

A New Generation of Rigid Landslide Debris-resisting Barrier System

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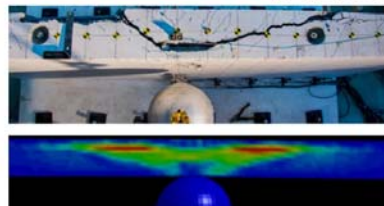
In Hong Kong, rigid debris-resisting barriers are commonly used to mitigate natural terrain landslide hazards. There are, however, two major challenges associated: (1) intensive construction works in remote hillsides; and (2) risk of extreme landslide events due to climate change. To tackle these challenges, a new generation of rigid debris-resisting barriers is developed based on the following two facets of holistic technical development work.



Testing of Debris Impact
(泥石流撞擊試驗)



Testing of Boulder Impact
(大石撞擊試驗)



Modelling of Localised Damage
(局部破壞模擬)

Facet 1: To optimise the structural requirements of rigid barriers, a novel design philosophy has been proposed. It mainly involves an innovative displacement-based assessment of geotechnical stability, and improved methodology for the evaluation of flexural response and localised damage of rigid barriers. These methods have been validated. The revamped design guidelines also incorporate an optimised debris impact load model and quantify the use of cushioning materials to protect rigid barriers. These areas of improvement could yield a less-structural demanding barrier, thereby reducing construction cost and time, and minimising environmental impacts.

Facet 2: To enable immediate landslide detection for expediting emergency responses, a Smart Barrier System equipped with Internet-of-Things (IoT) instrumentations is developed. The instruments are linked to a cloud-based IT platform which swiftly facilitates emergency responders to conduct real-time surveillance and monitoring using mobile devices. Site trials have been conducted to examine the system durability and reliability. In future, this system can be inter-connected with other emergency IT systems to form an emergency IoT ecosystem that enables the achievement of enhanced community resilience against the impact of climate change.

