GEO Technical Guidance Note No. 28 (TGN 28)
New Control Framework for Soil Slopes Subjected to Blasting Vibrations

1. SCOPE

1.1 This Technical Guidance Note (TGN) promulgates a new control framework for soil slopes subjected to blasting vibrations. Any feedback on this TGN should be directed to the Chief Geotechnical Engineer/Mainland East.

1.2 For the purpose of this TGN, "soil slopes" shall mean fill slopes and soil cut slopes.

2. TECHNICAL POLICY

2.1 The technical guidelines contained in this TGN were agreed by GEO's Geotechnical Control Conference (GCC) in May 2010.

3. RELATED DOCUMENTS

3.1 PNAP No. APP-72 (2007). *Control of Blasting*. Buildings Department, Government of the HKSAR.

3.2 Project Administration Handbook for Civil Engineering Works, 2008 Edition, Government of the HKSAR.

3.3 Wong, H. N. & Pang, P. L. R. (1992). *Assessment of Stability of Slopes Subjected to Blasting Vibration*. GEO Report No. 15, Geotechnical Engineering Office, Hong Kong, 112 p.

4. TECHNICAL RECOMMENDATIONS

4.1 The pseudo-static method of slope stability analysis given in GEO Report No. 15 is commonly used in blasting assessments to assess the peak particle velocity (PPV) limits for controlling the effect of blasting vibration on soil slopes.

4.2 As an alternative to using GEO Report No. 15, the PPV limits given in Annex A can be adopted. In using these PPV limits, the following existing risk control measures should be implemented by the geotechnical site supervision staff:

(a) prepare photographic and descriptive records of any signs of distress/instability or damage to the chunam or shotcrete cover, channels, etc., observed at the slopes, as part of the condition survey inspection,
(b) resolve any stability concerns observed at the slopes (e.g. persistent adverse discontinuity or other adverse geology, or loose boulders or other objects on the slope that could become unstable) before blasting,
(c) inspect consequence-to-life category 1 and 2 slopes that are subjected to significant blasting vibration before and after each blast,
(d) monitor vibration at slopes for risk control (at the slope toe and on rock, where possible), and
(e) prepare regular inspection/monitoring reports and non-compliance reports.

5. ANNEXES

5.1 TGN 28 A1 – New Control Framework for Soil Slopes Subjected to Blasting Vibrations

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NEW CONTROL FRAMEWORK FOR SOIL SLOPES SUBJECTED TO BLASTING VIBRATIONS

Type of Slope	Slopes that pose negligible risk to life	Consequence-to-life (CTL) category 1 & 2 slopes that meet current standards	All other slopes
PPV Limit	25 mm/s (Notes 1 & 2)	25 mm/s (Notes 1 & 2)	Analysis or other justified approach

Notes:

1. Other than the documentary records, the site and the slope conditions ascertained from the condition survey inspection should be taken into account in assessing whether the slope poses negligible risk to life or meets current standards. The prescriptive 25 mm/s PPV limit is not applicable if signs of distress/instability or other stability concerns (e.g. persistent adverse discontinuity or other adverse geology, or loose boulders or other objects on the slope) are observed, unless these concerns can be resolved before blasting.
2. A higher PPV limit could be used if it can be justified, for example, by analysis.
3. Where the pseudo-static methodology of GEO Report No. 15 is used for analysis, the PPV limit should be calculated using a critical acceleration at the slope, Kc, that corresponds to a dynamic factor of safety of unity.

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