Blasting-induced rock slope instability in Senai, Johor – a preliminary post-construction assessment

Abd Rasid Jaapar

Soils & Foundations Sdn Bhd, 23, Jalan Desa, Off Jalan Klang Lama, 58100 Kuala Lumpur
Email: arjimy@tm.net.my

Abstract: A new railway line was constructed recently in the state of Johor, Malaysia to link the Senai Airport and the newly built Tanjung Pelepas Port. Its alignment transverses some hilly terrain and thus resulted in the formation of a number of major cut slopes. One of them is a 35m high slope near Senai, Johor, which is cut in bedrock of the Late Cretaceous-Early Tertiary Pulai Granite. A preliminary post-construction geological assessments carried out on the rock slope indicate that most of the unstable elements are mainly due to excessive and poor blasting practice. Overblasting has resulted in widening of major joints, excessive overbreaks, unstable and loose overhanging blocks. Results of kinematic stability analysis on the discontinuities indicate that the rock slope has the potential to undergo planar, wedge and toppling failures. Rock falls could also take place by over toppling. Excessive overbreaks and fragmentation of the rock mass could be minimised if a proper geological

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appraisal on the bedrock was carried out beforehand, and suitable blasting practice adopted during the excavation works. Based on the results of this study, it was recommended that remedial measures should be undertaken in two different phases. Phase 1 is to scale off all the loose, potentially unstable blocks. This should be followed by phase 2 if necessary, i.e. fixing of wire netting, rock fall protection system or rock dowels.