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Works Bureau Technical Circular No. 17/2000

Improvement to the Appearance of Slopes

Scope

This Circular outlines the principles and procedures recommended for all departments involved in new slope formation and in upgrading and maintenance of existing slopes for improving the aesthetic and environmental impact of slope works. The Director of Agriculture, Fisheries and Conservation, Director of Housing, Director of Home Affairs and Director of Lands have agreed to the contents of this Circular.

2. This Circular does not apply to temporary slopes formed during construction activities. Nor does it apply to emergency repairs on slopes that are required during or after inclement weather or under other emergency circumstances.

Effective Date

3. This Circular takes immediate effect.

Effects on Existing Circulars

4. This Circular should be read in conjunction with Works Branch Technical Circular (WBTC) No. 25/93 on Control of Visual Impact of Slopes.

Background

5. For many years, there have been policy guidelines issued on the control of visual impact of man-made slopes to address concerns on aesthetics and environment. The latest guidelines are contained in WBTC No. 25/93 on the design principles of slope works. Concerns have recently been expressed on the increasing use of shotcrete (also referred to as sprayed concrete) surfacing, particularly for slope maintenance works. There is a need to strengthen the control on the use of shotcrete surfacing on slopes and to promulgate technical guidelines and good practice of landscape treatment and bio-engineering to improve the appearance of slopes.

Policy

6. The design principles and policy guidance contained in WBTC No. 25/93 should be adopted for all types of slope works, be they new slope formation, major slope upgrading or minor slope improvement/repair/maintenance works. In addition, the guidance on the use of shotcrete surfacing in slope maintenance works as depicted in Appendix A should be followed.

Technical Guidance on Landscape Treatment and Bio-engineering

7. Guidance documents on bio-engineering and landscape treatment for slopes listed in Appendix B have been published or will shortly be published for use. These should be adopted in designing and prescribing slope works. New design guidelines will be issued by the Geotechnical Engineering Office (GEO) from time to time as a result of continuous research and experience gained, and should be adopted as the technical guidance on these aspects. Designers should obtain specialist landscape advice from a landscape architect where necessary.

Control of the Use of Shotcrete in Slope Works

8. Each department with responsibility for upgrading or maintaining slopes should set up a Vetting Committee on Slope Appearance. The Vetting Committee should regularly review and, where satisfied, endorse the need for any slope shotcreting carried out by the department whether as part of routine or preventive maintenance or slope upgrading works. The scope of the review should include first-time use or renewal of an existing old chunam or shotcrete cover (but exclude emergency repair, minor local repair and temporary slopes.). The Vetting Committee should be chaired by a directorate officer for departments the slope works

of which carry significant visual impacts (viz. the Highways Department, Lands Department, Territory Development Department, Water Supplies Department and Geotechnical Engineering Office), and a senior professional officer or above for other concerned departments (viz. Agricultural, Fisheries and Conservation Department, Architectural Services Department, Drainage Services Department and Housing Department).

9. Where the use of shotcrete cover is unavoidable, measures such as toe wall planters, planter boxes, tree pits, creeper holes on slope surface, and application of colour/pigments should be introduced to improve the visual appearance of the slope.

Auditing

10. Aesthetic aspects of slope works will be included in the scope of slope maintenance audits to be conducted by the GEO in accordance with WBTC No. 9/96 (Standards of Good Practice for Maintenance of Man-made Slopes and Retaining Walls). This applies to slope works carried out after the date of this Circular.

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Guidance on the Use of Shotcrete Surfacing, Landscape Treatments, and Bio-engineering in Slope Maintenance Works

General Guidance on the Use of Shotcrete Surfacing in Maintenance Works

In general shotcrete surfacing should not be used, whether as routine or preventive maintenance, on slopes of consequence-to-life Category 3 as defined in Works Bureau Technical Circular No. 13/99 (Geotechnical Manual for Slopes - Guidance on Interpretation and Updating). As part of future maintenance programmes departments should aim to progressively replace any existing shotcreted surface covers on Category 3 slopes, if geotechnically acceptable, with a vegetated surface cover. Failing this, other forms of hard surface cover should be considered with a view to blending the slopes with their surroundings.

2. Generally shotcrete should not be used as part of maintenance works to cover hard, fresh to moderately decomposed (grade I – III) rock where the joints are tight and with average spacing wider than 60mm. Application of shotcrete may be warranted on more closely-jointed (i.e. joint spacing <60mm) rock, rock containing joints with open apertures or rock deteriorating quickly when exposed to weather, but the need should be confirmed by a suitably-experienced geotechnical engineer. Weepholes should be provided at appropriate locations based on a site assessment of the locations of discontinuities and seepage in the rock mass (see guidance in Figure 5.4 of the Geotechnical Manual for Slopes (GEO, 1984)).

3. In common with other slope works, soft landscape works should be as maintenance-free as possible. Plant species that demand a lot of trimming/pruning or dry season watering should be avoided. WBTC No. 18/94 gives the maintenance responsibility of landscape treatment works.

Technical Guidance on Landscape Treatment and Bio-engineering for Slopes

4. GEO Publication No. 1/2000 (GEO, 2000) (Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls) gives detailed guidance on the subject. The design process and techniques described in the document are applicable to the construction of new and upgrading of existing slopes, as well as improvement works under slope maintenance.

5. The Geotechnical Manual for Slopes (1984) contains general information on the use of grass, shrubs and trees on slopes. It covers simple hydroseeding which is generally applicable to establishing a vegetation cover on all soil slopes (i.e. soil cut slopes and fill slopes).

6. GEO Report 56 (GEO, 1999) (Application of Prescriptive Measures to Slopes and Retaining Walls) contains guidance on prescriptive application of vegetation as a slope surface cover to soil cut slopes up to an angle of 55°, to be used in conjunction with the prescriptive measures set out in the report.

Guidance Documents on Landscape Treatment and Bio-engineering for Slopes

Geotechnical Manual for Slopes, 2nd Edition (GEO, 1984)

Tree Planting and Maintenance in Hong Kong (Standing Interdepartmental Landscape Technical Group, 1991)

Plant Selection Matrix (Urban Services Department, 1992)

Review of Visual Amelioration Measures for Shotcreted Slopes Implemented under Highways Maintenance Programme (1996-1998) (Landscape Unit, Highways Department, 2000)

Guidelines on Prescriptive Use of Vegetation Cover for Soil Cut Slopes, Appendix C in GEO Report No. 56, 2nd Edition (GEO, 1999)

Highway Slope Manual (to be published by GEO in December 2000)

Highways Department and Civil Engineering Department Standard Drawings

Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls (to be published by GEO in September 2000)