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Hebahan koleksi keratan akhbar terpilih untuk makluman dan rujukan.

1.	TAJUK	ZON BATU KAPUR BAGAIKAN 'BOM JANGKA'
	SUMBER	BERITA HARIAN
	BIDANG PERKARA/SUBJEK	ALAM SEKITAR
	MUKA SURAT/RUANGAN	MUKA DEPAN, 3 (NASIONAL)

Zon batu kapur bagaikan 'bom jangka'

Eksklusif

Sekurang-kurangnya lima zon batu kapur berkeluasan ratusan ribu hektar di negara ini dipercayai tidak stabil sehingga membawa risiko batuan runtuh jika pembinaan kediaman dan infrastruktur kekal terus dibenarkan di lokasi berkenaan. Pakar mendedahkan pergerakan minimum walaupun hanya dua milimeter boleh menyebabkan runtuhannya yang mengancam nyawa.

Oleh Suzalina Halid → Nasional 3



5 zon batu kapur tak stabil, berisiko berlaku runtuhannya

Pembangunan tanpa kawalan ketat dijadikan kawasan bagi bom jangka

Oleh Suzalina Halid
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Kuala Lumpur: Sekurang-kurangnya lima zon batu kapur berkeluasan ratusan ribu hektar di negara ini dipercayai tidak stabil sehingga boleh mengundang risiko batuan runtuh sekiranya pihak berkuasa terus membolehkan pembinaan kediaman dan infrastruktur kekal, termasuk tempat rekreasi.

Ini kerana landskap formasi batu kapur sering terdedah kepada pergerakan struktur dan sebarang pergerakan minimum walaupun hanya membahayakan dua milimeter (mm), berisiko menyumbang kepada insiden runtuhannya yang boleh mengancam nyawa.

Pakar keselamatan landskap batu kapur, Dotak Zakaria Mohamed mendedahkan, beberapa kawasan bukit kapur di negara ini diklasifikasikan sebagai zon berisiko tinggi dengan ancaman runtuhannya yang boleh mengancam nyawa.

Selain itu, insiden batuan runtuh juga diklasifikasikan sebagai zon berisiko tinggi di Taman Negara Gunung Mulu, Sarawak; Geopark Langkawi, Kedah; Gunung Kanthan di Lembah Kinis, Perak dan Batu Caves di Gombak, Selangor.

Insiden batuan runtuh yang berlaku di Park Cave Temple pada 12 Januari 2009, mengakibatkan seorang mangsa dan dua cedera.

Jatuh batuan membahayakan lebih ratusan yang besar sekitar 25,000 tan berlaku di Gunung Cherbok, menyebabkan 12 kematian dan kesakitan ramai, kediaman dan rumah kedai berdekatan pada 18 Oktober 1975.

Zakaria yang juga bekas Pengarah Lembaga Ahli Geologi Malaysia (LAGM) dan Pengarah

Eksklusif

"Walaupun landskap batu kapur memaparkan kecantikan alam, ia membawa risiko yang besar untuk tempat kediaman berciri kekal. Ini kerana ciri berpori, satah retakan, sejar dan lerat batu kapur boleh menyebabkan pembentukan rongga bawah tanah, mencipta zon yang tidak stabil untuk struktur."

"Sehubungan itu, pihak berkuasa tempatan (PBT) harus mengutamakan peraturan mengenai penempatan kekal di sekitar kawasan ini," katanya kepada BH.

Antara landskap batu kapur yang dikenali di negara ini ialah Taman Negara Gunung Mulu, Sarawak; Geopark Langkawi, Kedah; Gunung Kanthan di Lembah Kinis, Perak dan Batu Caves di Gombak, Selangor.

Eksekutif Geomapping Technology berkata, beberapa insiden di kawasan batu kapur menunjukkan keperluan penyelidikan berterusan dan kemajuan dalam hal geologi.

Beliau berkata, ia penting untuk menyumbang kepada pemahaman ialah baik mengenai formasi batu kapur sebagai gun membantu dalam pembangunan strategi untuk mengurangkan risiko yang mungkin timbul dan memastikan keselamatan komuniti.

Katanya, selain itu ciri geologi untuk landskap batu kapur menyumbang kepada pembentukan sistem gun yang rumit, turut menyumbang kepada bahaya tanah runtuh.

"Sifat dinamik struktur batu kapur yang rentan terhadap ha-



Bukit batu kapur Gunung Kanthan di Chempur, Perak.



Zakaria Mohamed

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Batu Kapur

- Landskap batu kapur adalah formasi geologi yang unik dibentuk oleh pengaliran bahan larut, terutamanya terdiri daripada kalsium karbonat.
- Ciri utama landskap batu kapur terletak pada topografi kananya, yang berlaku akibat pengaliran batuan larut oleh asid semula jadi, biasanya asid karbonat yang terbentuk melalui interaksi air dengan karbon dioksida di atmosfera.
- Landskap karst ini terbentuk kerana batu kapur yang dibentuk oleh mineral berkapur (CaCO₃) atau disebut juga mineral karbonat yang mudah larut apabila terdedah kepada air yang mengandungi asid lemah atau air hujan beracid lemah.
- Proses ini mencipta pelbagai bentuk alam semesta, antaranya rongga, lubang runtuh, lurah dan puncak tajam (pinnacles/penes), gua dan sungai bawah tanah.
- Formasi batu kapur sering menunjukkan ciri permukaan yang unik, bereragam, atau kadang-kadang terdapat lereng batu kapur yang memegak, menyumbang kepada kemunculan persekitaran geologi ini.
- Sifat berpori batu kapur akibat sistem satah retakan dan sejar batuan juga mempengaruhi saliran air, menyebabkan pembentukan sistem saliran bawah tanah dan menyumbang kepada penciptaan landskap yang menarik.

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Rangkaian bukit batu kapur di Kemuning Padi, Seremban, Negeri Sembilan. (Foto: i-Media/Agensi)

2.	TAJUK	PROSES KERJA KAPAL DISYAKI PUNCA MINYAK TUMPAH
	SUMBER	BERITA HARIAN
	BIDANG PERKARA/SUBJEK	ALAM SEKITAR
	MUKA SURAT/RUANGAN	17 (NASIONAL)

Proses kerja kapal disyaki punca minyak tumpah

Pencemaran di jeti nelayan Nam Heng sejak Jumaat lalu

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Ulu Tiram: Proses kerja fizikal kapal disyaki sebagai punca berlakunya tumpahan minyak di sekitar jeti nelayan Nam Heng di Sungai Tiram, dalam kawasan perairan Sungai Johor, di sini. Pengarah Jabatan Alam Sekitar (JAS) Johor, Dr Mohd Famey Yusoff, berkata masalah pencemaran ter-

babit sebelum itu disedari oleh nelayan di situ sejak Jumaat lalu.

Katanya, nelayan berkenaan mendakwa kapal dalam proses kerja-kerja fizikal sebagai punca minyak mengalir ke kawasan jeti berkenaan.

"Pasukan Penguat kuasa Jabatan Alam Sekitar Negeri Johor menjalankan siasatan di lokasi yang diduduki semalam (kelmarin) dan mengenal pasti kewujudan minyak di kawasan sekitar jeti.

"Bagaimanapun tiada pekerja yang bekerja di premis itu. Arahannya sudah dikeluarkan kepada pihak bertanggungjawab terhadap kapal itu untuk menjalankan kerja-kerja pembersihan mi-

nyak di kapal dan sekitar kawasan terkesan dengan minyak," katanya ketika dihubungi semalam.

Usah buang sisa

Sebelum ini tular di media sosial beberapa keping gambar menunjukkan air berminyak kuning kehitaman di sebuah kawasan jeti nelayan di Sungai Tiram.

Dr Famey mengingatkan semua pihak yang terbabit dengan aktiviti perkapalan di negeri ini agar tidak sesuka hati melakukan pembuangan atau pelepasan sisa minyak ke kawasan perairan.

Katanya, ia menjadi satu kesalahan mengikut seksyen berkaitan di bawah Akta Kualiti Alam Sekeliling 1974.



Pasukan penguat kuasa JAS Johor memeriksa keadaan air di Jeti Nam Heng di Sungai Tiram, perairan Sungai Johor yang dipenuhi minyak, di Ulu Tiram, semalam. (Foto ihsan JAS)



3.	TAJUK	'SET UP AGENCY FOR SLOPE ENGINEERING'
	SUMBER	NEWS STRAITS TIMES
	BIDANG PERKARA/SUBJEK	ENVIRONMENT
	MUKA SURAT/RUANGAN	4 & 5 (NEWS/NATION)

'SET UP AGENCY FOR SLOPE ENGINEERING'

Experts say this agency can help local authorities identify landslide hotspots and draw up mitigation measures

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RECENT landslides in residential areas have prompted experts to call on the government to establish a centralised federal agency for slope engineering.

The agency, they said, can assist local authorities in identifying landslide-prone areas and draw up mitigation measures to prevent future and recurring landslides.

Geotechnical experts have also said that Malaysia is at risk of experiencing more landslides due to climate change and development projects.

Datuk Dr Gue See Sew, chief executive officer of engineering consultancy G&P Professionals, said a centralised agency is crucial due to the lack of geotechnical experts for the 149 local authorities in Malaysia.

"The agency can offer support to local councils in terms of risk assessment, technical expertise, policy review and guidelines.

"They would not only provide technical support, but also streamline and standardise the assessment and reinforcement processes in all councils.

"Climate change, particularly increased rainfall intensity, could increase the frequency of landslides.

"In addition, the risk of landslides is heightened during the monsoon season," he told the *New Straits Times*.

Gue said the urgency stems from the risks associated with soft soil, weak gradients, and inadequate stability measures — all factors that contribute to landslides.

He said manmade factors, such as improper development and cutting of slopes, could also contribute to instability.

"Slope stability depends on the geometry, material and water. You cannot attribute landslides to a single factor.

"There is a threshold for when a slope is deemed unsafe for development.

"This is why local authorities must be provided with geotechnical experts from a centralised agency to assist with data collection and inspections on slopes."

His remarks came on the heels of a series of landslides, the latest being in Jalan Wawasan 3/9 Taman Wawasan, Puchong, Serdang, which led to nine houses being evacuated on Dec 16.

On Nov 25, a 30m landslide occurred at a slope near the Taman Cheras Mas apartments, Cheras, while on June 27, a landslide hit Section 45 of Jalan Simpang Pulai-Blue Valley in Ipoh, Perak.

Gue said the National Slope Master Plan 2009-2023 had proposed the establishment of such an agency in 2014.

However, the proposal was never tabled in Parliament.

The Public Works Department's (PWD) Slope Engineering Agency (SEA) was planned to mature into a full-fledged independent body but never came to fruition, Gue said.

"The SEA serves the PWD and it sometimes helps other departments in certain aspects, but is not tied to them.

"So we need a dedicated agency that works under a ministry that is involved with local authorities.

"The Housing and Local Government Ministry is the suitable candidate.



Workers at an Indah Water Konsortium waste treatment plant observing damage to the premises due to a landslide in Taman Wawasan, Puchong, on Dec 16. PIC BY AZUDDIN SAAD



A 30m landslide destroyed part of a slope near the Taman Cheras Mas apartments on Nov 25. PIC COURTESY OF THE FIRE AND RESCUE DEPARTMENT

"We are in 2024 and there has yet to be light shed on this matter.

"I hope the Prime Minister (Datuk Seri Anwar Ibrahim) can consider it (centralised agency).

"Are we waiting for another tragedy to occur before we consider measures that must be taken?"

He said Malaysia could take a page from Hong Kong's Geotechnical Engineering Office (GEO), an organisation responsible for geotechnical engineering activities related to the safe and economic utilisation and development of land.

"Hong Kong's GEO serves as an effective role model for slope management."

He said GEO's roles included maintaining and updating a catalogue of slopes, as well using a computerised slope information system for analysis.

Another role involves managing consultants to conduct

geotechnical studies on private manmade slopes.

These studies identify potentially substandard features, leading to follow-up actions such as advisory letters or dangerous hillside orders issued by the Buildings Department based on GEO's recommendations.

The studies prioritise actions according to a ranked priority order and may address features on an area basis.

Gue said a centralised agency can also work with the National Physical Planning Council (NPPC) on project approvals.

He said while other agencies might focus on the condition of hills or slopes, the NPPC could take a broader approach, considering the overall suitability of a development.

"There would not be any sort of duty overlap, because the centralised agency focuses on the soil condition of the hill or slope, the technical aspects, as men-

AT A GLANCE: SLOPE STATS

- A 2021 circular by the then-Housing and Local Government Ministry on slope management shows that based on information from 95 local councils, there are 837 slopes nationwide up to December 2020.

- The states with the highest number of slopes are Selangor, Pahang, and Negri Sembilan.

- Of this total, about 35 per cent, or 292 slopes, have a history of slope failure.

- An online survey by the ministry shows that 41 out of 154 local councils have incomprehensive slope management systems.

- Among the issues identified are 49 per cent of local councils do not have governance structures and technical expertise to manage slope-related issues or landslides in their areas.

- Eighty-one per cent of local councils do not conduct slope maintenance, and 70 per cent do not have a database for collecting slope information/registration. Forty-one per cent of councils, meanwhile, lack awareness / understanding of slope guidelines.

INFOGRAPHIC: NET

tioned before.

"I believe the NPPC focuses on comprehensive planning rather than intricate engineering details, leaving technical aspects to local councils."

He said the government must focus on preventive actions because more landslides could be expected if there is no concerted effort to mitigate risks.

"As Malaysia faces the threat of landslides, the creation of a dedicated agency becomes not just a recommendation but also an urgent necessity."

DORMANT SLOPES CAN STILL POSE DANGER, SAYS EXPERT

With climate change, Malaysia must focus on an appropriate disaster management plan

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An expert has cautioned that landslides could even occur from slopes which had previously no signs of damage.

Dr Nor Shahidah Mohd Nazer, an expert in geological engineering and soil mechanics at Universiti Kebangsaan Malaysia, said inactive slopes do not stay that way forever.

"In general, all higher areas are landslide-prone. Old dormant slopes are where a landslide had already occurred and are in an inactive state with no sign of re-activation.

"However, this does not mean that they are inactive forever. Climate change and the increase in rainfall are causing some old dormant landslides to reactivate, and we (experts) should take a closer look into this matter," she told the *New Straits Times*.

Shahidah said landslides were caused by geological and geomorphological aspects of a slope, while the triggering factors were usually caused by human activity.

"For example, in urban areas where slopes have been devel-



The landslide at a camping site in Batang Kali, Selangor, on Dec 14, 2022, killed 31 people. FILE PIC

oped to solve the problem of land scarcity, the risk of soil slip-page increases as the slope is constantly exposed to soil erosion in its natural environment due to the gravity of the earth's material.

"To make matters worse, some slopes are left without proper stabilisation or monitoring by the authorities, making them prone to soil movement," she said.

Shahidah added that the severity of Malaysia's landslide issue

depends on the quality of the monitoring system, slope stabilisation measures and development planning.

"With the increasing extremes of climate change, it is best if we can minimise slope development and focus on the existing slopes with an appropriate disaster management plan and strategies."

She concurred with the idea of having a centralised agency to co-ordinate slope monitoring and

management among local councils.

"I think this is a good idea, especially to reduce redundancies between agencies and departments to promote national coordination for slope investigation and mitigation by considering both the geotechnical and engineering geological aspects of the slope."

She said slopes classified as high-risk need to be stabilised by applying some grey techniques to certain parts of the slope body.

"A retaining wall is one of the most popular measures designed by engineers, taking into account the geological information of the slope by geologists to ensure that the factor of safety (FoS) of the slope is increased to the value as per Public Works Department standards.

"The types of retaining walls range from simple gabion walls or rubble walls to gravity walls, like crib walls or reinforced earth walls, where the soil is reinforced with geogrids or geotextiles.

"Reinforcement is possible on slopes that have been developed, but it is often associated with problems in terms of soil and overburden complexity and is more expensive," she said.



The site of a landslide at Jalan Wawasan, Puchong, on Dec 16 last year. PIC BY ASWADI ALIAS



Dr Nor Shahidah Mohd Nazer

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