

Damage Prediction Observation for Existing Buildings in Sabah under Moderate Risk Earthquakes

ABSTRACT

Seismic design in building construction is still new in Malaysia. Sabah, a Malaysian state, is situated southeast of the Eurasian Plate, between the highly active Philippine Sea Plate and Indo-Australian Plate, and has a history of earthquakes, with the largest measuring a magnitude of 6.3 (2015). Although small earthquakes occur annually, most old buildings in Sabah were built pre-code and designed without considering earthquake loadings. This study aimed to analyze the potential damage to buildings in Sabah based on their vulnerability to moderate earthquakes. More than 500 buildings in seven districts were evaluated using a quantitative method based on score assignment, within 100 kilometers of the epicenters. According to the findings, more than 160 buildings in the Kota Kinabalu and Kudat districts were assessed as vulnerable to Grade 4 damage. In Ranau, Kota Marudu, Tawau, Semporna, and Lahad Datu, most buildings had a Grade 3 damage potential, with some at Grade 2 or 4. This study's findings provide a summary of the damage risk for structures in Sabah and offer a starting point for planning and developing safer buildings that can withstand local seismic conditions. The resulting building-grade damage map can be used as a reference for future damage mitigation measures.