



Application of Geotechnics in Open Mine Design and Reserve Estimation

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Abstract

The need for a proper understanding of subsurface geology, depositional pattern of the intrusive rock and mining trend at the study area was very imminent. Data for this mining design was then generated through geotechnical subsurface investigation. A total of eleven (11) borings were made to depths of 25 meters into intrusive rock bodies. Drilling is carried out both in the quarry pit and around the surrounding berm. A sampling interval of 1.0 meter was maintained for the cored rock samples from each of the eleven drilled holes. The depth range of the boreholes varies from 15.0 meters to 25.0 meters. Results of analyses showed that the intrusive trends in the east-west orientation. However, north-south trends were also observed at certain sections of the mine/quarry. The values of the plunges of the intrusive were observed to be between 2.00 and 6.00 degrees at the northern segment and 4.00 to 6.00 degrees at the southern segment. The average thickness of the intrusive bodies varies from 11.20 meters for the surrounding bench area to 20.00 meters in the pit. This observed thickness of rock mass covers an area of approximately 81,750 m², made up of 29,500 m² for the floor of the quarry and 52,250 m² for the surrounding bench. Using an average thickness of 16.00m, the rock volume was calculated to be 1,300,000 m³. The rocks has a density of 2.98 mg/m³, which gives us a total reserve tonnage of 3,874,000.

Keywords: Mining design; Intrusive body; Slanzi rotary diamond coring rig; Quarry Trend.