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Building a Safer Malaysia: Ensuring Structural Resilience Against Earthquake Risks

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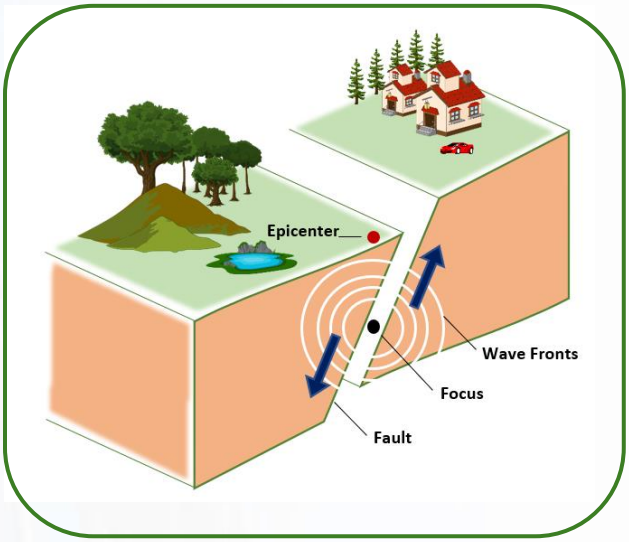
Malaysia experiences the impact of both regional and local earthquakes. Although Malaysia is known to be a country with low seismicity, it is located on the stable Sunda plate, part of the Eurasian plate, near the famous Pacific Ring of Fire tectonic belt where most of the earthquakes occur in this zone. An earthquake occurs when tectonic plates beneath the Earth's surface move against each other along a fault line. This movement releases energy in seismic waves that spread outward from the point of origin called the "focus". The epicenter is the point on the Earth's surface directly above the focus.

Throughout the year 2023, a number of large-scale earthquakes struck various parts of the world, including Turkey, Syria, Japan and Indonesia. In light of these recent events, experts have warned Malaysians to take the necessary precautions and enhance their preparedness in the face of a natural disaster. According to Professor Ir. Dr. Azlan Bin Adnan, Head of the Seismology and Earthquake Engineering Research Group at Universiti Teknologi Malaysia (UTM), in an interview with the local newspaper Sinar Daily in April 2023 highlighted that peninsular Malaysia may experience earthquakes of up to magnitude 6, while Sabah could face earthquakes of a magnitude of 7, following the recent series of earthquakes. It should be noted that while earthquakes in Turkey and Syria do not directly affect the likelihood of earthquakes occurring in Malaysia, those in Indonesia and Japan can impact the activity of the Pacific Ring of Fire and consequently increase the possibility of earthquakes in Malaysia.

He further emphasized that all buildings should incorporate earthquake-resistant design in line with the Malaysian Standard guidelines, commonly known as MS EN 1998-1:2015 Eurocode 8. These guidelines emphasize the importance of developing provisions for seismic design for both existing and new structures in the region. In addition, existing old



The movement in tectonic plates contribute to earthquakes.

buildings and critical structures such as schools and hospitals must undergo reassessment to assess whether repairs are necessary.

Meanwhile, Professor Dr. Felix Tongkul, a geologist at the Center for Natural Disaster Studies, Universiti Malaysia Sabah (UMS), stressed that most strong earthquakes in Malaysia are concentrated in several locations in Sabah. According to Felix, even though the risk of a major earthquake in Malaysia is not as great as in neighbouring countries where there are occurrences of active earthquakes, Malaysia needs to be prepared in case of an earthquake in the future. This is because when an earthquake occurs in neighbouring countries surrounding Malaysia, the tremors can be felt across four states in Malaysia, namely Perak, Selangor, Melaka and Johor. People who feel the tremors at their residences usually tend to panic and evacuate their high-rise residential buildings to gather in open areas, waiting for the vibrations to subside.

Reflecting on the devastating earthquake that struck Sabah with a magnitude of 6.0 in 2015, the impact it had on buildings and infrastructure was significant. These structures were not equipped to withstand such seismic activity, resulting in the loss of lives and significant damage. One possible way to reduce structural damage and the consequent losses is to adopt earthquake-resistant seismic design philosophy in practice. Retrofitting techniques for structures can be a cost-effective and environmentally friendly way to improve the safety of existing structures, as opposed to building new ones from scratch. Over the years, seismic retrofitting techniques have made significant progress in strengthening the structural integrity of buildings during seismic activity. Thanks to the availability of advanced materials like fiber-reinforced polymers (FRP), fiber-reinforced concrete, seismic rubber bearing and high-strength steel, retrofitting techniques have made great strides in enhancing the building's ability to withstand strong vibrations and ground movement during earthquakes. The design involves adding braces, damping, reinforcing walls, strengthening shear walls and upgrading foundations to make buildings more resistant and prevent from collapse to minimize the risk of death or injury to people. It is crucial to prioritize the development of effective retrofit techniques and ensure that Malaysia is better prepared to face future disasters in a safer and more resilient way for our communities.

One effort that needs to be intensified and held continuously is to increase public awareness of the risk of earthquakes and preparations before, during and after an earthquake. To date, earthquake hazards are not well comprehended and can not be accurately predicted in Malaysia due to insufficient scientific data. Moreover, the issue in Malaysia is that we are still lagging behind in adopting the latest earthquake-resistant technology. This raises a pertinent question - if an earthquake were to occur in Malaysia, will we be adequately prepared to face it?

Sorotan Aktiviti

Practice-Oriented Component (POC) bagi Kursus ECG243

Juliana Idrus dan Azura Ahmad

Aktiviti *Practice-Oriented Component (POC)*

ECG243 (Soil Mechanics)

Aktiviti POC bagi topik Soil Compaction and Consolidation

Aktiviti *Practice-Oriented Component (POC)* bagi kursus ECG243 (Soil Mechanics) yang melibatkan pelajar program Diploma CEEC110 telah berjaya dilaksanakan sepanjang Semester Mac – Ogos 2023. Empat (4) aktiviti *POC* telah dijalankan menggunakan empat (4) slot masa kelas tutorial subjek ini merangkumi bab *Physical Properties and Classification of Soil*, *Flow of Water Through Soil*, *Shear Strength of Soil* dan *Soil Compaction and Consolidation*. Semua aktiviti yang dilaksanakan ini adalah bertujuan memberi pendedahan kepada para pelajar untuk menjalankan pembelajaran secara *hands-on* dan seterusnya dapat mempraktikkan konsep dan teori yang telah dipelajari mengikut topik yang terkandung di dalam kursus ini.