# GEOTECHNICAL BACK ANALYSIS AS AN ECONOMICAL METHOD OF SLOPE STABILIZATION: A CASE STUDY AT THALATHU OYA METAL QUARRY

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MAHESH NALIN CHANDANA SAMARAWICKRAMA

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# ABSTRACT

Most of the slope failures occur due to unplanned land use and mining activities. The same principal is applied to slope failure at Thalatu Oya. Earlier disturbed area due to tectonic activities has created a secondary discontinuity, which formed along the well developed foliation plane. This has caused to form the weaker slip surface. The Chert particles found from the slip surface and the drainage pattern of the area are good indications for the seepage through this slip plane for past thousands of years. The uncontrolled blasting techniques and unplanned mining methods causing the removal of toe support rapidly were the ultimate causative factors for this slope failure.

It was identified from this study that, the most simple and economical methods of determining shear strength parameters in designing slopes are with the use of Rock Mass Rating System and use of Empirical Equations. Even though these methods provide more conservative values, these results will be very useful in assessing the vulnerability to failure and in initial design work. The back analysis method is more reliable and economical compared to above two. This can be used only if same type of a failure has occurred at the vicinity of the site and based on its results, the other parts of the site can be stabilized. This method was used to determine the most economical method of stabilizing the existing unstable wedge. The most economical method of stabilizing the existing unstable wedge should be the reduction of the slope height with the use of controlled blasting techniques to minimize the vibration forces.

The example model for slope design to failed slope will be a useful tool to future mining engineers, in their development of design capabilities.

Finally it can be concluded that the regulatory bodies responsible for issuing mining licenses should take immediate measures to

- Train necessary persons to carry out comprehensive slope designs, before issuing the licenses to these quarries.
- Provide necessary laboratory and field testing facilities.

This will not only mitigate future disasters but also these regulatory bodies can earn by providing design services to customers.