

ABSTRACT

When slope angles are designed during open pit optimisation, there is a risk factor applied to steepen the slopes. The steepening of slope angles has implications on the safety and economics of the mining operation. The steeper the slope angles, the greater the probability of slope failure and also the higher the benefit of cost saving during waste stripping. The challenge facing the mining engineers involved in open pit design is to maximize the economic benefits of the project without putting the mine workers and the mining equipment at the risk of rock falls. This challenge is addressed by striking a balance between safety of the operation and the cost savings. The ideal situation is to have a slope monitoring system that will predict slope failure by detecting any ground movement before the actual failure occurs. This will allow for the application of the risk factor with a high degree of confidence knowing that the risk will be adequately mitigated with a slope monitoring system.

The objective of this research report is to provide guidelines on how to design an optimal survey slope monitoring system. It is the author's view that for a survey monitoring system to yield desirable results, it should adhere to survey principles such as working from the whole to part and cross checking always. The research report covers all aspects of the survey monitoring systems such as survey control network design, beacon construction, equipment selection, data management, procedures and personnel involved in slope monitoring. The report was compiled with guidance from published papers by various authors and discussions with mine surveyors and geotechnical engineers involved in slope stability monitoring. The findings used for analysis are from Jwaneng Mine. The design strategy outlined in this report can be used as a guideline for setting up a new slope monitoring system or to optimise an existing monitoring setup.