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New code for safer buildings

JSM: Better design standards to make buildings quake resilient

By YUEN MEIKENG
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PETALING JAYA: A new design code to make buildings more resilient to tremors is expected to be ready later this year.

The proposed code, to be ready by October, will cover all buildings including condominiums, landed properties and commercial places, said the Department of Standards Malaysia (JSM).

"Currently, the technical details of the code are being ironed out by a working group," the JSM told *Sunday Star* recently.

The group comprises the Malaysian Meteorological Department, Minerals and Geoscience Department, Public Works Department (JKR), Institution of Engineers Malaysia (IEM), Sabah Housing and Real Estate Developers Association and other experts.

However, it is possible that the new standards may lead to higher construction costs, with the JSM estimating the increase to be about 5% to 10%.

> **"It isn't compulsory for all buildings to follow the code as it is up to the local authorities to decide on imposing the standards."**
>
> Department of Standards Malaysia (JSM)

"After the code is published, it isn't compulsory for all buildings to follow the code as it is up to the local authorities to decide on imposing the standards," said the JSM, which comes under the Science, Technology and Innovation Ministry.

IEM president Tan Yean Chin said the code could be used in all states in Malaysia but each state had the power to determine when to implement its application.

"Once the code is adopted by the local authorities, then all new buildings to be constructed will have to comply with it.

"As for existing buildings, it will be up to the owners' discretion to seek advice from professional engineers to assess whether such structures need to be upgraded or retrofitted to comply with the code," he added.

Tan said that while the code would increase the resistance of buildings to higher magnitudes of tremors, owners of existing buildings should not be overly concerned about their properties.

"Adopting the code is like adding new features to a car to further improve its safety.

"It doesn't mean that existing cars are unsafe without such features," he added.

While Malaysia has generally low seismic activity, it is still subject to tremors from earthquakes in neighbouring countries.

On Jan 16, residents in Penang and other areas on the west coast of the peninsula felt the ripples of a 5.6-magnitude earthquake that struck near Medan, Indonesia.

Sabah has recorded more major incidents, including a 6.0-magnitude local earthquake in Ranau which led to 18 deaths in June 2015.

It was reported that Malaysia was working on an earthquake design code by endorsing the Eurocode 8 to be incorporated into Malaysian standards.

Safer buildings in the works:
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SUNDAY STAR (FOCUS) : MUKA SURAT 16 & 17
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Safer buildings in the works

A new design code for buildings in Malaysia to better withstand tremors from earthquakes is expected to be ready by October this year.

Stories by YUEN MEIKENG
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WE may not be in the Pacific Ring of Fire, but let's face it – Malaysians are not immune to earthquakes.

Last month, a 5.6-magnitude earthquake struck near Medan, Indonesia. But its ripples reached Peninsular Malaysia where tremors were felt by residents in Penang and other areas.

In a more devastating event, a quake measuring 6.0 in magnitude rocked Ranau in Sabah, leading to the deaths of 18 people on June 5, 2015.

A year later in August, a three-second tremor sent residents, climbers and hotel guests scrambling when a 4.0-magnitude earthquake hit the area around Mount Kinabalu.

No major earthquakes have struck the peninsula so far but this doesn't mean it is spared.

Few will remember but in 2009, eight minor quakes were recorded in Bukit Tinggi, Pahang.

More vividly perhaps, those here may recall the tremors felt from the catastrophic 2004 Indian Ocean earthquake near Sumatra, Indonesia, which brought upon the tsunami.

Some Klang Valley folks literally felt the earth moved under their feet while others watched in disbelief as frames on walls swayed on their own.

Our authorities are leaving little to chance now.

New buildings will soon be able to better resist earthquakes and tremors with a design code for buildings currently being drafted to raise safety standards of structures.

The code is expected to be ready by October this year, reveals the Department of Standards Malaysia (JSM), which comes under the Science, Technology and Innovation Ministry.

"It will be applicable to all buildings including houses, commercial areas, landed properties and high-rise buildings.

"But for now, the finer details of the code are currently being deliberated by a working group," the JSM tells *Sunday Star*.

Such efforts are a timely development as more Malaysians are moving into condominiums and apartments, with about 30% of the urban population currently living in such high-rise buildings.

But while the code is a welcomed move to ensure the safety of the people, there is one downside – it could lead to more expensive properties.

"When the code is published, it isn't mandatory for all buildings to follow as it is up to the local authorities to impose such standards.

"But there is likely to be additional costs to make buildings more earthquake-resistant in line with the code.

"This could possibly raise construction costs by about 5% to 10%," the JSM estimates.

Among the features that can be incorporated to buildings to help it weather quakes are the use of reinforced concrete and seismic rubber bearings.

The group drafting the code comprises officials from relevant government agencies such as Malaysian Meteorological Department (MetMalaysia), Minerals and Geoscience Department, Public Works Department (JKR), Sabah Housing and Real Estate Developers Association, Institution of Engineers Malaysia (IEM), Association of Consulting Engineers Malaysia and other seismic experts.

One of the key points that needs to be ironed out is the Peak Ground Acceleration (PGA) value, which will ultimately determine how much ground movement a building can withstand in the event of a quake.

However, the JSM says determining the PGA value is quite a challenge as Malaysia lacks data on earthquakes, unlike its neighbours which have a longer history of such phenomena like the Philippines.

"With such limitations, it is tough for experts to come up with the value," explains the JSM.

Calling the quake in Ranau "a wake-up call for everybody," Science, Technology and Innovation Minister Datuk Seri Madius Tangau says he hopes to introduce the building code as soon as possible.

"Once we have an agreement among the experts, we can finalise the code. The code will have to be approved by the ministry first, just like all standards introduced in Malaysia.

"The only way consumers can feel safe is for us to have such standards.

"We have a job to do and we cannot compromise on safety," he assures, adding that MetMalaysia is closely monitoring the country's seismic activities.

Efforts to come up with the earthquake design code was reported by *StarMetro* in 2015, whereby the IEM had said the Eurocode 8 (EC8) is to be incorporated into Malaysian standards.

IEM president Tan Yean Chin says the design code is not to make buildings earthquake-proof as it would be very costly, but rather to increase resistance against tremors if it happens in future.

"Having earthquake-proof buildings is also unnecessary for a low seismic risk country like Malaysia," he says.

He explains that IEM and others in the working group, are coming up with a Malaysian National Annex to support the EC8, with design recommendations especially for new building structures, which will suit a low seismic risk zone like Malaysia.

"When the code is approved, each state has its own jurisdiction to determine when to adopt it. Once it is adopted, then all new buildings will have to follow the code.

"As for existing buildings, it will be up to the owners' discretion to seek advice from professional engineers to assess whether such structures need to be upgraded or retrofitted to comply with the code," Tan explains.

Fortunately, he assures that owners of present buildings shouldn't be overly concerned.

"To date, buildings in Malaysia, particularly in the peninsula and Sarawak are considered safe based on records over the past 100 years or more in terms of earthquakes," he says.

Despite some high-rise structures in the Klang Valley experiencing "swaying" from the 9.1-magnitude Indian Ocean earthquake in 2004, no structural damages were reported.

"This means that existing buildings are still safe after the incident. Therefore, adopting the new code is just like an added measure to improve safety," Tan says.

He says nobody can predict where and when the next earthquake will strike, even in a low seismic risk country like Malaysia.

Tan explains that tall buildings are more vulnerable to distant earthquakes because high rise structures have lower frequencies in vibration, resonating with the low frequency of seismic waves from distant earthquakes.

"As such, high rise buildings (exceeding 30m) in western Peninsular may be affected by tremors from distant earthquakes such as from Sumatra.

"On the other hand, such tall buildings can better withstand close-range earthquakes compared to shorter buildings.

"This is because the high frequency of vibration from the nearby quake will resonate closer with shorter buildings, causing more damage," he says.

Concurring with Tan, JKR civil and structural engineering branch senior director Kamaluddin Abdul Rashid says past records show that magnitudes of local earthquakes in Peninsular Malaysia are relatively low.

"If this continues, buildings designed in accordance with the existing Uniform Building By-laws 1984 are considered safe.

"It has been generally accepted by local structural engineers that the impact of seismic tremors from earthquakes in neighbouring regions on Malaysian buildings is not likely to be catastrophic," he says.

But in Sabah, Kamaluddin says, the local authorities are more cautious and have decided to include the requirements for seismic loads as a criteria before issuing planning permissions.

However, the issue of public safety in the event of earthquake is not confined to providing good building design alone.

"As building owners, we need to ensure that our buildings are well maintained and in good condition.

"A study by JKR found that the risk of building failure in an earthquake is significantly higher for ill-maintained buildings compared to well-maintained buildings that have not been designed according to seismic standards.

"Thus, it is money well spent to maintain buildings because they will better withstand earthquakes," Kamaluddin adds.

A quake look at the past

July 26, 1976
A 5.8-magnitude earthquake hit Lahad Datu, Sabah, leading to homes being severely damaged.

Dec 26, 2004
A devastating 9.1-magnitude earthquake struck in the Indian Ocean, off the west coast of Sumatra, Indonesia, triggering tsunamis and killing over 230,000 people in 14 countries. In Malaysia, northern coastal areas like Penang were also hit by the tsunami while others in the Peninsular felt tremors, with reported incidents of furniture shaking and so on.

April 11, 2012
An 8.6-magnitude quake off Sumatra, Indonesia caused a tsunami warning to be issued. Tremors were felt all over Peninsular Malaysia. People in several shopping malls in Penang and the main government hospital in Kuantan were ordered to evacuate the buildings.

Oct 8, 2009
Eight minor earthquakes occurred at Bukit Tinggi, Pahang between 4.45am and 12.05pm.

The situation in Sabah

- Malaysia is categorised as a **country with relatively low seismicity,** except for Sabah where earthquakes of local origin are known to occur.
- Sabah is **located on the south-eastern Eurasian Plate,** bordered by the Philippine Plate and the Pacific Plate.
- **Low to moderate seismic activities** occur in Sabah because of the interaction between the three plates and several active fault lines.
- **A total of 182 earthquakes,** with magnitudes ranging between 2.9 to 6.0, were recorded in Sabah between 1900 and 2016.

Sources: Science, Technology and Innovation Ministry and others

June 5, 2015
Mount Kinabalu in Sabah and the surrounding areas, including Ranau, were jolted by a series of earthquakes, with the first measuring 6.0. The incident killed 18 climbers, including four mountain guides. To date, it is the strongest quake recorded in Malaysia.

March 2, 2016
A 7.9-magnitude earthquake hit west of Sumatra, Indonesia, leading to a tsunami warning which was later called off for Indonesia and Australia. In Malaysia, tremors were felt in Johor, Selangor and Kelantan.

Aug 26, 2016
A three-second tremor sent residents, climbers and hotel guests into a panic when a 4.0-magnitude earthquake hit the Mount Kinabalu area, some 16km west of Ranau.

Jan 16, 2017
A 5.6-magnitude earthquake struck near Medan, Indonesia. Residents in Penang and other areas in Peninsular Malaysia felt tremors from the incident.

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Lelaki ditahan, curi dan jual bahan radioaktif

SHAH ALAM: Beberapa bahan radioaktif yang dipercayai dicuri daripada sebuah syarikat berkaitan cari gali minyak ditemui di dua lokasi di Klang dan Shah Alam, semalam.

Dalam kejadian petang dan malam semalam, bahan berkenaan ditemui di satu premis kedai barang lusuh di Klang sebelum siasatan membawa polis ke sebuah pangsapuri di Seksyen 36, di sini. Bahan radioktif berkenaan dipercayai Iridium 192, dikatakan dicuri daripada cawangan syarikat berkenaan di Klang awal minggu ini sebelum laporan polis mengenainya dibuat.

Sumber memaklumkan, polis dan pakar nuklear dari **Lembaga Pelesenan Tenaga Atom (AELB) Malaysia** menjalankan operasi bersama di kedua-dua premis berkenaan semalam untuk mendapatkan semula bahan berkenaan. Katanya, pasukan berkenaan berjaya menemui bahan berkenaan di sebuah kedai barang lusuh di Klang dan merampasnya.

"Polis kemudian berjaya mengenal pasti individu yang menjual bahan berkenaan kepada penjual barang lusuh berkenaan sebelum mereka ke sebuah unit rumah di sebuah pangsapuri di Seksyen 36 kira-kira jam 8.30 malam tadi dan menahan seorang lelaki," katanya.

Pasukan berkenaan menemui beberapa lagi bahan radioaktif dalam kebuk simpanannya dalam sebuah stor berhampiran rumah sewa suspek. Sementara itu, Ketua Polis Daerah Klang Selatan, Asisten Komisioner Alzafny Ahmad, ketika dihubungi mengesahkan kejadian itu dan memaklumkan beberapa individu sudah ditahan untuk membantu siasatan. "Ia bahan yang berbahaya kalau ia bocor kerana ada radiasi. Kes ini masih lagi dalam siasatan," katanya.

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Curi Bahan Radioaktif

Shah Alam: Polis menemui beberapa bahan radioaktif yang dipercayai dicuri daripada syarikat berkaitan cari gali minyak di dua lokasi di sekitar daerah ini dan Klang, semalam.

Bahan dipercayai Iridium 192 itu dicuri daripada cawangan syarikat berkenaan di Klang, awal minggu ini, sebelum laporan polis dibuat untuk tindakan lanjut.

Sumber polis berkata, bahan itu ditemui di sebuah premis barang lusuh di Klang, petang semalam, sebelum siasatan membawa ke sebuah pangsapuri di Seksyen 36, di sini.

"Operasi dijalankan oleh polis dan pakar nuklear dari **Lembaga Pelesenan Tenaga Atom (AELB) Malaysia** di dua premis itu untuk mendapatkan semula bahan berkenaan.

"Selain berjaya menemuinya, polis turut mengenal pasti individu yang menjual bahan itu kepada penjual barang lusuh berkenaan berkenaan," katanya.

Sementara itu, Ketua Polis Daerah Klang Selatan Asisten Komisioner Alzafny Ahmad mengesahkan kejadian itu dan berkata beberapa individu ditahan bagi membantu siasatan.

"Ia bahan yang mempunyai radiasi dan yang amat berbahaya sekiranya bocor. Kes itu bagaimanapun masih dalam siasatan," katanya memaklumkan sidang media mengenainya akan dibuat bersama AELB, pagi esok.