1. BACKGROUND

Liquefaction during seismic events can lead to significant damage to buildings and infrastructure networks, including differential settlement of buildings, collapse of roads, or breaching of buried infrastructure. Because of the young coastal sediments and their location along the Pacific Basin Ring of Fire, New Zealand is prone to liquefaction induced damage. An effective resource to identify areas of risk and to estimate the potential extent of damage to buildings and infrastructure is a liquefaction hazard map. However, the development usually requires extensive investigation to characterize the potential liquefaction-induced damages using simplified liquefaction evaluation procedures. When assessing distributed infrastructure networks, the number of investigations required can be expansive and labor-intensive, hence they may not be viable for the overall assessment of large-scale networks.

2. INFRASTRUCTURE NETWORKS

The functionality of national infrastructure networks is essential to provide services such as transportation and power transmission. Because of their geospatial distribution, they are exposed to a range of natural hazards. One important factor is the topography of New Zealand: the distribution in one location can often have widespread implications across the network. In the event of an earthquake, liquefaction-induced settlement and ground deformation are the main causes of infrastructure damage. The map shows areas of high susceptibility in the centre of New Zealand. The areas are very close to the coast and across alluvial plain areas. For the Inter-Island, liquefaction-induced settlement and ground deformation are the main causes of infrastructure damage. The centre point, on the other hand, was shown to illustrate the location more accurately on the map.

3. SUSCEPTIBILITY ANALYSIS

For state highways and rail, the results are very similar, which may be because road follows the state highways at a number of locations. The relatively high percentage of infrastructure sections with "very high" susceptibility (74.3%) for state highways, (80.9%) for rail) is because a large proportion of state highways are close to the coast and across alluvial plain areas. For the Inter-Island, liquefaction-induced settlement and ground deformation are the main causes of infrastructure damage. The map shows areas of high susceptibility in the centre of New Zealand. The areas are very close to the coast and across alluvial plain areas. For the Inter-Island, liquefaction-induced settlement and ground deformation are the main causes of infrastructure damage. The centre point, on the other hand, was shown to illustrate the location more accurately on the map.

4. INFRASTRUCTURE CRITICALITY

Partially or fully damaged infrastructure can cause a divergence of consequences on the economy and society. Liquefaction damage can cause a number of consequences, including: (i) high infrastructure costs; (ii) high repair costs; and (iii) high costs for business and industry. The example illustrates that the assessment of the susceptibility map alone will lead to incorrect outcomes. The inclusion of ground motion data is crucial for forecasting the consequences and seismic hazard estimations is indispensable for a proper analysis of the liquefaction hazard.