

Supplementary Information / Explanatory Notes to
UPDATED POLICIES & PROCEDURES FOR ENGINEERING CONTROL
OF HILL-SITE DEVELOPMENTS

A. Agency for Control of Developments with Slopes (ACDS)

It is considered that a dedicated federal agency needed to take charge of all matters encompassing developments with slopes should adopt a fresh wholesome approach to the issue and should not be unencumbered by past practices in similar areas. The Agency shall be staffed and managed with key personnel who shall possess capabilities and experience adequate for slope engineering issues.

As the Agency is expected to function also as the repository for documents and records for management and maintenance of all slope engineering activities nation-wide, it will need to be equipped with the necessary facilities for efficient electronic data entry, filing, archival and retrieval of all documents received. The capabilities also need to include the ability to timely prompt the Agency for scheduled upcoming activities especially maintenance and retrofits as well as to report on missed schedules so that appropriate follow-on actions may be taken. Such tasks should be straight forward given the state of information technology available.

The Agency is intended to function through the current system of local authorities in an advisory capacity. As with any body empowered with regulatory functions, the Agency must not come under private ownership.

B. Slope Classification System

The slope classification system being adopted is an adaptation of that successfully utilized in Hong Kong and is familiar to most Local Authorities already.

The continued use of a familiar system will make for a trouble free operation by planners and other less technically endowed personnel.

C. Review Engineer to certify and endorse as-built drawings

The requirement for the participation of a review engineer, particularly an Accredited Checker, stems from the reasoning that the submitting engineer often does not possess the necessary expertise for slope engineering matters. Presently, reviews and accredited checkings are confined to the design stage.

The current involvement of review engineers where they are limited to reviewing the design documents is inadequate. It leaves a vacuum of competence in the construction phase which is at least as important as the design if not more so. The review/checking engineer assumes no responsibility whatsoever in the completed works which is not satisfactory in spite of his documented participation in the Works.

The update to the Position Paper requires the review engineer's participation to cover the entire engineering design and construction process and to assume joint responsibility with the submitting engineer.

D. Hydraulic Design of Slope Drains

A common finding with distressed slopes has been non-functioning drains owing to chokage with sediments and other debris. The Position Paper Update recommends that slope drains be designed and constructed to have self-cleansing capabilities even at low flows. This aims at obviating the need to undertake high frequency maintenance work to such areas of mostly difficult access.

E. Landowner Solely Responsible

The registered owner of the land is always responsible for ensuring the stability of the land at all times. He/she shall also be liable for any consequential damage to adjacent properties as the result of slope instability in his/her own property.

F. Developments Located on or adjoining Slope Sites of Class 3 and Class 4 Slopes

Sites more severe than Class 2 involve natural terrain slopes with gradients that approach or exceed the friction angle of many common geological materials. For this reason, the Position Paper Update recommends increasingly stringent controls on developments with Class 3 and Class 4 slopes.

G. Checking and Certifying Already Completed Constructions

Slope failures have been occurring unabated from since long way back in the past to the present day irrespective of the age of construction. It would suggest that same past inadequacies in slope engineering have been propagated to the current time.

For the above reason, all past and present constructions need to be reviewed in the same manner that new constructions are to be subjected to. Where established to be inadequate, such already completed constructions will need to be retrofitted accordingly before being certified satisfactory.

H. Soil Mechanics Teaching

Classical soil mechanics teachings preached the existence of cohesion strength against shearing in soil bodies especially where the materials are perceived to comprise significant proportions of fine particles. The employment of cohesion strength renders a stability evaluation of a slope considerably less adversely affected by the action of water pressures in the ground but instead more by its height and density of the slope body.

The geotechnical engineering community has been informed of studies on actual slope failures and landslides covering a wide spectrum of geological materials commencing with Skempton (1970) that repeatedly arrived at the same conclusion whereby soil strengths or resistances available on the respective shearing surfaces to resist the instability of slopes are the ‘fully softened strengths’ (an Imperial College, London, terminology) without the existence of cohesion or any significance of it. A similar statement had been made in Bolton (1993) though the term used is ‘critical state strength’. The implication of these positions is also that any additional component of strength available from dilatation will not come into play in resisting the shearing process associated with failure of slopes.

Engineers working on slope issues will also need to expand their repertoire of tools to include the proficiency in conducting analysis with shear surface geometries created by specific pre-existing boundaries between blocks where the mobilisable strengths may generally be significantly lower than those of the intact blocks.

References

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Skempton, A.W. (1970). “First time slides in over-consolidated clays.” *Geotechnique* 20, No. 3, pp. 320-324.