Geomechanical characterisation and rock slope stability analysis, Bukit Kledang, Perak

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Bukit Kledang, a granite hill located approximately 30 km north of Universiti Teknologi PETRONAS along the Lumut to Ipoh road in Perak is a popular recreational area for outdoor activities such as hiking and cycling. It was during such a hiking trip that visual observations indicated potential instability of exposed granite rock slopes along the road leading up the hill. Based on these initial observations, a quantification of the rock slope stability was undertaken. For this purpose, the rock mass was classified using Bieniawski's (1993) Rock Mass Rating (RMR) system and these results were applied to determine the Slope Mass Rating, SMR (Romana *et al*., 2015 and Romana, 1985) of the investigated slopes in order to quantify the rock slope stability. A total of five rock slopes were investigated and have been labelled 1A, 1B, 2,3 and 4. For the RMR values, the slopes 2,3 and 4 are Class II, "Good Rock" and the remaining two slopes are Class III, "Fair Rock". However, the unfavorable discontinuity orientations with respect to slope orientation for slope 1B and 4 result in these two slopes having a low SMR rating falling into Class V, representing a high hazard. The remaining three slopes are Class III and can be considered as stable. This quantification clearly shows that slopes 1B and 4 need urgent mitigation.Table 1 summaries the failure modes and orientations with the respective slope stability analysis stereoplots shown in Figure 1.

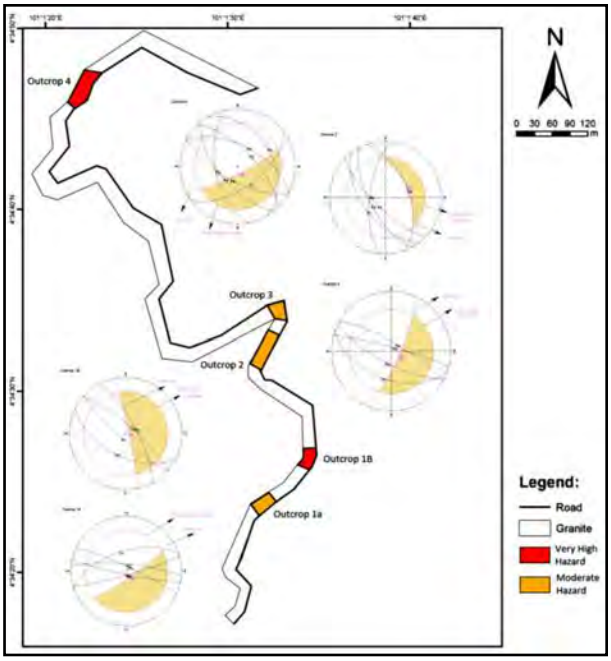

Figure 1: Slope hazard map, Bukit Kledang, Perak.

Table 1: Slope failure modes and orientations, Bukit Kledang, Perak.

Outcrop	Slope Face (Dip Direction/Dip)	Friction Angle (degree)	Failure Modes	Plane (Dip Direction/Dip)
1A	145/80	25	Wedge	F2 (005/82) & F4 (164/84) F3 (025/83) & F4 (164/84) F3 (025/83) & F5 (192/85)
1B	078/85	25	Wedge	F1 (222/81) & F2 (062/74) F2 (062/74) & F3 (041/78) F2 (062/74) & F4 (207/57) F1 (222/81) & F4 (207/57)
2	114/78	30	Wedge	F3 (015/84) & F4 (030/78)
3	060/54	30	Planar	F5 (070/55)
			Toppling	F1 (233/57) F3 (224/74) F4 (242/67)
4	153/80	25	Wedge	F1 (144/59) & F3 (059/39) F1 (144/59) & F7 (027/60) F1 (144/59) & F2 (046/67) F1 (144/59) & F6 (208/69) F1 (144/59) & F4 (230/64) F1 (144/59) & F5 (259/58) F3 (059/39) & F7 (027/60)
			Planar	F1 (144/59)

References

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