Maybank Investment Bank

STRATEGY

Malaysia

Malaysia ESG Thematics

Rising earthquake risk is real in Malaysia

Fail to plan is a plan to fail

Malaysia (MY) is in the Ring of Fire zone. According to expert, there is potential earthquakes of higher intensity in time to come although most areas in MY have low-to-no seismic risks. Sabah faces the highest seismic risk, followed by Peninsular. An earthquake magnitude of >6.0 may cost severe damages. Mitigation strategy involves additional seismic design which adds just ~5-10% to structural costs, benefiting construction players. Insurance sector may benefit from earthquake add-on coverage.

Myth 1: Malaysia is outside the Ring of Fire zone

We hosted Prof Ir Azlan (see speaker's profile on later sections) for our ESG- webinar titled "Malaysia's Seismic Reality: A Look at Earthquake Risk and Preparedness". We learn that MY lies within the broader Ring of Fire (see Fig.1) and is exposed to intraplate earthquakes, contrary to earlier belief that it was outside this zone. There are several types of earthquake hazards: (1) ground shaking – damages buildings and infrastructure; (2) ground failure – ruptures, landslides, liquefaction; (3) tsunamis; as well as (4) secondary hazards – fires from damaged circuits or gas pipes.

Myth 2: Recent Segamat earthquake is one-off

Segamat's earthquake (Aug 2025) in Johor at 4.1 magnitude was a surprise to many as it is the first recorded in that area. Earthquake magnitude of <4.0 is considered weak, while magnitude between 4.0-4.9 is considered moderate in strength. However, an earthquake magnitude >5.0 may start to cause serious damages, exemplified by Ranau's 2015 earthquake in Sabah with a magnitude of 5.9-6.0. There are many fault lines in Peninsular, Sabah and Sarawak, though not all are active (see Figs.2-4). One example of inactive fault line is the Kuala Lumpur Fault Line, which runs beneath the KL city. Active fault areas/hotspots in Peninsular (see Fig.5) include Bukit Tinggi (Pahang), Kuala Pilah (Neg. Sembilan), Manjung (Perak), Temenggor (Perak), and Tasik Kenyir (Trengganu). In Sabah (see Fig.6), the hotspots are in Lahad Datu and Kudat. The speaker believes there is potential for earthquakes of higher intensity in time to come, though the timing cannot be predicted. A 6 magnitude earthquake is possible for Peninsular (likely in Bukit Tinggi which is about 30km from KL) and up to 7 magnitude is possible in Sabah (likely in Lahad Datu and Kudat).

Implications, mitigation and preparedness

Malaysia has laws addressing seismic risk. But prior to 2017, there was no specific guidelines governing the design of buildings. The additional seismic design cost to make earthquake-resistant properties will outweigh the financial loss of subsequent repair/replacement in the event of an earthquake. Ongoing education on earthquake risk and preparedness are important especially near hotspot areas. We see the insurance sector (Buy pick: Allianz (ALLZ MK, CP: MYR18.38, TP: MYR23.05)) as key beneficiary from potential revenue upside, for greater awareness could prompt more comprehensive insurance coverage for the properties. Another potential beneficiary is the construction sector on potentially higher job orders as building owners spend more to make their buildings earthquake-resistant, while reconstruction / repair / replacement works are common post an earthquake. [see Fig.8 for our sectorial comments]

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Abbreviation
KL - Kuala Lumpur
MY - Malaysia
Peninsular – Peninsular Malaysia

PP16832/01/2013 (031128)

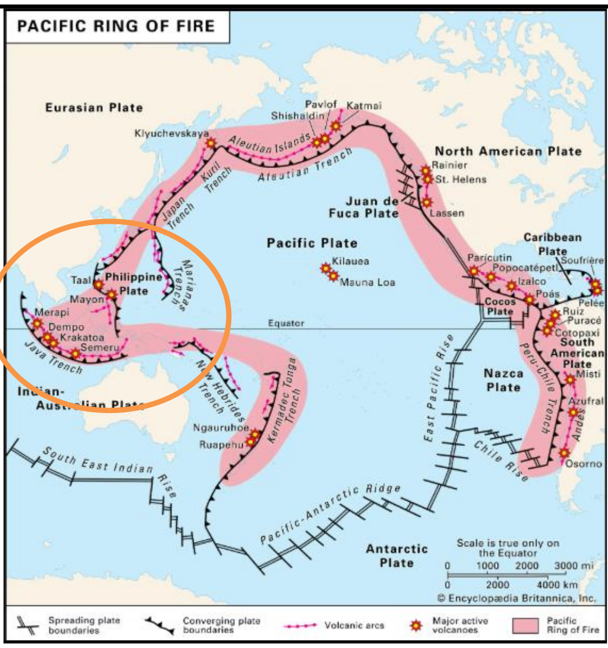
Topic: "Malaysia's Seismic Reality: A Look at Earthquake Risk and Preparedness"

Speaker: Professor Ir Azlan Adnan, expert in earthquake engineering

Key highlights:

- **Malaysia is in the Ring of Fire**: Malaysia lies within the broader Pacific Ring of Fire and is exposed to intraplate earthquakes, contrary to earlier belief that it was outside this zone.

Fig 1: Malaysia is in the Ring of Fire



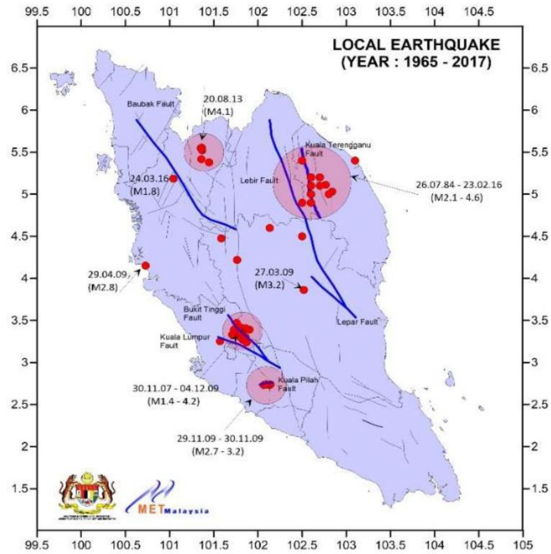
Source: Encyclopedia Britannica

- **Types of Earthquake Hazards:**
  1. Ground shaking – damages buildings and infrastructure.
  2. Ground failure – ruptures, landslides, liquefaction.
  3. Tsunamis.
  4. Secondary hazards – fires from damaged circuits or gas pipes.

- **Richter Scale Summary:**
  1. <3.0 very weak. Hardly felt
  2. 3.0-3.9 weak. Felt, but little damage
  3. 4.0-4.9 moderate. Felt with some damage
  4. 5.0-5.9 relatively strong. Slight damage, mainly to poorly constructed buildings
  5. 6.0-6.9 strong. Damage to a moderate number of well-built structures in populated areas
  6. 7.0-7.9 major. Causes damage to most buildings.
  7. 8.0-8.9 great. Major damage to buildings, structures likely destroyed
  8. >9.0 catastrophic. At or near total destruction

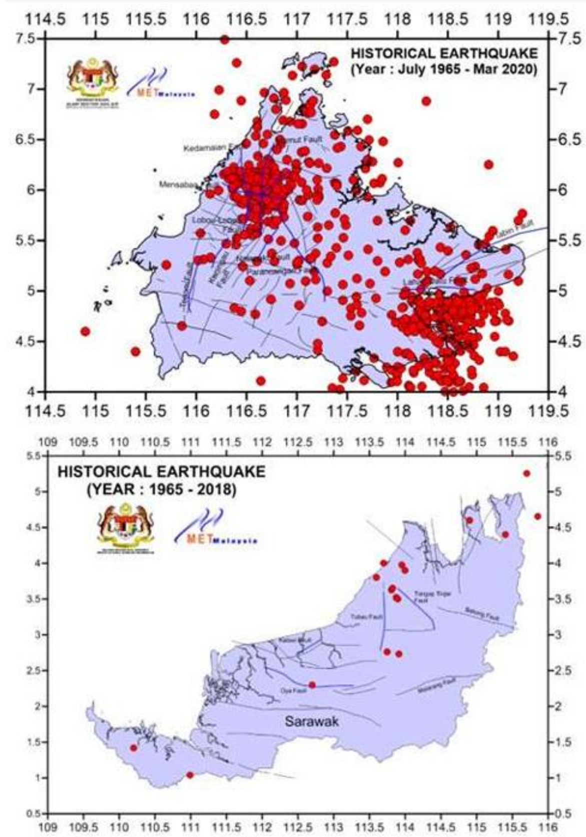
- **Recent & Historical Events**:
  - *Segamat, Johor (2025)* – magnitude 4.1, first recorded in that area.
  - *Ranau, Sabah (2015)* – magnitude 5.9–6.0, caused a lot of cracks and damages to buildings.

Fig 2: History of Earthquakes in Peninsular Malaysia



Source: Malaysia Meteorological Department

Fig 3: History of Earthquakes in Sabah and Sarawak



Source: Malaysia Meteorological Department

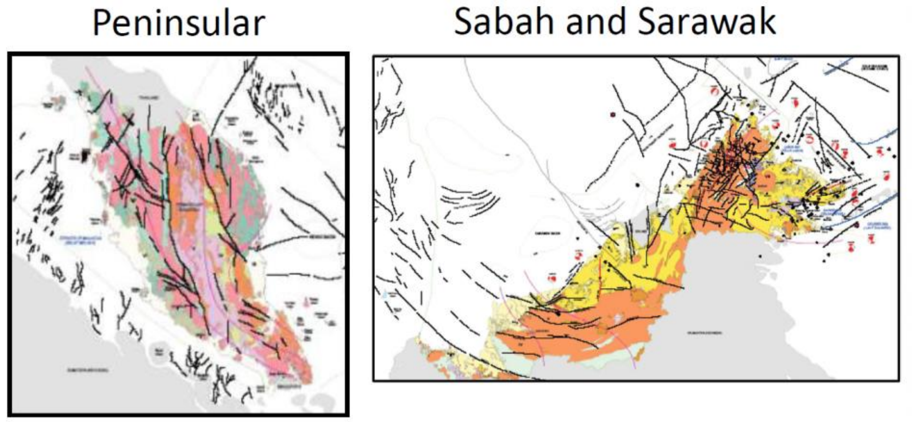
- **Future Outlook**:

  Potential earthquakes of higher intensity in time to come, though timing cannot be predicted.
  - Possible magnitude 6.0 in Peninsular (likely Bukit Tinggi, which is near KL).
  - Possible magnitude 7.0 in Sabah (especially Lahad Datu, Kudat).

- **Fault Lines & Hotspots**:

  There are many fault lines in Peninsular, Sabah and Sarawak, though not all are active. One example of inactive fault line is the Kuala Lumpur Fault Line, which runs beneath the KL City. Active fault areas/hotspots in Peninsular include:
  - Bukit Tinggi (Pahang), Kuala Pilah (N.S), Manjung (Perak), Temenggor (Perak), Tasik Kenyir (Trengganu).

Fig 4: Local Faults & Earthquake



Source: Webinar

- **Disaster Preparedness**

  There is growing awareness for disaster preparedness. Suggestions include:
  - Use of AI in earthquake monitoring and emergency response systems
  - Comprehensive study to assess structural resilience of older buildings, particularly critical facilities such as hospitals, schools and government offices
  - 2 more seismic stations to be built in Segamat

- **Regulations & Building Standards**:

  Malaysia has 2 levels of uniform building by-laws (UBBL): national (UBBL 1984) and local.
  - Local councils often lag in adopting national rules.
  - Seismic design codes were only introduced in 2017 (based on Eurocode 8). Prior to this, there was no specific guidelines governing the design of buildings.

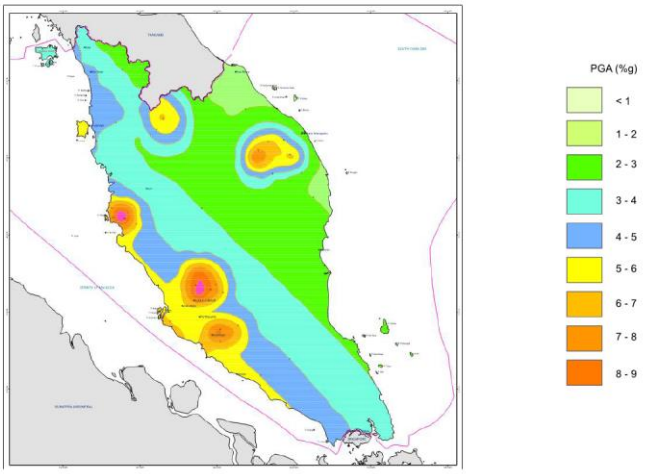
- **Cost to Property Developers for Seismic Compliance**

  - Additional seismic design adds ~5-10% to structural costs.
  - This outweighs the financial loss of subsequent repair/replacement in an earthquake event

- **Seismic Hazard Zones** (Zone 0 = lowest risk):

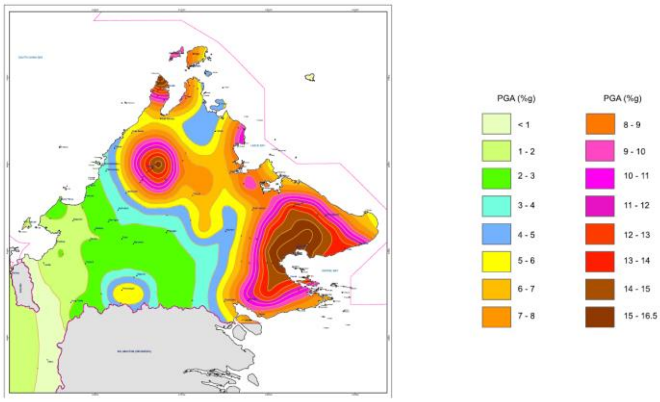
  90% of Peninsular and Sarawak fall within Zones 0 and 1 (<5 magnitude), without any special requirement for steel detailing. About 40% of the regions do not require to design for seismic. Sabah has a larger % (30%) in Zone 2.
  - Peninsular: 70% Zone 0, 25% Zone 1, 5% Zone 2+.
  - Sabah: 30% Zone 0, 40% Zone 1, 30% Zone 2+.
  - Sarawak: 70% Zone 0, 20% Zone 1, 10% Zone 2+.

Fig 5: Peninsular – Seismic Hazard Map (max PGA = 9.5%g)



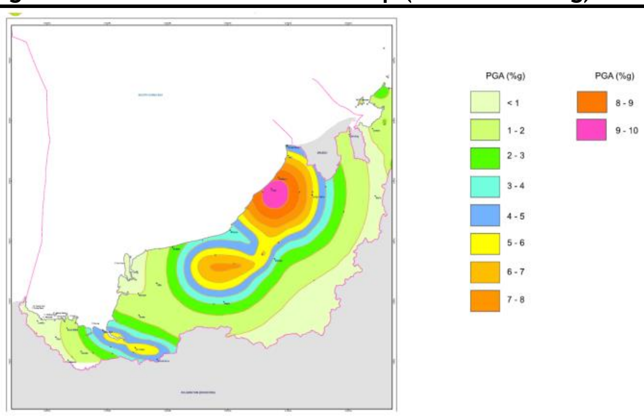
Source: Webinar

Fig 6: Sabah – Seismic Hazard Map (max PGA = 16.5%g)



Source: Webinar

Fig 7: Sarawak – Seismic Hazard Map (max PGA = 9%g)



Source: Webinar

- **Peak Ground Acceleration (PGA) Values**:

  PGA is the maximum acceleration experienced by an object on the ground during an earthquake, representing the intensity of shaking:
  - Peninsular: up to 9%g.
  - Sabah: up to 16.5%g (highest risk).
  - Sarawak: up to 9.5%g.

Fig 8: Earthquake impact on selected sectors

Sector	Comments	Potential beneficiaries
Construction (Overweight)	Construction companies are potential beneficiaries on potentially higher job orders as building owners spend a little more to make their buildings earthquake-resistant (if not already in practice). And in the unlikely event that an earthquake happens, construction companies may benefit from reconstruction and/or repair works too. *Yin Shao Yang* *samuel.y@maybank-ib.com*	**Gamuda** (GAM MK, BUY, CP: MYR5.53, TP: MYR6.17) **IJM Corp** (IJM MK, BUY, CP: MYR2.82, TP: MYR3.18) **Sunway Construction** (SCGB MK, BUY, CP: MYR6.05, TP: MYR6.72) **Cahya Mata Sarawak** (CMS MK, BUY, CP: MYR1.26, TP: MYR1.66)
Insurance (Overweight)	Insurance companies are potential beneficiaries from potential revenue upside, for greater awareness could prompt the general public/companies to seek out more comprehensive natural disaster coverage for their properties. Earthquake insurance coverage in Malaysia is usually not included in a standard policy, but more as an optional rider. as part of the coverage for natural disasters. For instance, basic fire/home insurance typically cover risks such as fire, lightning or gas explosions, whereas comprehensive fire or “all-in-home” packages would include earthquakes/volcanic eruption coverage under natural disaster perils. Strata buildings such as condos/apartments are typically insured under strata policies that include earthquake protection. For instance, Boost Bank offers a basic Fire & Flood Benefit plan for an annual premium of MYR93.48 for a sum insured of MYR25k. It offers a Comprehensive Fire Perils plan (which includes aircraft damage, earthquake and volcanic eruption, damage to insured’s own vehicle, riots/malicious damage and storms) for an annual premium of MYR209.28. Meanwhile for vehicles, general insurance companies do offer “special perils coverage” that covers all forms of natural disasters, for premiums ranging from 0.2%-0.5% of the sum insured of the vehicle. *Desmond Ch’ng* *desmond.chng@maybank-ib.com*	**Allianz** (ALLZ MK, BUY, CP: MYR18.38, TP: MYR23.05)
REIT (Overweight)	Seismic risk in Malaysia remains a low-probability event and is not currently priced into M-REIT valuations. While modern landmark assets such as KLCC, TRX and Merdeka 118 are expected to incorporate some earthquake risk in their designs and construction, it is unclear if much older high-rise properties built prior to the introduction of seismic design codes in 2017 have adequately factored in earthquake risk. If not, owners may face higher retrofit or insurance requirements over time if tremors recur (especially in KL and Johor) or regulatory enforcement tightens (on renovation submission), potentially adding to long-term opex or asset enhancement initiatives (AEI) needs (in the unlikely event of a severe earthquake). *Nur Farah Syifaa* *nurfarahsyifaa.mohamadfuad@maybank-ib.com*	
Healthcare (Overweight)	In an unlikely event earthquake happens, this may potentially drive sudden surges in patient volume for private hospital operators, particularly in trauma and emergency care. *Nur Natasha Ariza* *natashaariza.aizarizal@maybank-ib.com*	**IHH** (IHH MK, BUY, CP: MYR7.55, TP: MYR7.97) **KPJ Healthcare** (KPJ MK, BUY, CP: MYR2.75, TP: MYR3.00)

Source: Maybank IBG Research

About Professor Ir Azlan Adnan

Professor Ir Azlan Adnan is an expert in Earthquake Engineering. He is the honorary member of the Engineering Seismology and Earthquake Engineering Research (e-SEER) research group at UTM. He has published more than 200 technical and academic papers. Apart from research, he is actively involved in providing consultation for several megaprojects on seismic hazard and risk. He was involved in the National Seismic Design Code Committee of Malaysia and MESTECC Inter-Agency Committee on Earthquake and Tsunami. Recently, he received the Fulbright US-ASEAN Visiting Scholar Award for research on Seismic Risk and Monitoring of Bridges based at the University of Kentucky. Prof Ir Azlan has won several international and national awards for his outstanding invention. One of his novelty inventions is “Digital Triaxial Seismo Accelerograph Using Single Mass and Hall Sensors (SEER-SAG) which he won a gold medal in 2005 at the 33rd International Exhibition on New Techniques, Innovation and Product at Geneva, Switzerland. At the national level, he received several awards including the Malaysian Construction Industry Excellence Awards for the year 2005 and 2008 under the category R&D Project of the Year Award. He contributed his expertise to ASM by conducting a research study titled “Seismic and Tsunami Hazards and Risk Study (STHRS) in Malaysia” in the year 2006 to 2011. His contribution in this study contributed to the implementation of the Seismic Design Code of Malaysia in National Annex Eurocode 8, which was published in the year 2017.

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