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# Post-disaster Risk Assessment for Hilly Terrain exposed to Seismic Loading

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The 2010-present Canterbury earthquake sequence in the central South Island of New Zealand has identified and highlighted the value of practical, standardised and coordinated geotechnical risk assessment guidelines for inhabited structures in the aftermath of a geotechnical disaster. The lack of such guidelines and provisions to enforce risk assessments was a major gap which hindered coordinated, timely and transparent management of geotechnical risk.

The earthquake sequence initiated a series of rockfall, cliff collapse and landslide events around the Port Hills southeast of Christchurch. This was particularly the case with the 22 February 2011 earthquakes, which put thousands of people inhabiting the area at risk. Lives were lost and thousands of houses and critical infrastructure were damaged.

Given the highly seismic environment in New Zealand and a significant number of active faults near population centres, it is prudent to develop such guidelines to ensure response mechanisms and geotechnical risk assessment is effective following an earthquake rupture in a largely populated urban environment. For response and associated risk assessments to be effective, the mechanisms of the geotechnical failure should be taken into consideration as part of the life safety assessment. This is to ensure that the hazard's potential risk is fully assessed and encompassed in decisions regarding life safety.

This paper examines the event sequence, slope failure mechanisms and the geotechnical risk management approach that developed immediately post-earthquake. It highlights experiences from key municipal, management and operational stakeholders who were involved in geotechnical risk assessment during the Canterbury earthquake sequence, and sheds light on the evolution of information needed through time during the emergency response and identify the hard won lessons. It then discusses what is needed for life safety assessment post-earthquake and create awareness of potential geotechnical hazards. This is not only important to New Zealand but has international implications as there are many other regions of the world also subject to high seismic risk.