Slope Engineering

Dear Editor,

It is my understanding that it has been a practice of IEM not to review advertorials published in JURUTERA. I am concerned about the publication of misleading materials and the implications of these advertorials on the safety of engineering practice. This practice should be reviewed if an advertorial has misleading information especially on the issue of safety.

I refer, with serious concern, to the advertorial on page 46 of the June 2007 issue of JURUTERA where Figure 1: Cut Slope Design shows a five-berms slope with a gradient 1:1 (45°). Although the note in the figure mentions that this cut slope design is not intended to substitute proper engineering slope design by qualified engineers, the importance of proper slope design is being overlooked.

However, note 1 of the text suggests that a gradient 1:1 (45°) slope with five berms is statistically safe to use. Note 1 of the text stated, '1:1 cut slopes with 2.0m benches at 6.0m (max.) vertical intervals' should be statistically ok provided there is:

a) Adequate and effective surface drains and slope protection works are provided including upslope
b) No perched water table (based on SI result and constructive review)
c) No unstable geological discontinuities settings
d) No tension cracks at upslope

This is a very dangerous suggestion in the use of this prescriptive. The practice is safe without the presence of a water table and adverse geological settings as the parameters of soil vary considerably from 26° to 36° [see Ref. 1: Gue SS & Tan YC (2006)].

Reference 1 indicates the typical range of peak effective friction angle (Ø) for soils in Malaysia. The lower values are associated with soils having high fines (silt and clay) while soils with higher coarse content have higher Ø'. Cohesion is generally less than 10kPa and zero should be used unless sufficient tests indicate a higher value of soil cohesion.

The reference further illustrates that factor-of-safety (FOS) of less than unity for a three-berms slope with gradient of 1:1 without a water table and adverse geological setting, and have soil parameters of c'= 1kPa and Ø' = 33°. FOS also decreases with the increase in the numbers of berms.

Although it is an advertorial, I suggest that the Geotechnical Division of IEM should comment on the misleading message to prevent failure due to the abuse of this prescriptive method.

IEM should encourage prudent practice by carrying out proper soil investigation to determine the soil properties, water profile and geological features if any. Subsequently rigorous analyses to assess the stability of a slope are needed. Otherwise, it will contradict IEM's Position Paper entitled 'Mitigating the Risk of Landslide on Hill-Site Development in Malaysia'. ■

Regard,
Engr. Dr Gue See Sew, F.I.E.M, P.Eng.

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