of your building, potentially for a prolonged duration. This could be caused by significant damage to the building, as well as external factors (eg safety cordons erected by officials, damage to surrounding buildings and services).

Your tolerance for business disruption will depend on factors such as:

- the importance of the building for the provision of key goods and/or services
- how time-critical your services are
- the likely impacts of disruption to your services, to your organisation and the people you support.

If your organisation is highly dependent on your building to deliver key goods and/or services (eg if you have specialised equipment or have a customer facing service that is difficult to relocate), occupying a building that can be operational quickly after an earthquake is likely important.

This is even more important if the delivery of your services is time critical and/or the loss of your service is significant to your customers. For example, essential services such as grocery stores and pharmacies need to get up and running quickly after an event to support their communities.

Generally, you are likely to have lower tolerance for business disruption from a seismic event if:

- ☐ Your **business operations** are heavily place-based and dependent on your building,
- ☐ Your building contains **specialised and/or difficult to replace equipment** that is critical to the operation of your organisation (including IT servers),
- ☐ It is **not possible for your staff to work/operate in an alternative location** (eg from home),
- ☐ Your building **serves vulnerable building users and/or customers**,
- ☐ Your building provides **goods and/or services which vulnerable users** depend on,
- ☐ Your organisation provides **essential goods and/or services** (eg grocery store, pharmacy),
- ☐ Your building provides **social connection** (eg community meeting spaces),
- ☐ Your organisation supports a **post-disaster response/recovery** function,
- ☐ There is a significant **financial risk** of being unable to occupy your building,
- ☐ There is a significant **reputational risk** to your organisation of being unable to occupy your building,
- ☐ Your building is critical to your **organisation's brand**,
- ☐ Your building contains **hazardous substances**,
- ☐ Your are not insured for **business interruption**.

Key prompts to help you evaluate your organisation's seismic risk tolerance for life safety, property loss, and business disruption:

- ☐ How are your **business operations** dependent on your building?
- ☐ **How many people** use the building and **how much time** do they spend there?
- ☐ Are there any **vulnerable users** of the building/customers who use the organisation's services/building?
- ☐ What are the **financial stakes** if the building is unusable or severely damaged?
- ☐ What are the **reputational stakes** if the building is unusable or severely damaged?
- ☐ To what extent do **customers depend on building access**?
- ☐ What are the **consequences if staff cannot access** the building to complete tasks or retrieve materials?
- ☐ Does the building contain **hazardous materials or substances**?
- ☐ How could activities be **affected by loss of access or utility services** to the building?
- ☐ Does the organisation provide **essential goods/services**?
- ☐ Does the building contain **specialised and/or difficult to replace equipment**?
- ☐ Does the organisation provide **social connection** for the community?
- ☐ How critical is the building to the **organisational brand**?
- ☐ Does your organisation support a **post-disaster response or recovery function**?

8. How to understand the expected seismic performance of a building

There is no such thing as an "earthquake-proof" building. However, some buildings are designed to perform better than others in an earthquake.

Section 7 helped you to understand your business' tolerance for:

- life safety risk (section 7.1)
- property loss (section 7.2)
- business disruption (section 7.3).

In light of the risk tolerance of your business, this section helps you to interpret information about the expected seismic performance of your building.

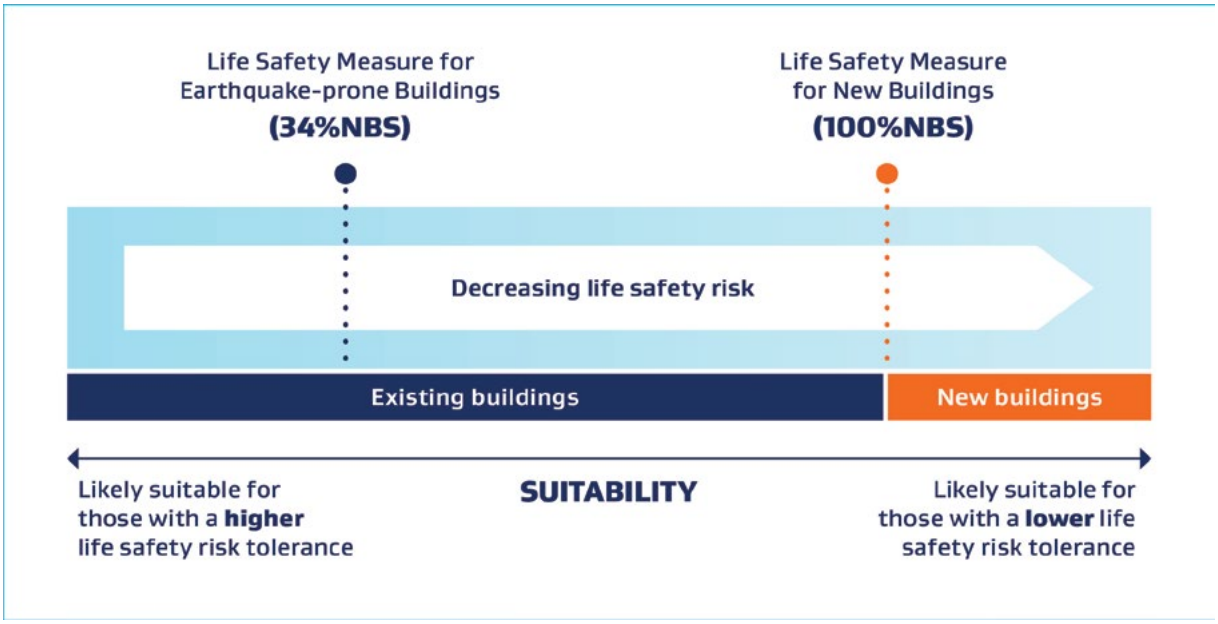
8.1 Life safety performance

Unless you have identified a lower tolerance for life safety risk, the provisions in the current Building Code and Building Act should be sufficient for you and your organisation.

It is important to note that older buildings (without seismic strengthening to current requirements) – particularly those identified as earthquake prone, or those which are not earthquake-prone but have identified seismic vulnerabilities – while legally compliant to occupy, do not provide the same life safety protection as a building built to the current Building Code (see Figure 2).

This is an important factor to understand when assessing whether a building meets your organisation's tolerance for life safety.

Figure 2: Life safety risk associated with existing buildings without seismic strengthening to current requirements and new buildings



If you do have a lower tolerance for life safety risk, or your building is older, you may want to know a bit more about the life safety risks associated with the building(s) you occupy. The information to consider asking to obtain from your landlord/owner could include the year of design and construction of the building, details of any strengthening works that have been completed, and any seismic assessments that have been carried out.

In Aotearoa/New Zealand, there are two main methods for assessing the expected seismic performance of buildings: Initial Seismic Assessments (ISA) and Detailed Seismic Assessment (DSA).

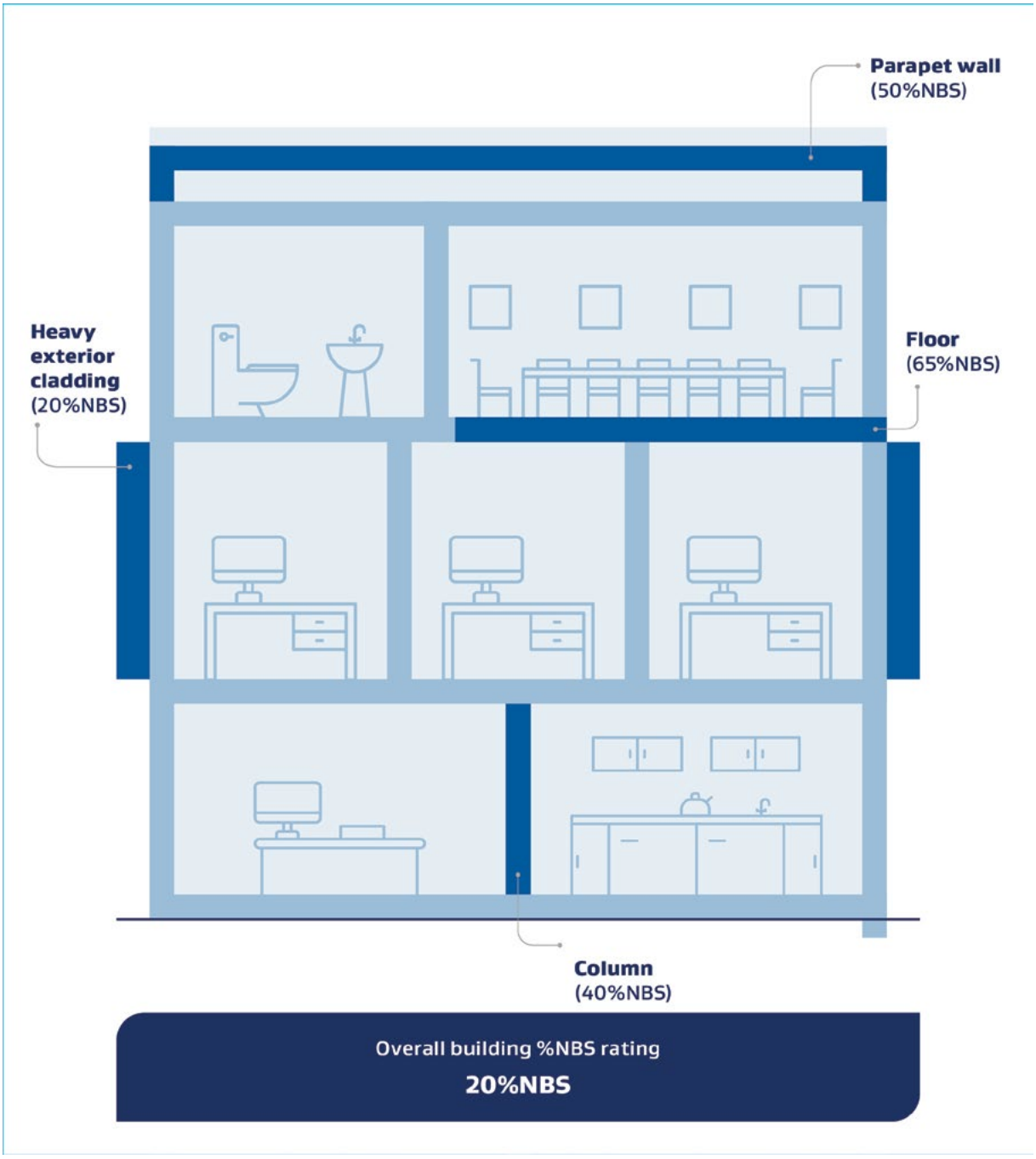
An ISA is designed to identify a very high-level understanding of a building's likely seismic performance from a life safety risk perspective. These assessments are intended to determine whether a more thorough investigation of a building should be undertaken, with a DSA. If important decisions need to be made that rely on a building's seismic status, it is expected that an ISA would be followed by a DSA.

A DSA is a much more comprehensive assessment than an ISA. It provides more specific information about aspects of a building that may pose a life safety risk in an earthquake. They are the most common method for evaluating seismic building performance in Aotearoa/New Zealand. When completing a DSA, engineers will identify the expected seismic performance of any and all elements in the building that could present a significant life safety hazard during an earthquake (eg columns, floors, parapets, heavy exterior cladding).

Each of these elements are rated, expressed in terms of percentage of New Building Standard (%NBS). The lowest score (ie the worst performing element) will determine the overall earthquake rating (%NBS) for the building.

This is illustrated in Figure 3. In this example, the overall %NBS rating for the building is 20%NBS. However, this is determined by the %NBS rating of the heavy exterior cladding (20%NBS) – the lowest rating among the assessed building elements. Rather than the whole building posing a significant risk, overall life safety risk could be reduced by taking action to manage the risk posed by this exterior cladding. The figure illustrates the importance of looking beyond an overall building %NBS rating to properly understand the life safety risk of your building.

Figure 3: Illustration of how an overall %NBS rating is determined for a building, through %NBS scores of individual building elements



Importantly, a %NBS rating primarily considers the life safety risk from structural elements and some selected non-structural fixtures or fittings of a building. Risk to life safety, in particular injury risk, may also arise from some non-structural elements, such as fixtures and contents, which are not necessarily covered in this assessment process. One study into life safety risk from recent Aotearoa/New Zealand earthquakes found that while almost all deaths were caused by falling structural building elements, "most injuries were caused by falls, strains and being hit by contents or non-structural elements" of buildings (Horspool, 2022).

It is important that the life safety risk posed by these elements are also considered and mitigated. Ask your property manager/building owner to view the seismic assessment of your building. If they have not undertaken a seismic assessment, advocate for them to have one completed. This will help you to better understand life safety risks and enable you to take appropriate action to mitigate any risk.

Different tenants might have different requirements for the acceptable NBS ratings of buildings. Some tenants are satisfied with a building that has an NBS rating above 34%, which means it is not earthquake prone. However, some tenants may require a higher seismic rating, especially if they plan to occupy the building for a long time.

Our building has a low %NBS, should we vacate our building?

Decisions around whether to vacate a building should not be made solely based on a %NBS building rating.

As emphasised in *Seismic Risk Guidance for Buildings* (MBIE, 2022), % NBS is not a predictor of building failure, nor is it an assessment of safety in a particular earthquake. %NBS building ratings were not intended to be used to support building occupancy decisions.

The %NBS metric is a way of characterising how a building is expected to perform in an earthquake compared to the minimum life safety seismic performance requirements of the Building Code. It simplifies complex risk factors about a building and should be viewed as indicative of an engineer's confidence in the expected seismic performance of the building, not a prediction.

For more information on how to make decisions around occupancy of buildings with a low %NBS refer to *Seismic Risk Guidance for Buildings* (MBIE, 2022).

Key questions to ask an engineer or your building owner/property manager:

- ☐ What are the key structural weaknesses in our building?
- ☐ What is the likelihood of failure for these?
- ☐ What is the potential consequence of their failure?
- ☐ Are there any non-structural elements that could pose a life safety threat?
- ☐ Can the risk of these be mitigated?
- ☐ If the building or part of the building is earthquake-prone or otherwise seismically vulnerable, what remediation works are planned?
- ☐ When are these works planned?
- ☐ How will these works reduce the life safety risk?

8.2 Property loss and business disruption

This section is particularly relevant to those with a lower tolerance for property loss and business disruption.

Understanding building performance relative to property loss and business disruption is more challenging than life safety. The potential for these impacts in buildings are not often assessed by engineers, unless specifically requested. In part, this is due to the focus on life safety in the Building Code and in DSAs.

In the United States, the Seismic Performance Prediction Platform (SP3) has been developed to estimate potential losses. However, in Aotearoa/New Zealand, there are currently no commonly used methodologies for assessing likely property loss and business disruption after an earthquake. Potential loss in an earthquake is typically determined as a statistical assessment, based on particular types of buildings.

However, structural engineers may be able to provide qualitative advice regarding what could be expected to happen at a particular level of shaking. This could help to identify possible losses in a particular building. These qualitative assessments focus on building components, design features, and situational factors that contribute to the likely performance of a building and contribute to reduced (or increased) property losses and business disruption. Importantly, building damage can disrupt business operations and cause property damage at much lower levels of shaking than would cause loss of life.

8.3 Non-structural building elements

Non-structural building elements are fixed to or within a building but are not part of a building's structure. Examples can include:

- wall and ceiling panels,
- facades,
- balconies,
- utility service equipment, such as air conditioning systems or elevators.

Damage to or displacement of non-structural building elements may interrupt an organisation's ability to continue business operations for a period after an earthquake. For example, fallen ceiling tiles may leave an unsafe environment that takes some time to clear, and could even damage equipment or other contents that are costly to replace or are critical for an organisation to function.

Engineers and other building experts can help organisations better understand the potential risk posed by non-structural elements of a building, including the condition they are in and their expected performance in an earthquake.

Key questions to ask an engineer or your building owner/property manager:

- ☐ Could any non-structural elements damage our fitout or equipment?
- ☐ At what level of shaking could this happen?
- ☐ Is there any way to mitigate the risk from these non-structural elements?

8.4 Low damage seismic design

One option to significantly reduce the risk of potential losses and business disruption is to lease a building constructed with low damage seismic design.

Buildings constructed with a low damage seismic design philosophy go above and beyond the minimum Building Code seismic performance requirements. They are designed to minimise potential damage to the structure, fit out and contents of a building. The aim is to reduce the potential of prolonged disruption to a building after an earthquake and therefore make it faster to return to functionality.

There are many different approaches to low damage seismic design, and buildings are designed to achieve a range of different levels of performance. While it may be marginally more expensive to lease a building with low damage seismic design, it can save you costs with reduced losses in the event of an earthquake. If you are interested in a low damage seismic design building to reduce post-earthquake building disruption, then it is important to talk to the building developer or owner to understand if the building will perform to meet your needs.

Key questions to ask an engineer:

- ☐ What is the likely time it would take to repair our building after a significant earthquake?
- ☐ What level of damage is likely to building components that are critical to our organisation (eg ceilings, utilities, floors)?
- ☐ Are there any simple building modifications available that could reduce the potential for disruption after a significant earthquake?

8.5 The surrounding environment

Neighbouring buildings

Individual buildings do not exist in silos. Even if your building is well designed with good seismic performance standards, other buildings may not be.

This could lead to restrictions on access to your building after an earthquake. For instance, damage to surrounding buildings may directly or indirectly impact your organisation's own building. This might be caused by physical building damage (eg falling debris) and/or potential cordons around neighbouring buildings. This was the experience of many in Christchurch Central City following the 2011 earthquake.

It is beneficial to take stock of the types of buildings and layout of streets that surround your existing building or buildings you are considering leasing. Factors to consider may include whether surrounding or adjoining buildings are primarily new or old, could sustain ground damage due to proximity to riverside or waterfront areas, or whether building access streets are narrow or wide.

Key questions to ask an engineer or your local council:

- ☐ What are the types of buildings near and adjacent to our building, and are they likely to experience damage that would impact our building?
- ☐ Is there any geotechnical information that would indicate surrounding buildings are situated on potentially vulnerable land?
- ☐ What is the width of accessways leading to our building, and could they be blocked by debris and/or access restrictions in a significant earthquake?

Critical infrastructure

The ability to continue business after an earthquake will not only depend on building access, but also the provision of critical infrastructure services to the building. This includes things such as power, water, or communications – all of which have a very real chance of being disrupted after a significant earthquake.

Where possible, your organisation should consider leasing buildings where there are good and resilient infrastructure services or back-up services. Wherever you lease, it is important for organisations to consider potential disruption of these services and mitigation options, especially if it relies on these services in its building.

Key questions to ask an engineer or your infrastructure provider(s):

- ☐ Are there any vulnerabilities to critical infrastructure services servicing our building?
- ☐ Are there any back-up services in case of infrastructure disruption (eg alternative water supply, electrical generator)?

Secondary hazards

As well as building shaking, secondary hazards may affect an organisation's building and its ability to continue operating. Depending on location, co-seismic hazards could include landslides, liquefaction, and tsunami. Other hazards should also be considered, such as flooding.

When considering leasing decisions, you may wish to ask experts about the possibility of these hazards and their potential impact on a building and the surrounding environment.

Key questions to ask an engineer or your local council:

- ☐ Is our building in a tsunami or flood zone?
- ☐ Is the land susceptible to landslips or rockfall?
- ☐ What is the risk of liquefaction on the site?

9. What can you do to manage seismic risk in a building you lease?

Seismic risk should be considered in the same way as other organisational risks. A key difference is that seismic risk can be managed, but not eliminated.

In situations where the expected performance of the building you occupy does not match your risk tolerance, you need to investigate ways to reduce the risk to a level you are comfortable with.

As a tenant, it may seem like there is not a lot you can readily do to reduce the seismic risk posed by your building. However, there are several things you can do within your own organisational operations.

You can also engage with your property manager and/or building owner, and advocate for them to take action to manage seismic risk.

Tenancy agreements and seismic risk

Some commercial building leases have a specific earthquake clause that allows a tenant to terminate the lease and/or claim rent abatement if they cannot occupy the building or the building does not meet an agreed seismic performance threshold. This includes for situations where new information arises that changes your understanding of your building's seismic risk, and after an earthquake where your building, or access to your building, is disrupted.

If you have been looking to lease a new building or renegotiating your current lease, you may want to consider the addition of these types of clauses.

But be sure to check with a structural engineer and a lawyer to make sure any such provisions in your lease allow for assessment and can be actioned and that they are consistent with all current laws and regulations.

9.1 Life safety risk

Compared to more day-to-day organisational risks (eg financial, reputational), significant earthquakes are rare events. Because they occur very infrequently, risk management options should be evaluated with this low likelihood in mind.

There is generally no need for alarm or immediate action if your building has an identified seismic vulnerability or does not meet the life safety standards you desire through your risk tolerance assessment. You should work with your landlord to implement mitigation measures. These measures may take some time to implement. However, it is important to ensure actions are properly considered and thought-out, to avoid potential complications later.

Alternatively, if your decision is to vacate the building, identify other arrangements for service delivery and/or business operations before you vacate the building to reduce the impact on users of vacating your building.

It is important to note that you can reduce seismic risk, but you cannot completely eliminate it. For instance, vacating a building because of concerns about seismic risk may feel like you are eliminating the risk. However, the risk of an earthquake will exist wherever you choose to relocate your operations or your employees to. In this sense, you are simply transferring the risk elsewhere.

Refer to *Seismic Risk Guidance for Buildings* (MBIE, 2022) for more information about occupying a seismically vulnerable building.

Potential mitigation actions may include:

- closing parts of the building where the most vulnerable parts of the structure are located,
- cordoning areas where exterior secondary structural elements may fall,
- moving affected services to reduce building occupancy,
- bracing, strengthening, and addressing hazards in stairwells and exits,
- bracing services and restraint or replacement of heavy ceilings,
- staged/incremental earthquake strengthening,
- removing, propping, or tying back the high-risk features of the building (such as chimneys, parapets, or heavy cladding).

Balancing occupancy decisions with business impacts

In some circumstances, an unacceptable life safety risk may lead to a decision to leave the building. **Any decision to vacate a building should be balanced against potential impacts on your business and the people who use your premises**.

For example, if your business serves vulnerable persons, then this may be a good reason to develop a plan for seeking out premises with higher life safety standards. Abruptly leaving a building because it is assessed as seismically vulnerable, however, may have an immediate detrimental impact on the people and/or community your business serves.

Earthquakes are low likelihood events. Decisions made around building occupancy should be considered carefully, not made in a reactionary way.

If you are concerned about continuing to occupy a building that is deemed seismically vulnerable, refer to *Seismic Risk Guidance for Buildings* (MBIE, 2022).

9.2 Property loss or business disruption

Compared to earthquakes that pose a risk to life safety, property loss and business disruption can occur at much lower levels of shaking. Because lower levels of shaking can be expected more often, property loss and business disruption are more likely to occur.

There are several mitigation measures that can be taken to reduce your risk of property loss or business disruption within an existing lease:

What you can do within your organisation:

- secure or replacement of heavy contents/fittings (related to your tenancy), and
- obtain insurance to cover property/contents losses or business interruption, and
- reduce building dependence by facilitating flexibility of building use (eg providing the option to work from home, where applicable).

What you can advocate your property manager and/or building owner to do:

- secure or replacement of heavy contents/fittings/non-structural building elements (items that are not part of your tenancy),
- undertake seismic strengthening,
- provide back-ups for key services you depend on (eg water, electricity).

Even after mitigation actions have been implemented, you will still need to accept at least some residual risk; that is, risk posed by the building that you cannot reasonably avoid.

Preparing for different earthquakes

One particularly challenging aspect of managing seismic risk is the variety of earthquakes that can and do occur. This includes more significant and less frequent events, to smaller and more frequent events that can still cause property loss and business disruption.

It is therefore appropriate to consider multiple earthquake scenarios in your risk register, with this spectrum of possibilities in mind.

10. Benefits of leasing a building with enhanced seismic performance

Leasing a building with enhanced seismic performance can reduce seismic risk, as well as produce a range of other benefits to your business.

Buildings with enhanced seismic performance (ie those designed above and beyond Building Code requirements to incorporate mitigation against property loss and/or disruption, rather than just life safety risk) may be marginally more expensive to lease. However, they can also directly and indirectly save your organisation money in the long-term as well as providing several other key benefits.

10.1 Reduce losses after an earthquake

Leasing a building with enhanced seismic performance will save you in overall costs after an earthquake event. You will have reduced need for building repairs and/or replacement of contents or building fitouts, reduced business disruption in the event of an earthquake, or will avoid spending money and time on identifying and setting up a new premises.

10.2 Enable opportunity capture after an earthquake

Being able to get back to operation quickly after an event could be a significant advantage if competitors are not operational. While other organisations are dealing with damaged or inaccessible buildings, and ruined stock, your organisation will be able to identify opportunities and provide services that disrupted businesses cannot.

10.3 Protect against insurability

In some areas, particularly in high seismic hazard areas like Wellington, insurance premiums for earthquake cover have been increasing. In some instances, insurers are becoming more hesitant to provide cover for buildings that are seismically vulnerable.

As knowledge of seismic risk changes over time, insurance cover for organisations may not always be readily available for some seismically vulnerable buildings. In the short term, leasing a higher performing building may improve the likelihood you will be able to insure your building. In the long term, if insurance is considered unaffordable, you will benefit from lower direct and indirect costs in the event an earthquake occurs: in effect you will be self-insuring.

10.4 Protect organisational reputation

By investing in measures to reduce the potential impact to business operations after an earthquake, organisations can help to increase their reputation and relationships with key staff, customers, and suppliers.

Actions that signal that an organisation is actively considering seismic risk, and how to mitigate its impacts, can provide these key stakeholders with greater confidence of the organisation's continued operation after an earthquake.

10.5 Increased confidence

Planning for and mitigating seismic risk, through building leasing decisions, can also improve an organisation's understanding and control over risk exposure. This improves confidence in operational continuity, by reducing uncertainty over expected building performance.

Improved confidence in how your building is likely to perform can also benefit staff wellbeing, by sending a positive message that factors such as health & safety and business continuity are actively pursued. In this sense, it can help with attracting and retaining staff.

10.6 Lower environmental impacts

For many organisations, environmental sustainability is a critical organisational value. Leasing a building with enhanced seismic performance could help to support this objective (directly or indirectly).

Studies suggest that buildings with enhanced seismic performance reduce the potential environmental impacts post-earthquake (Gonzales et al, 2023). Extensive building damage or the need to demolish a building and rebuild can have significant impact on the environment, both in terms of carbon emissions and waste generation.

Occupying a building with enhanced seismic performance reduces the risk of your fit out and stock being damaged because of an earthquake.

Your rent will also be supporting a property developer/landlord and building that is more likely to be enduring.

10.7 Contribute to community resilience

A quicker return to business operations after an earthquake can also enable community recovery, especially if an organisation provides an essential or influential function or service to affected communities.

This may include economic recovery, whether local or regional, or social recovery, by enabling people to connect with or participate in their community.

11. How to communicate seismic risk with your staff

Be as transparent as possible with your staff; make sure you communicate the information you do not know, as well as that which you do.

Your approach to making building lease and occupancy decisions with seismic risk information, and the communication and discussion about such decisions with your staff, requires careful planning.

Where possible, it is good to involve staff throughout the decision process. There will be a range of tolerable levels of risk among individuals, which can also be different from the risk tolerance of an organisation. Enabling staff to be part of the decision process helps to build trust and confidence in the decision, which in turn has wider benefits for staff engagement.

Depending on the decisions that are made and how they are communicated, staff may react in different ways. For instance, some staff may have a range of questions and/or concerns, while others may desire reassurance about the decision(s) made and why. It is important to provide staff with a pathway that allows them to manage or respond to the risk that you are communicating and reduce any negative emotions such as anxiety or fatalistic thinking.

Key principles for communicating seismic risk should be considered and are listed below:

- **Diversify information:** Provide information in diverse ways for different staff; some people may prefer reading text, some charts and diagrams, and others may prefer to talk. Consider seeking assistance from experts to help explain different concepts to staff and address any questions.
- **Curate information:** Provide risk information that is relevant to your staff, to avoid overwhelming them with information. Ideally, assess this by listening to staff concerns early in the communication process.
- **Communicate clearly & consistently:** Be consistent and clear in your communications. Ideally, you should develop a communication strategy prior to communicating with staff.
- **Be empathetic:** Be empathetic with your communication. This is particularly important if there is a perception of heightened risk, or your staff have been adversely affected by previous events.
- **Be transparent:** Be transparent when explaining your decision process. Outline how you have obtained the risk information, how you have interpreted it, and how you have applied it to your decision-making. Where possible, include staff in the decision process.
- **Provide staff with agency & timeframes:** If you assess that there is high risk but cannot manage it in the short-term, then enable your staff by providing them with actions that promote agency and control. You should also provide clear information about clear timeframes for when the risk will be acted upon.
- **Be upfront about what you don't know:** If you are uncertain about some of the risks, be transparent about this; but also outline what you are doing to reduce this uncertainty, including how and when you expect to have more certainty.

12. Additional actions to help understand and manage seismic risk

12.1 Talk to the right people

- **Your landlord/property manager:** they will be able to provide you with information about the seismic risk of your building, and you can discuss potential mitigation options.
- **Your Regional and/or Local Council:** they will be able to provide you with relevant hazard information (including information about both the seismic hazard and secondary hazards, such as landslips).
- **A structural and geotechnical engineer:** they will be able to provide you with information about seismic risk, both generally and specific to your building.
- **Your insurance broker and/or insurer:** they will be able to help you understand your insurance cover and any options you may have.
- There are also many **online resources** available that provide advice on preparedness, non-structural mitigation (eg for securing fittings) and business continuity planning (see Section 12.3).

12.2 Complete a business continuity plan

Business continuity planning can also help to mitigate any potential disruption from seismic risk to your organisation, especially where you are otherwise limited in your ability to mitigate risk. This has benefits not only for disruption from earthquake events, but from all types of events that cause disruption.

Business continuity planning is a simple and effective strategy to consider different "what if" scenarios and develop alternative plans, ahead of time, should your building become unavailable and your business is interrupted.

Some key business continuity actions that you should consider are:

- assess the minimum requirements for your business to operate and consider how to make sure these requirements are met after an earthquake,
- consider likely supply and demand changes following an earthquake,
- include clear plans for communicating with your staff, as well as your customers, suppliers, and other key stakeholders,
- keep up-to-date information for key contacts (eg suppliers), and maintain back-ups and/or cloud storage of key information,
- work with other businesses and your local community to consider how you may be able to lean on them for support after an earthquake (and vice versa).

12.3 Further information

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Risk management	• Horspool, N. (2022). Life-Safety Risk in Earthquakes: Investigating Risk Factors and Development of Risk Management Tools. Doctoral thesis, The University of Auckland Research Repository. https://hdl.handle.net/2292/62613 • Risk Management: Guidelines (2023). ISO 31000:2018. https://www.iso.org/standard/65694.html • Toka Tū Ake EQC (2023). Risk tolerance methodology. https://www.eqc.govt.nz/resilience-and-research/research/search-all-research-reports/risk-tolerance-methodology
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13. Glossary

Term	Definition
%NBS	An index used to characterise the expected seismic response of a building to earthquake shaking. It identifies buildings that represent a higher seismic risk than a similar new building, built to the minimum life safety requirements of the Building Code (or New Building Standard).
%NBS rating	Rating given to a building based on an assessment of the vulnerability of key building elements. The %NBS rating for a building is the lowest %NBS score for any building element representing a significant life safety hazard.
%NBS score	Score given to an individual building element, denoting the degree to which the element is expected to perform in earthquake shaking compared with the minimum performance prescribed in the Building Code with respect to life safety.
Commercial Building Tenant	An organisation that leases one or more buildings for the purposes of carrying out commercial operations (excluding residential tenants).
Earthquake-prone building	Legal term to define buildings rated less than 34%NBS and designated as "earthquake-prone" by a territorial authority under the Building Act 2004. Earthquake-prone buildings must be remediated or demolished within a period of 7.5 to 35 years depending on their use and location in Aotearoa/New Zealand.
Enhanced seismic performance	For the purposes of this document, the expected performance of a building designed above and beyond the Building Code minimum seismic requirements, focusing not just on life safety but also property loss and business disruption.
Low damage seismic design	An approach to building design that limits damage to a building in a significant earthquake, to reduce expected downtime.
Risk tolerance	The level and frequency of disruption that an organisation is willing to accept.
Seismic performance	The expected ability of a building or structure to perform during a given earthquake.
Seismic retrofit	The upgrade of existing structures that reduces the level of risk caused by shaking in the event of an earthquake.
Seismic risk	The potential for harm, loss, and/or disruption following an earthquake event.
Seismically vulnerable building	A building which has some identified seismic vulnerability, whether or not the building is determined as earthquake-prone.

14. Feedback

Thank you for your time reading through this document. We encourage you to share your thoughts through our online feedback form: https://mbie.wufoo.com/forms/z1t62lzb18vzzqe.

Your feedback will be anonymous and will help us improve the quality of our resource documents and materials.

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