



Communicating seismic risk with commercial building tenants: Preliminary results

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ABSTRACT

In Aotearoa New Zealand, the interpretation of seismic risk information and the subsequent demands put on building owners and developers, are shaping the performance of our building stock. Commercial building tenants, in particular, can significantly influence property developers and landlords, who respond to tenant preferences to ensure they can lease and make a return on their property investment(s). However, there are many cases that indicate commercial building tenants do not fully understand the seismic risk information they receive nor how to incorporate the information into decision-making of leasing or vacating a building. This ongoing research will identify key challenges with current approaches for communicating seismic building risk with commercial building tenants through a series of interviews with commercial building tenants, property managers/owners, and structural engineers. The findings will develop and test best-practice communication approaches to assist tenants with making well-informed lease decisions about seismic building performance requirements within the context of their organisational needs. Preliminary findings indicate that lease decisions are mainly based on the %NBS (New Building Standard) of tenants' buildings and that benefits of enhanced seismic performance considerations (i.e., building functionality) are not widely considered.

1 INTRODUCTION

1.1 Background

Recent earthquakes have demonstrated the importance of reducing the seismic risk and improving the seismic performance of buildings in Aotearoa New Zealand. For instance, the 2010-2011 Canterbury Earthquake Sequence resulted in the partial and total collapse of many buildings, including office buildings and heritage structures (Kaiser et al., 2012). A significantly affected group was commercial building tenants,

with approximately 1,000 commercial buildings demolished or slated for demolition, and a cordon established around the CBD restricting access (Chang et al., 2014).

Commercial building tenants play a significant role in reducing the seismic risk and improving the seismic performance of buildings. Commercial tenant priorities and preferences, and willingness to pay to occupy a building with improved seismic resilience, drives the commercial rental market (Filippova, 2016). In turn, landlords and developers, who are driven by the ongoing ability to lease the building and make a return on investment, will respond to commercial building tenant desires to seek a certain level of seismic performance (Marquis et al., 2017). How commercial tenants interpret seismic risk information, and the subsequent demands they place on building owners and developers, therefore, helps to shape the market and value associated with seismic resilience in Aotearoa New Zealand.

Despite the influence of commercial building tenants in shaping seismic performance in the market, there is little literature on commercial tenants' decision-making process, needs, and effective communication regarding seismic building risk and leasing decisions. Most available literature and guidance focus on communicating seismic building risk to the building owners/developers or homeowners to motivate seismic preparedness (Blake et al., 2021; McClure et al., 2015; Miranda et al., 2022). This might not be fully extrapolated to commercial tenants since different community groups, such as owners-occupiers, or residential tenants, have different perceptions, priorities, and limitations (Doyle & Becker, 2022).

There is growing evidence that the communication of seismic risk information, and interpretation of this information by commercial building tenants, can result in suboptimal outcomes for improving resilience. This includes the use of metrics such as %NBS (New Building Standard) leading to the (arguably) premature vacation of buildings with significant flow-on impacts to communities (Ministry of Education, 2022; Nuth et al., 2021), and other tenants seeking code-minimum buildings (sometimes at a discounted rental rate (Filippova, 2016) even when there are good business and social reasons to occupy buildings with enhanced seismic resilience. Furthermore, research on Auckland's real estate professionals and their perceptions of seismic risk indicated that the %NBS (New Building Standard) has become a market requirement since the Canterbury earthquakes (Filippova, 2015).

To address this issue, there is a growing focus on understanding how to effectively communicate seismic risk aiming to help experts articulate potential consequences and uncertainties, motivating preparedness. Recent work (MBIE, 2022; Nuth et al., 2021) has highlighted a lack of useful and digestible information on seismic risk available explicitly for commercial building tenants, and a gap between standard outputs from engineering assessments and general organisational risk management processes. For instance, the Ministry of Business, Innovation and Employment released the *Seismic Risk Guidance for Buildings* (MBIE, 2022) to help building users and owners understand seismic assessments and make informed decisions about their buildings. While the guidance explicitly references its usefulness to tenants, its primary focus is on communicating occupancy decisions for buildings with limited seismic performance. Research targeted directly at commercial building tenants to better understand the interpretation of seismic risk information and decision-making processes is urgently needed to ensure optimal outcomes for tenants and communities.

Our study aims to identify key challenges with current approaches for communicating seismic building risk with commercial building tenants. As part of this, we are engaging with commercial building tenants, as well as groups who are the primary communicators of seismic risk information to tenants: property managers/owners, and structural engineers. This research seeks to explore tenants' priorities, preferences, tolerability of seismic building risk, and how they influence the market towards building a more resilient Aotearoa New Zealand.

1.2 Engineers and property managers' role

To effectively communicate seismic building risk with commercial tenants to promote optimal outcomes of occupancy and lease decisions, it is necessary to understand the perspectives and experiences of the groups who primarily communicate seismic risk information with commercial tenants.

All these stakeholders involved in the process have unique priorities, preferences, and tolerability, but their understanding of why and how seismic building risk information is communicated can differ. While some might want to inform about potential seismic building risk, others might want to inform and minimise seismic building risk. The property managers are an example of individuals actively involved in communicating seismic building risk information. The Real Estate Agents Act (2008) and Health and Safety at Work Act (2015) indicate that owners and property managers must disclose any risk, including seismic building risk. Although information on seismic building risk must be disclosed, information on how to mitigate seismic building risk might not be required. Following those lines, the Real Estate Authority (2023) website outlines seismic risk considerations for building owners and states that commercial and industrial property owners are often required to demonstrate a building's earthquake resilience.

On the other hand, engineers play a critical role in informing about seismic building risk and strategies for minimising it. This communication typically takes place through reports. All reports aim to communicate seismic building risk; however, depending on the type of reports, they may also include recommended mitigation actions. For example, Initial Evaluation Procedure (IEP) or Initial Seismic Assessment (ISA) reports include an indicative %NBS for their building, produced based on building records, plans and visual inspections, while Detailed Engineering Evaluation (DEE) or Detailed Seismic Assessment (DSA) involves modelling, tests, and detailed assessments, which provides a more accurate %NBS and include recommendations on potential mitigation actions.

2 METHODOLOGY

Based on a review of relevant literature, we identified three key stakeholder groups to engage with who directly influence how commercial building tenants understand and interpret information about seismic risk: structural engineers, commercial property managers/owners, and commercial building tenants.

This project was divided into two phases. In Phase One, interviews were conducted with structural engineers and property managers/owners with experience in communicating seismic risk information with commercial building tenants. Phase Two (ongoing) explores the perspective of commercial building tenants. This paper presents preliminary findings from Phase One.

All participants in Phase One were asked about the nature of their organisation and their own role within the organisation, including their role in communicating seismic risk information with their commercial tenants.

Ten semi-structured interviews were completed with structural engineers and property managers/owners. These interviews concluded in July 2023. Each interview was limited to one hour.

Participants in Phase One were identified from their representation of communicating seismic risk information with a spectrum of commercial building tenants, from large corporate tenants with multiple buildings to smaller tenants. Participants were also selected to represent different seismic hazard zones in Aotearoa New Zealand, including Wellington, Auckland, Hamilton and Christchurch.

Interviews were transcribed and coded inductively. Codes have been preliminarily clustered into themes using a generic thematic analysis (Braun & Clarke, 2006).

This project was evaluated by peer review and is considered low-risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

3 PRELIMINARY FINDINGS

The following sections provide the authors' preliminary impressions from the interviews and are intended to provide a broad overview of emerging themes and findings.

3.1 %NBS as a dominant tool used to explain seismic building risk

All participants referred to %NBS as a primary tool to explain and quantify seismic building risk when asked about how they understood seismic building risk.

Participants expressed the perspective that tenants do not fully understand %NBS. Structural engineers emphasised the importance of communicating beyond just the %NBS rating of buildings, including providing additional context such as what the rating represents in terms of the consequences of failure. Both structural engineers and property managers/owners stated that tenants generally focus on the %NBS rating and don't have a more holistic view of building components. For example, 80%NBS might be good, and 79%NBS might be unacceptable, as tenants have been setting their own minimum standards of, for example, 80%NBS.

While participants indicated that the *Seismic Risk Guidance for Buildings* (Ministry of Business, 2022b) is a useful tool for helping them understanding and communicating the %NBS metric, participants indicated that there are still widespread misunderstandings and misperceptions about %NBS. Interviewed structural engineers stated that the numerical %NBS rating has caused many challenges because people get fixated on those numbers.

Structural engineers indicated they have seen building assessments that included a %NBS rating with decimal numbers (e.g., 70.5%), despite seismic building assessment guidance advising against this. Participants indicated that the %NBS metric, let alone the use of decimal points in a rating, created an impression of accuracy in a process that holds so much uncertainty and complexity. Interviewed engineers indicated a broader rating system would have avoided that confusion.

3.2 Methods for communicating seismic risk information

In general, participants indicated they primarily communicate seismic risk with commercial building tenants through the use of engineering reports (e.g., ISA, DSA). Reports can be requested by tenants or property managers/owners from engineering consultant companies. Interviewed structural engineers noted that reports should only be used by those commissioning them, to avoid potential misinterpretations of the information. Such misinterpretations might arise because the information provided in reports might not reflect all conversations engineers have had with clients and are based on information available to engineers, including whatever the client chooses to provide.

Inconsistencies between seismic assessment reports was also identified as a challenge when communicating seismic building risk. As these reports are written by engineers who self-interpret current guidance, some inconsistency of outcomes provided in seismic assessment reports can be expected across different engineering firms. This might also be affected by the information engineers had access to

Interviewed property managers stated that seismic assessment reports can be difficult to understand because of the technical information provided. Generally, clients might instead simply read the summary of assessment reports.

Interviewed engineers mentioned the importance of avoiding certain wording in their reports. This includes terms such as ‘life safety’ or ‘acceptable damage’. They emphasised that while these terms are understood and commonly used by engineers, they can trigger uncertainty or raise additional questions for non-engineers.

Participants also acknowledged that the need to provide communication beyond these reports is key for tenants to make well-informed decisions regarding the seismic risk of their buildings. For instance, some participants noted that they hold meetings with tenants to provide extra context and answers any questions tenants might have. Interviewed engineers mentioned the importance of holding meetings to articulate the report’s outcomes, to prevent clients from making building occupancy decisions based on a %NBS rating alone. During these conversations, interviewed engineers mentioned that they typically explain to clients the philosophy behind the building code, which is about life safety and not building safety.

3.3 Context matters in making decisions regarding seismic building risk

Some participants indicated they try to explain seismic risk to clients by comparing the probability of earthquakes and the risk they pose to the probability of other risks, such as being involved in a car accident.

Participants also indicated they encounter differing perceptions of and tolerance to seismic building risk across the country, based on seismic hazard zones and the size of communities (i.e., small towns vs larger cities). Participants indicated that, in their experience, tenants in lower seismic hazard zones (e.g., Auckland) might be more comfortable with occupying a building with a reduced %NBS rating, compared to those in higher seismic hazard zones (e.g., Wellington).

Interviewed property managers from smaller towns expressed that tenants sometimes have to deal with buildings of a lower %NBS rating since there is a limited commercial property market, and existing buildings have not been raised to higher levels. Participants indicated that although conversations on the importance of mitigating seismic building risk are happening in cities – such as Wellington or Christchurch – at a regional level, these conversations often do not occur because renting values do not justify the cost of seismically strengthening buildings. Some interviewed property managers mentioned that in smaller towns, the cost of seismically strengthening would be higher than the building's worth.

Participants also indicated the nature of a tenant’s business (e.g., retail or office space) might also influence decisions related to seismic building risk. For instance, they emphasised the importance of public access to retail businesses, with a critical emphasis on location. In the decision-making process, retail businesses might prioritise leasing buildings based on factors that favour accessibility and visibility, with a lesser assessment or prioritisation of the seismic risk of the buildings.

In addition, participants indicated that the sources of seismic building risk information plays a significant role in tenants’ decision making about the lease or occupancy of a building. For instance, tenants might be more likely to trust a DSA. Furthermore, the ongoing changing information/standards (as a result of growing knowledge) creates confusion among tenants because one day, their building might have a lower %NBS. In this regard, participants have highlighted the critical role of engineers when the %NBS is affected. Engineers must communicate the updated risk clearly to clients. Participants have observed that engineers actively engaging in conversations with clients about potential strengthening solutions have significantly influenced tenants' decisions, especially regarding the possibility of vacating a building.

3.4 Tenants’ demands influencing the market

Participants noted that the size of tenant organisations plays a role in the demands and requirements seismic building performance, and therefore the influence tenants have in influencing the property market.

Interviewed property managers agreed that some tenants, especially large or corporate tenants, have internal policies that set out a requirement to occupy only buildings with a minimum %NBS rating and won't even look for buildings with a lesser rating. Noting the influence of commercial tenants on shaping the seismic performance of buildings. In comparison, some smaller tenants might not even consider nor ask for advice about the seismic risk of their buildings. Consequently, participants indicated that the %NBS tool has become a marker of the market, such as double glazing, which is not the intention behind %NBS.

Participants indicated that in their experience, government tenants of commercial properties have been driving a minimum threshold of 80%NBS for leasing buildings, particularly in Wellington. Some participants indicated that government tenants might be willing to stay in a building they currently lease and occupy that is less than 80%NBS if the key drivers behind that figure are known. However, to enter a new lease arrangement, the building must be 80%NBS or above. Participants indicated that large or corporate tenants have been following that trend; they might include a %NBS baseline that has to be met throughout the lease period, or they might terminate the lease.

Participants also mentioned that they are aware of some tenants having policies on having up-to-date DSAs, or exclusively obtaining DSAs rather than ISAs. For example, one participant noted that some tenants they have engaged with will not accept DSA reports that are older than 2016, which pre-date the current earthquake-prone building legal framework.

Some participants indicated that they have dealt with owners of buildings who couldn't strengthen their buildings and had to sell them. New owners must pass the strengthening's cost onto tenants at higher rent prices that only large corporate tenants can afford. Participants have noted a distinct market for premium buildings, specifically those designed with a low-damage design philosophy. These structures come with an additional cost, typically only affordable for large corporations. This trend highlights a shift in the market, where companies, especially major ones, are willing to invest in higher-priced buildings that prioritise low-damage design to align with and exceed their internal seismic risk policy.

4 CONCLUSIONS AND FUTURE WORK

The findings presented here are initial themes that have emerged from data analysis of 10 interviews with structural engineers and property managers who have experience communicating seismic building risk with commercial building tenants. Preliminary findings indicate that conversations about seismic risk with commercial building tenants are primarily dominated by the issue of life safety, in particular the %NBS metric. There must be a shift in the communication of seismic building risk with owners and tenants of commercial buildings, which must not just include information about seismic building risk, but also how to minimise that risk (e.g., building strengthening). Greater communication tools must be developed to help commercial tenants understand seismic risk beyond simply life safety considerations, and toward factors such as damage and business disruption. While commercial tenants' needs may vary based on factors such as the organisation's size and location, discussions regarding seismic building risk and related actions are pertinent across the board. These conversations are not exclusive to specific organisations but rather cut across the spectrum of commercial tenants, emphasising the universal importance of addressing seismic building risk concerns.

Further interviews with commercial tenants will contribute to a more comprehensive understanding of commercial tenants' understanding and needs of seismic building risk. This includes testing different seismic risk messages, to assess those which are most effective in helping tenants to understand seismic risk in the context of their organisation. We plan to publish this research in a peer-reviewed publication and use this information to create guidance for commercial building tenants.

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