Creating a city oasis by greening slopes

Civil Engineering and Development Department

An innovative slope landscape measure, involving the formation of a series of terraces on the slope surface to maximise planting opportunities and promote vegetation growth, was specially designed by the Civil Engineering and Development Department (CEDD) to address the unsightly landslide scars along Bowen Road overlooking urban Hong Kong.

Emergency landslide repair works

During a heavy rainstorm in August 2005, two major landslides occurred above Bowen Road, resulting in the temporary closure of St. James’ Primary School for more than three weeks. In order to alleviate the imminent risk of further slope degradation, emergency repair works, involving the use of shotcrete and temporary soil nails, were undertaken to affected areas.

The massive shotcrete covered about 2,000 square metres and could be seen from as far afield as the Wan Chai Harbourfront. It was an eyesore to both local residents and the public.

Innovative design of the landscape works

The objective of the landscape measure was to provide quick, effective and sustainable vegetated cover to blend the area into the surrounding natural landscape. Critical factors to be considered in the design were the over-steepened scars and a terrain devoid of nutrient-rich topsoils, which together would inhibit vegetation growth.
The design finally implemented by the Geotechnical Engineering Office (GEO) of CEDD was innovative and unique, involving reshaping the ground profile by constructing a series of terraced walls on the steeply sloped surface. Reinforced concrete slabs and soil nails were also employed to provide structural support.

With the terraced walls in place, favourable conditions for healthy vegetation growth could then be created, providing a larger planting space, more flexibility in the selection of plant species, and a nutrient-rich soil mix to expedite growth. A sustainable approach was also adopted by planting predominantly native species to provide natural habitats for wildlife to thrive in. The landscape measure implemented would also promote the establishment of a quick, effective and sustainable vegetated cover on the landslide scars.

**Difficulties encountered**

Access problems and the steepness of the site posed serious challenges to the slope safety enhancement and landscape works. There are stringent traffic restrictions on the use of Bowen Road, as it is a very popular route for joggers. Delivery of construction materials to the site was not easy and would often have to be done manually. All in all, the works took about 20 months to complete in mid-2011.

**Improvement in slope appearance**

About a year after the completion of landscape treatment, the appearance of the landslide scars has improved significantly. Trees and shrubs planted on the terraces thrive and will eventually obscure the terraced walls. The design also promotes natural exchange of plant species with those from the adjacent landscape. We expect the appearance of the landscaped landslide scars will blend in with the surrounding environment before long. This project illustrates a good example of integrating landscape treatments into the natural terrain landslide hazard mitigation works.

**Media briefing on slope greening**

The success of the landscape treatment to Bowen Road landslide scars prompted us to hold a media briefing to further promote the Government’s efforts in landscape treatment. With assistance from the Secretariat Press Office (Development), the briefing was successfully held on-site on December 21, 2012, with representatives of 14 media organisations in attendance.
At the briefing, we explained to the media that urgent repair works had to be carried out immediately after the landslides in order to prevent slope deterioration. The “terrace” option was adopted because it could enhance slope stability, blend the slope into the surrounding environment, and conform to the cost-effectiveness principle. Subsequent media reports were very positive, and they acknowledged the Government’s efforts in enhancing Hong Kong’s living environment.

CEDD’s slope greening commitment

CEDD has pledged to provide landscape treatment to every slope upgraded under the Landslip Preventive Measures (LPM) Programme before 2010 and the subsequent Landslip Prevention and Mitigation (LPMit) Programme since 2010.

According to the results of a recent public opinion survey, there is an increasing public appreciation of slope greening works. In 2002, 65% of the respondents were satisfied with the appearance of slopes. This percentage increased to 70% in 2012.

Promulgation of best practice & winning of award

In September 2011, CEDD issued GEO Publication No. 1/2011 “Technical Guidelines on Landscape Treatment for Slopes” to promulgate the latest best practices of landscape treatment for slopes, which include landscape treatment for natural terrain mitigation works and landslide repairs. Examples of different treatments that have proved to be effective are also documented, including the Bowen Road landslide site.

In 2012, the Hong Kong Institute of Landscape Architects granted a Merit Award under the Landscape Planning/Research Category for the new Publication in recognition of CEDD’s continuous improvement and contributions to the enhancement of the slope environment.

We take pride in seeing thriving vegetation growing on previous landslide scars. We are also much encouraged by the public’s recognition of our efforts in greening slopes and enhancing biodiversity.