



寶雲道 斜坡研習徑

寶雲道 Bowen Road Slope Study Trail



A 柔性防護鋼網
Steel Flexible Barriers



B 美化山泥傾瀉殘痕
Landscaping a Landslide Scar



C 砌石擋土牆
A Masonry Retaining Wall



D 石網
Rock Mesh



E 泥釘
Soil Nails



F 泥石壩
Check Dams



G 坡腳種植槽
A Slope Toe Planter



H 削坡與削坡的組合
Combination of Cut Slopes

3 公里
km

1 小時
Hour

8 研習點
Study Points



土木工程拓展署轄下土力工程處於寶雲道設立了「寶雲道斜坡研習徑」，讓老師、學生和市民沿途自助導覽各種香港常見的斜坡工程。研習徑由寶雲道臨時休憩處開始，途經寶雲道健身徑，終點是司徒拔道。研習徑路程約3公里，需時約1小時。途中設有多個研習點，介紹附近的特色斜坡工程，包括各類防止及防治山泥傾瀉和斜坡美化措施。

The Geotechnical Engineering Office of the Civil Engineering and Development Department developed a self-guided tour of "Bowen Road Slope Study Trail" on Bowen Road to facilitate teachers, students and public for a trip on common slope works in Hong Kong. The tour is along Bowen Road Fitness Trail, starting at Bowen Road Temporary Sitting-out Area and ending at Stubbs Road. The trip is around 3 km and it takes around 1 hour to complete. There are a number of Study Points in the tour to introduce particular kinds of slope works, including various landslide prevention and mitigation as well as slope landscaping measures.

VR研習點

VR Study Points

我們利用虛擬實境的技術，把斜坡工程的虛擬動畫展現在實境當中。市民可以利用手機或平板電腦掃描研習點資訊板上的二維碼進行體驗：
We use Virtual Reality (VR) technology to visualize the virtual animation of slope works in real environment. Interested members of the public can experience it by scanning the QR codes on information boards at the use of their mobile phones or tablets:



研習點資訊板
Information boards at study points



A 柔性防護鋼網

Steel Flexible Barriers

柔性防護鋼網是常見的天然山坡山泥傾瀉風險緩減措施。柔性防護鋼網能吸收和分散泥石的撞擊能量，有效地攔截山泥，減低山泥傾瀉對附近民居或者其他設施的風險及影響。

雖然山泥傾瀉風險緩減措施可減輕山泥傾瀉的後果，但是未必能阻隔泥水造成的滋擾，而且現今的科技仍有其局限性，緩減措施在非常嚴重或極端暴雨情況下可能不足以阻擋所有泥石，所以在大雨發生時，大家都要遠離斜坡，留在安全的地方。

Steel flexible barriers are common landslide risk mitigation measures on natural hillside. Steel flexible barriers absorb and dissipate the impact energy of the soil and rock, effectively intercepting the landslide debris and mitigating the landslide risk to the nearby residents and other facilities.

Landslide mitigation measures will reduce the consequences of failure. However, they may not stop the nuisance of mud and water over-spilling the mitigation measures. Because of the limitations in today's technology, these measures could be overwhelmed under very severe or extreme rainstorms. During heavy rain, we should therefore stay away from slopes and stay at safe shelters.



寶雲文物 知多點： Know more about relics at Bowen Road:

寶雲輸水道的21拱拱券段位於此路段下方，建於1885至1887年，現為法定古蹟。

The 21-Arch Section of the Bowen Aqueduct under this road section, which was constructed between 1885 and 1887, is a declared monument.

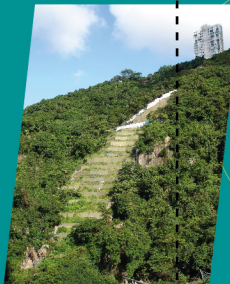


B 美化山泥傾瀉殘痕

Landscaping a Landslide Scar

在2005年8月，寶雲道的天然山坡發生了大型的山泥傾瀉。政府立刻進行緊急鞏固工程，以混凝土噴漿加固山泥傾瀉殘痕，防止雨水沖蝕或滲入泥土。土力工程處憑著創新思維，制定了一個獨特的美化方案，沿殘痕建造以泥釘及鋼筋混凝土板承托的梯田式台階，並在牆後填土，讓植物在內生長。設計亦有助栽種植物與附近山坡的各式品種自然散播，讓山泥傾瀉殘痕與四周自然景觀融合。

In August 2005, a large landslide occurred on the natural hillside of Bowen Road. The government immediately carried out emergency stabilisation works with sprayed concrete on the landslide scar to prevent rainwater from eroding the soil or infiltrating into the soil. With an innovative idea, the Geotechnical Engineering Office developed a unique greening plan for the landslide scar by constructing a series of terraced walls which were supported by soil nails and reinforced concrete slabs. Soil was then filled behind the walls to allow growing of vegetation. The design also facilitates the natural dispersal between the planted vegetation in the terraced steps and other vegetation species on the nearby hillside.

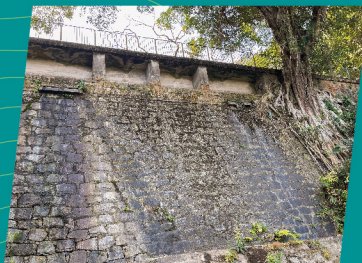


C 砌石擋土牆

A Masonry Retaining Wall

當斜坡過於陡峭，無法維持自身的穩定性，斜坡便可能需要擋土牆的支撐。擋土牆的種類很多，在研習點C的是砌石擋土牆。砌石擋土牆是由工人逐塊石頭堆砌，一層一層地興建。由於人工成本上升及建築技術發展，近年的擋土牆是以鋼筋混凝土建造。

When a slope is too steep to maintain its stability, it may need to be supported with a retaining wall. There are many types of retaining walls, and the one at Study Point C is a masonry retaining wall. The masonry retaining wall is built piece-by-piece and layer-by-layer with intensive labour force. Due to the rising labour cost and the development of construction technology, the retaining walls in recent years are constructed of reinforced concrete.



E 泥釘

Soil Nails

泥釘是插入泥土並以水泥灌漿固定的鋼筋，作用是防止山泥傾瀉。一般而言，安裝泥釘的數量和長度，會視乎斜坡的斜度和高度、岩土狀況、地下水位高度等因素而定。研習點E的斜坡埋藏了數百支長達十六米的泥釘，以確保斜坡有足夠的穩定性。

Soil nails are grouted steel bars penetrated through the soil mass of the slope to resist the soil mass from sliding. Generally, the number and length of soil nails to be installed depend on factors such as gradient and height of the slope, geological conditions, the height of the groundwater table, etc. Hundreds of soil nails with length up to 16 metres are hidden in this slope to ensure sufficient stability of the slope at Study Point E.



寶雲文物 知多點： Know more about relics at Bowen Road:

子午線南標記石柱位於此斜坡上方，與2005年山泥傾瀉的位置非常接近。石柱屹立於寶雲道超過一世紀，見證了香港以天文觀測來授時的歷史。

The South Meridian Mark is located above the slope crest and very close to the landslide in 2005. It has been standing at Bowen Road for more than a century to testify the history of provision of time service in Hong Kong through astronomical observation.



F 泥石壩

Check Dams

泥石壩是常見的天然山坡山泥傾瀉風險緩減措施。當山泥傾瀉發生時，泥石壩能攔截泥石，從而緩減山泥傾瀉對公眾安全的影響。風險緩減措施可減輕山泥傾瀉的後果，但未必能阻隔泥水造成的滋擾。再者，山坡崩塌處和毗鄰土地可能仍有再崩塌的風險，受影響的建築物和道路可能因而需要暫時封閉，以保障公眾安全。

Check dams are common landslide risk mitigation measures on natural hillside. When a landslide occurs, the check dam can mitigate the impact of the landslide to the public by trapping the debris. The mitigation measures will reduce the consequences of failure. However, they may not stop the nuisance of mud and water over-spilling the mitigation measures. Buildings and roads may have to be closed temporarily in the interest of public safety due to risks remaining from the landslide scar and the adjacent ground.

