

City Talk

LANDSLIDES SHOW WE'VE LEARNED FROM THE PAST

A few landslides over the past few months amid torrential rain might have caused concern among the people of Hong Kong, but I can assure you that, if you examine the statistics over the years, we were able to escape serious damage and casualties due to our effective system of slope stability control.

Some of us might remember the catastrophic landslides of June 18, 1972, when 140 lives were lost and many buildings collapsed, including those in Sau Mau Ping and Kotewall Road.

The 24-hour rainfall recorded then was about 200 millimeters. Compared to June 7, 2008, when 300 mm of rainfall befell us in a day, there were some 360 landslides but only two casualties.

Compared to these two infamous days in Hong Kong's history, this September 8's deluge, when 600 mm rain was seen over a 24-hour period, resulted in 190 landslides but no direct casualties from them. Many roads were blocked but most of them could be fully or partially reopened within 48 hours.

I would call that good progress.

This result is not pure good fortune, but hard work on the part of the departments in our government.

Following the 1970s catastrophes, it established the Geotechnical Engineering Office in 1977, as recommended by the independent review panel set up following the Sau Mau Ping landslide, with the main purpose of ensuring slope safety.

It focused on three strategies: containing risk from new developments; reducing risks imposed on existing ones; and minimizing landslide consequences.

It catalogued a comprehensive list of slopes, which is believed to be the largest database of its kind in the world.

The list contains more than 60,000 manmade slopes, of which about 20,000 are under private responsibility. They are all accessible at the Hong Kong Slope Safety website.

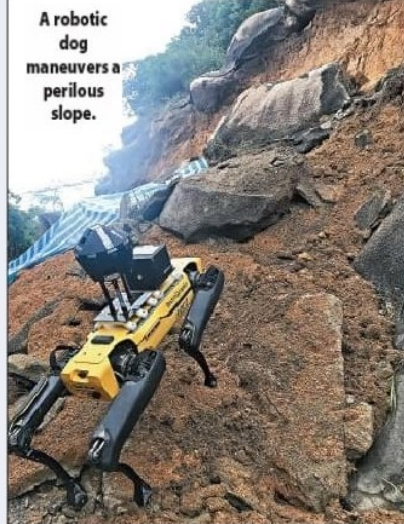
The landslip prevention and mitigation program promotes upgrading of substandard manmade slopes to current safety standards.

Risks from natural hillsides have also been mitigated to ensure public safety, and a continuous program, with an annual budget of HK\$1 billion, ensures the overall landslide risk is kept at a reasonably low and practicable level.

Measures include cutting slopes to

Nuts and bolts

Edmund Leung



A robotic dog maneuvers a perilous slope.

less acute angles to improve natural stability, installing soil nails to reinforce slopes and erecting retaining walls to provide extra protection and stability to soil.

Engineering studies are used to find out the most effective method of control.

With the availability of AI technology, firstly, IoT enables a digital twin model of some critical slope stabilization measures provides real-time monitoring.

An example of this is the Po Shan area hillside near the Po Shan Drainage Tunnel. Remote sensing technology, using airborne Lidar surveys, builds a cloud model of the terrain to facilitate further data processing.

Robotic dogs, equipped with high-def cameras and Lidar sensors, can traverse landslide sites and other harsh environments hazardous to humans to conduct inspections and data collection of failed slopes.

I said in my earlier article that landslides are natural occurrences. Water saturation in soil reduces friction and eventually some part of the soil mass may slip down the slope. But with the effective catalogue, timely improvement works and other management methods and control, the Geotechnical Engineering Office is like our sentinel, protecting us and maintaining safety for all.

We owe it to this professional team who guards our safety in inclement weather, and hope landslide occurrence will become fewer with time.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over features of modern life