

Five drivers

Buildings with insufficient seismic strength are key contributors to deaths and building losses. Better information is needed for owners and potential buyers on a property's seismic risk, a research programme finds.

BY TEMITOPE EGBELAKIN AND PROFESSOR SUZANNE WILKINSON, UNIVERSITY OF AUCKLAND



The severely damaged CTV building.

PHOTO COURTESY OF SNPA – PAM JOHNSON.

THE CANTERBURY EARTHQUAKES Royal Commission reported that the magnitude of building collapses from the earthquakes is evidence that owners of earthquake-prone buildings are not adopting appropriate risk-mitigation measures in their buildings.

Cost, risk perception and the effectiveness of mitigation measures have been identified as factors influencing property owners' seismic retrofit decisions.

Retrofitting could be encouraged

Research at the University of Auckland and Massey University identified five ways to encourage retrofitting:

- Seismic risk appraisal in property valuation assessment.
- Provision of a unified seismic risk information system.
- Mandatory disclosure of seismic risk information in property market transactions.
- Accuracy in earthquake risk assessments with low-cost engineered solutions.
- A risk-based insurance premium system.

1. Seismic risk appraisal

Seismic risk appraisal in property valuations is an important enabler for increasing seismic retrofits.

Currently, these appraisals are not in property valuation reports unless requested. Property professionals generally include a disclaimer on any related seismic risks in their valuation report, reducing the scope and rights that may be exercised should litigation ensue.

As one research respondent said, 'Most times when making real estate investment decisions, we assume risk from rare disaster events such as earthquake is negligible compared to other market risks.'

'If valuation and property standards mandate the inclusion of seismic risks in a valuation report, the relative importance can be attached to seismic risks in investment decisions.'

2. Sharing information

A seismic risk information system could encourage improved seismic retrofitting. The importance of this information has been confirmed in previous studies, and evidence from Christchurch shows the effect on earthquake vulnerability when it is lacking.

The Canterbury Earthquakes Royal Commission recommended that the Christchurch City Council consider compiling and making available a public database of all

bore logs previously recorded in the CBD, in addition to those made for future buildings.

A unified system would help property market stakeholders access a building's seismic risk data. This information could influence the price-setting and valuation process of individual property transactions, enabling informed investment decisions to be made.

3. Mandatory disclosure

Mandatory disclosure of risks would increase the extent to which people are aware of seismic risks in the market, allowing them to make appropriate property investment decisions.

One comment was, 'It is difficult for all market stakeholders to know the issues around seismic risks unless the law mandates that it must be disclosed. Most owners and real estate agents will prefer to be silent on such issues because it will affect their business transactions.'

Findings after the Canterbury earthquakes showed that the owner of the CTV building was unaware of the building's seismic risks at the time of purchase. If the owner had been aware of the building's vulnerability, the cost of retrofitting could have possibly been factored into the investment decision and retrofitting work undertaken.

If owners and property retailers are obliged to disclose a building's seismic risk to prospective buyers or tenants at the point of sale or lease, building occupants would demand buildings that ensure their safety. Accurate risk information to buyers, insurers and lenders would result in an informed property market and possibly force down the property value of non-retrofitted earthquake-prone buildings.

Building owners are likely to increase investments in seismic retrofitting if they perceive a potential loss of revenue or tenants.

4. Accurate earthquake risk assessments and low-cost engineered solutions

The Canterbury earthquakes showed the importance of accurate earthquake risk assessment in earthquake risk mitigation. Often they are based on rough estimates and probability of earthquake occurrence and can be inaccurate.

The challenge is for earthquake hazard mitigation professionals to develop reliable methods of estimating seismic risks, as most seismic mitigation decisions are based on the outcome of the assessed risks.

The benefits of improved risk assessment are:

- enhanced risk estimation and the adoption of adequate mitigation measures in retrofitted earthquake-prone buildings

- insurers are helped in setting accurate premiums
- information irregularities between insurers, reinsurers and financial institutions are reduced.

Once accurate risk assessment has been made, reliable low-cost engineered solutions could be further developed and implemented.

5. Risk-based insurance premiums

While risk zones play an important part in insurance premium estimations, there appears to be a lack of importance placed on these by insurers and reinsurers.

Generally, insurance premiums are not calculated in terms of risk-based analysis, leading to high premiums, even for buildings that have been retrofitted to high seismic performance standards.

Insurance premiums should reflect risk and take into account mitigation actions undertaken on the building.

Where buildings are retrofitted well beyond minimum requirements, the owners should be rewarded with premium discounts. Research suggests that combining earthquake insurance with compliance to seismic retrofitting of earthquake-prone buildings will encourage owners to adopt mitigation measures. ◀