

Earthquake Vulnerability Index of Buildings in Kota Kinabalu, Sabah, Malaysia

ABSTRACT

Sabah has experienced an increasing number of low to moderate seismic events throughout the years, owing to the presence of certain moderately active fault lines in the region. A significant earthquake struck in Ranau in 2015. Central and eastern Sabah, including Kota Kinabalu, were affected by the earthquake. Around 300 moderate magnitude earthquakes have occurred in this region during the last 150 years, ranging from MW 2.5 to MW 6.9. The majority of existing structures in Kota Kinabalu are based on wind and gravity loads, notably those built between the 1970s and 2000s. As a result, the inspection stages for building vulnerabilities are somewhat limited. The purpose of this study was to establish an earthquake vulnerability index for existing buildings in the city. The building databases contain information on the locations, structural and geometric properties of 247 structures that have been collected and analyzed. The obtained data is used to conduct an empirical assessment of the seismic vulnerability of existing buildings. Furthermore, this will be performed by employing a seismic vulnerability assessment with a score assignment, which is useful for analyzing a large number of buildings. Out of the total sampled buildings, the majority are classified as grade 3 and 4, suggesting a risk of severe structural damage. In comparison, only 5% of the population suffers from minor to no structural damage. In conclusion, the anticipated vulnerability index can be used to plan and carry out repair, reinforcing, and adaptation actions on existing structures that were designed and built without respect for earthquake loads. Such estimates may reveal weaknesses that should be avoided during the design and construction of new structures to avoid future earthquake damage.