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Dear Editor

A System for Slope Safety in Hong Kong

Mr Jake van der Kamp published in your paper on August 12, 2012, his views on the Government's efforts on slope safety. We thank him for his interest in the subject and wish to share the following.

Slope safety system

Over the past 35 years, the slope safety effort in Hong Kong has evolved into a system that comprises three key components. The first is geotechnical control to contain the landslide risk from new developments. This covers both private and public projects over the whole territory and tackles landslide hazards at natural hillsides. Second, for developments completed before the introduction of geotechnical control, work is carried out to identify and mitigate potential hazards. Mr van der Kamp has focused his comments on this component of the system. Third, there is the collection of measures to reduce potential consequences of landslides, among which rehousing squatters has been an important element. Probably more well known to the public is the Government's effort to share slope-related information and knowledge with the community. The slope safety website (<http://hkss.cedd.gov.hk/hkss/eng/index.aspx>) is an example of such effort.

Use of soil nails

Mr van der Kamp suggested that shotcreted slopes "need to be redone with concrete nails" and other measures. Since the late 1990s soil -nailing has been the most common engineering solution to upgrade cut slopes in Hong Kong. In this method, steel reinforcement bars are grouted into the ground to stabilise the soil mass. Compared with other engineering schemes,

the soil-nailing works are more tolerant of uncertainties of the ground and hence less likely to fail. Slopes upgraded before then may not have enjoyed the benefit of the soil-nailing technique and may rely on a shotcrete cover in part for stability. We are indeed returning to these slopes to improve them using soil nails where needed.

Use of shotcrete

It is our policy to make upgraded slopes look as natural as possible and that vegetation should be used as the primary surface protection for all soil-nailed slopes whenever possible. Shotcrete is sometimes required due to the steepness of the slope face, to provide surface protection against erosion and shallow failures. Shotcrete is also sometimes requested by occupants of buildings at the base of a slope. Where shotcrete has to be used, existing trees are kept and the slope surface appearance is improved with measures such as the planting of creeper plants.

Apart from being used in slope upgrading works, shotcreting is sometimes inevitable as an emergency measure after a slope failure. It is a fast and effective means to remove immediate danger and can help minimise social disruption, e.g. to allow early reopening of roads closed by landslides.

Mitigation of natural terrain landslide hazards

Landslide risk from natural terrain is very real in Hong Kong. The heavy rainfall on June 7, 2008, caused 2,400 natural terrain landslides on Lantau alone. This cut off the sole road access to the Hong Kong International Airport as well as the Tai O community, and resulted in chaos in many parts of the territory. More recently, during Typhoon Vicente, four boulders measuring about a metre across fell from the natural hillside above the junction of Magazine Gap Road and May Road. This could have been fatal if any of the boulders had hit a vehicle - not a remote possibility had the rocks have fallen outside of the height of a typhoon. For your information, that particular hillside was included in the study programme conducted in 2010. The study found that mitigation works were needed. This will be taken forward as soon as possible.

We do our utmost to strike a balance between mitigating landslide hazards and minimising any possible environmental impacts. We aim to avoid extensive slope stabilisation works on natural hillsides and definitely avoid “slathering natural hillsides with concrete buttresses”, which is of concern to Mr van der Kamp. Instead, mitigation measures such as check dams and steel flexible debris barriers are used. These aim at reducing the consequence of failures but not the number or scale of landslides.

Integration of road widening with slope upgrading

It is the Government’s policy to integrate road widening works with stabilisation works for adjacent slopes as far as possible, with a view to optimising the use of resources and minimising inconvenience caused to the public. However, for improvement works for roads

adjacent to slopes (including provision of footpaths), we need to consider the technical feasibility and slope safety, as well as other factors such as the environmental impacts (e.g. trees to be felled), traffic impact during construction and cost effectiveness.

Mr van der Kamp is right in that there is no time for self-praise, nor complacency. Given Hong Kong's hilly terrain, dense population, intense development and heavy rainfall, landslides will still occur, especially during periods of heavy rainfall, and the landslide risk will never be zero. We are acutely aware of the limitations in our knowledge and technology, and the surprises that Mother Nature is capable of. We welcome views from the public, with which we can reflect on and improve our work. For that, we wish to express our heartfelt gratitude to Mr van der Kamp once again for his comments.

Yours sincerely,

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