

PRIME NEWS

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Early warning system on unsafe slopes

IN DEVELOPMENT:

System categorises slopes and sends out alerts to road users, authorities

KUALA LUMPUR

THOSE plying routes where they could be exposed to life-threatening mudslides or debris flows can expect a heads up on any impending risks, as efforts are under way for the implementation of a multi-faceted warning system.

Geological experts who have been working closely with the government in establishing the system said the move could be initiated after gathering data on risky zones in the country.

Authorities are, at present, collating data on the hazards and risks of slopes through a mapping process using Light Detection and Ranging (LiDAR) technology, a remote sensing technology that measures distance by illuminating a target with a laser and analysing the reflected light to develop the public warning system.

Universiti Kebangsaan Malaysia Engineering Geology and Structural Geology associate professor Dr Tajul Anuar Jamaluddin said the slope hazard and risk mapping project, which was proposed to the authorities several years ago, was part of the process in developing the alert warning system.

Works Minister Datuk Seri Fadillah Yusof confirmed the development of the system.

He told the *New Straits Times* last night that the ministry expected the system to be ready in two years.

"We have to ensure that the warnings are at least 85 per cent accurate because we do not want to lose public confidence if false alerts are sent out.

"In order to get this level of accuracy, we need a lot of data, accurate rainfall reading and events of mudslides. We are working with the Malaysian Meteorological Department and Department of Irrigation and Drainage to share their rainfall data."

"There is also the issue of the correlation in one region being not applicable to another. The model has to be fine-tuned to other areas," Fadillah said, adding that the ministry had done hazard assessments on most slopes along the major federal roads in the peninsula, Sabah and Sarawak.

Risks posed by the slopes assessed are categorised as very high, high, medium, low and very low, depending on relevant engineering data and mudslide statistics.

Fadillah said for now, slopes that showed signs of instability but were too costly to repair were being monitored for movements in real time, and warnings would be immediately given out to the district and Public Works Department (PWD) and its slope engineering division.

"We have a standard operating procedure in which the district and state PWD, together with the police, will be mobilised once movements hit a threshold level," he said, adding that the ministry was carrying out a study along the Tapah-Cameron Highlands route to establish a correlation between rainfall and mudslides, in order to provide an effective warning system.

Tajul, in explaining how the system would work, said such systems were widely used in countries including Japan and Switzerland.

He said the system would trigger an alarm when a sensor, placed at areas marked as risky, picked up on earth movements.

"Debris flow usually causes vibrations, which will trigger the alarm system. This will enable the population in the areas concerned to react accordingly.

"For mudslide-prone areas, sensors would usually be placed in the cracks of slopes to detect movement."

The system should also be able to



Transport Minister **Datuk Seri Liow Tiong Lai** surveying the site of the mudslide at Km52.4 of the Karak Highway yesterday. Pix by Abdullah Yusof and Ghazali Kori

Cabinet appoints Fadillah to lead team

BENTONG: Works Minister Datuk Seri Fadillah Yusof has been appointed as spokesman for the Karak Highway mudslide.

The decision was made at a cabinet meeting yesterday, said Bentong member of parliament and Transport Minister Datuk Seri Liow Tiong Lai.

"He is the right person for the job since Fadillah helms the Works Ministry, which is in charge of assessing safety in the area affected by the mudslide.

"Slope, drainage and irrigation experts have been deployed to assess the safety of the highway and adjacent rivers and streams near trunk roads.

"The Public Works Ministry is also working to stabilise all slopes along the trunk road between KL and Bentong," he said after visiting the site.

Liow said the highway was an important route connecting the East Coast.

"While it should be reopened as soon as possible, the safety of road users is also important."

He had earlier surveyed the affected site in the rain before being briefed by representatives from the Malaysian Highway Authority and highway concessionaire Anih Bhd.

Liow said 30 families were affected by the incident. Of the 30, 15 are from the Pahang Forestry De-

partment quarters, near the site.

The department is looking at re-locating the families to other vacant quarters soon. They are being sheltered at a mosque in Lentang here.

Lentang forestry officer Saiful Azmi Mat Aazid said the department had three quarters in Bentong, including the one affected by the mudslide.

"We are working with our counterparts in other states, including Negri Sembilan, Selangor and Pahang, as well as the Fire and Rescue Department, to clean and renovate vacant units before relocating the victims," he said when met at the shelter yesterday.

predict the dangers that a certain amount of rainfall could pose, he said, adding that highway concessionaires should not limit their risk assessments to their highways, but must expand them to the surroundings, including nearby slopes.

Tajul said highway concessionaires could play a role to ensure the effective dissemination of any alerts.

A system that could be applied in this instance, he said, included a party monitoring the risks and alerting the highway concessionaire of any impending mudslides. The concessionaires could then take precautionary measures, including blocking access to the routes at risk.

Also doable are beacon lights, like those attached to tall structures, that will be visible to road users when they are triggered to warn of an impending mudslide.

"The warning system could also enable the authorities and the public to react before anything untoward happens, as in some cases, the trigger would come at the first sign of a potential earth mass caving in.

"Usually, there would be a certain length of time before the earth comes sliding down," Tajul said.

On feasible mitigation methods, he said building debris-flow barriers would help in trapping debris

from rolling downhill, including onto highways.

"Many countries, including Indonesia, Hong Kong and Japan, use this method.

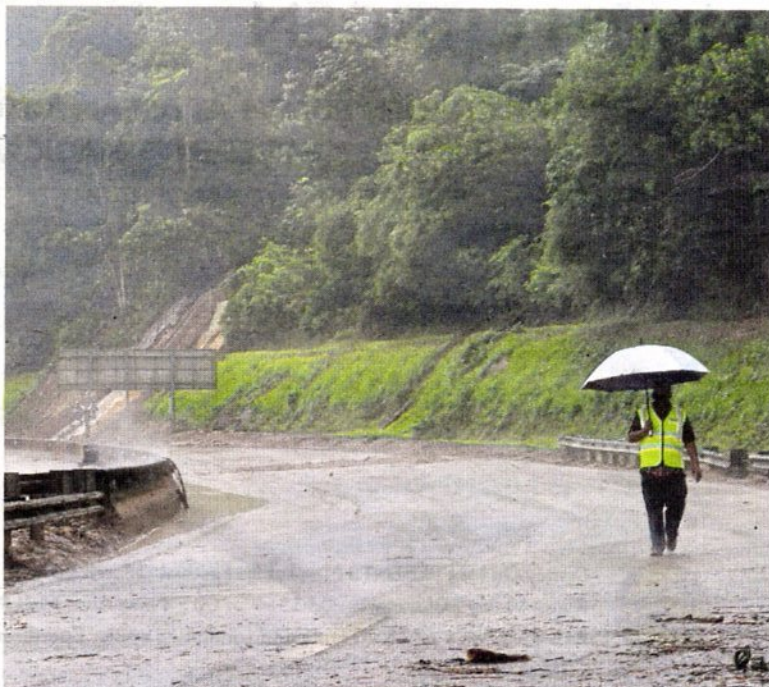
"It is basically a net, but it has to be well maintained or it could turn into a temporary dam and create greater problems in the future," he said.

Another option, he said, was the

use of a Sabo Dam — a concrete dam system used in trapping debris.

"A Sabo Dam could be installed in high-risk locations in order to reduce the kinetic energy of flowing debris to minimise damage to areas they pass through.

"The North-South Highway uses this dam system at some stretches, including in Jelapang and Muar."



A man in a safety vest **surveying the site of the mudslide** at Km52.4 of the Karak Highway in the pouring rain yesterday.