Evaluation and comparison of ground vibration predictors at Tourah quarry- Egypt

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Abstract:

The present paper mainly deals with the prediction of blast-induced ground vibration level at Tourah Mine in Egypt. The safe charge of explosive and peak particle velocity (PPV) were recorded for 79 blast events (79 blast data sets) at various distances. These datasets were used and analyzed by the widely used vibration predictors. From the six predictors, vibration levels were calculated and compared with new monitored 15 blast data sets. Again, the same data sets were used to validate and test the three-layer feed-forward back-propagation neural network to predict the PPV. Different propagations equations were derived by using the shapes of the selected predictors formulae. It is found that among all the predictors, ANN provides very near prediction with high degree of correlation.

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EVALUATING AND IMPROVING BLASTING RESULTS AT TOURAH LIMESTONE QUARRY- HELWAN, EGYPT

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Abstract:

Evaluation of blast performance is considered of high interest for mine operators to improve blasting results. Within the scope of this study, the aim is to determine the optimum blasting conditions in Tourah-quarry, Helwan, Egypt. Guidelines have been suggested for a step-by-step trial blasts to evaluate blasting results in Tourah quarry. Thirty full scale production blasting events in Tourah quarry have been conducted and the results have been recorded. Two design parameters have been investigated. These parameters are initiation point and primer location inside the blast hole. The objective has been achieving optimum blast results: adequately displaced and swelled muck pile; desired fragmentation degree; less uneven rock face and minimum environmental problems such as ground vibrations, and flying rock.

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Comparison between Some Methods Used In Solving Transportation Problem with Linear Programming

Mostafa M. Elbeblawi, Mohamed A. Y., H. Elsageer, Mostafa Tantawy, and Mahrous

Abstract:

This paper discusses merits and drawbacks of some manual and computer methods used in solving transportation problem in mining. The transportation model deals with a special class of linear programming problems in which objective is to "transport" a single commodity from various "origins" to different "destinations" at minimum total cost. The total supply available at the origins and total quantity demand by the destinations are given in the statement of the problem. Two manual methods (Northwest-corner rule, Vogel's approximation) are used in solving small dimensions problems. Two softwares (premium solver platform, Lindo) are used in solving the same problem. It is found from the obtained results that: firstly, the Northwest-corner rule is used to find the optimum solution while Vogel's approximation method is used as advanced step to the optimum solution. Secondly, the premium solver platform is better than Lindo software.

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Evaluation and Transportation Problem of Gravel Quarries, Qena governorate

Mostafa M. Elbeblawi, Mohamed A. Y., H. Elsageer, Mostafa Tantawy, and Mahrous A. M

Abstract:

This paper presents the evaluation of aggregate in gravel quarries at Qena. This evaluation depended on the physical properties such as density, water absorption, size fraction, shape and chemical properties as well as mineral contents in the aggregates. The mineral composition of sedimentary rocks was investigated using polarizing microscope and x-ray diffraction (XRD). The petrography examination of the gravel was carried out according to ASTM standard 295 to identify constitutes of the samples; identify the alkali-silica reactive ingredient such as opal, tridymite, chalcedony, cristobalite and alkali carbonates reactive rocks. These minerals react with alkalis in cement, leading to the expansion and cracking of concrete. Other components such as sulfides, sulfates, halites, iron oxides, clay minerals and anhydrites are examined, which might be present as coating and impurities. Coatings prevent the development of good bond between gravels and cement. Also, the transportation problem of these materials from quarries to destination sites has been applied. The transportation problem is one of the linear programming problems. There are different methods which are used to solve it such as: row minimum, column minimum, matrix minimum, north-west corner rule, Vogel's approximation method either manually or by computer software. The present study indicated that, gravel in most of the quarries studied is suitable for concrete making.

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Quality Index to Determine The Optimum Utility of Some Egyptian Limestones As Building, Road Construction and Cement Industry

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Abstract:

It is very important to determine the optimum utility of any limestone deposit according to the physical and mechanical properties. The quality index is a good way for this aim. The physical properties such as porosity, density and water absorption and mechanical properties such as compressive-, tensile-strength and coefficient of dynamic fragmentation, control the optimal use of limestone as building, road construction and cement manufacture. These parameters are determined for several locations in Egypt and the quality index for each location is calculated, and the optimal use is determined.

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Effect of operating parameters and formation properties on penetration rate in some sandstone rocks by using diamond core bit

Mustafa M. Elbeblawi, Mohamed A. Sayed, Gamal Y. Boghdadi and Helal H. Hamd-Allh

Abstract:

In this Study four Sandstone rocks were drilled by diamond core bit using a fixed laboratory-drilling machine at 400 and 1200 rpm, rotary speed, over a range of weights on bit (WOB) 12,18,24,30,36kg. Operating parameters of the drill bit such as WOB, penetration rate (PR), torque (T), and specific energy (SE)were continuously monitored during the drilling trials. Besides the effects of formation properties on the penetration rate were monitored. Relationships between WOB and both PR, torque T and Se were described and the relationship between PR and SE was given. Graphs are presented and can be used to predict diamond-drilling performance easy and fast.

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DISTRIBUTION AND IMPLEMENTATION OF DRILLING MACHINES AT THE QUARRY BENCHES

Mostafa M. Elbeblawi, Mohamed A. Sayed, Mostafa T. Mohamed, Mohamed E.I. Abdelrasoul

Abstract:

In many times, a good distribution and implementation of equipment and machines along the quarry faces is considered a challenge to the mining engineer or the quarry operator. Quarry equipment includes drilling machines, air compressors, loading equipment including loaders and/or excavators, in addition to the transportation fleet of high-tonnage trucks. These equipment cost large investments in the production processes and need high skill to be efficiently distributed and operated. In this investigation, study of the optimum distribution of the available drilling machines of different specifications and capacities along the faces of the lime stone quarry of Assiut Cement Company has been carried out. A mathematical model has been used to find several alternatives and to choose the best alternative. Calculation of the minimum number of drilling machines that satisfy the annual production plan is an important step to decrease production costs.

Keywords:

drilling machines, modeling, quarry.

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Evaluation of open pit slope stability using various slope angles and element types

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Abstract:

The success of mining operation primarily is measured by safety and productivity. Rock slope stability is the major concern in open pit mines. Slope instability results in damage to equipment, injuries to personnel, disruption to mining operation and loss overall mine profitability. The objective of this study is to demonstrate a method to select the optimal slope angle related to three principal factors: safety, productivity and mining costs. Also, it aims to investigate the accuracy of numerical analysis using different element types and order. Therefore, series of two-dimensional elasto-plastic finite-element models has been constructed at various slope angles (e.g. 400, 450, 500, 550, 600, 650, and 700) and different element types (e.g. 3-noded triangle (T_3), 6-noded triangle (T_6), 4-noded quadrilateral (Q_4) and 8-noded quadrilateral (Q_8)). The results are presented, discussed and compared at various slope angles and element types in terms of critical strength reduction factor (CSRF) or its equivalent factor of safety (FOS), total rock slope displacement, mine production and mining costs. The results reveal that, the mine productivity increases as slope angle increases, however, slope stability deteriorates. Alternatively, the factor of safety (FOS) decreases as slope angle becomes steeper (e.g. minimum factor of safety is obtained at highest steep angle of 700). Despite of the increasing in computation time, the analysis shows that, the accuracy of the modelling increases when adopting high-order element types (e.g. 8-noded quadrilateral and 6-noded triangle elements).

Keywords:

Slope stability, open pit mine, critical strength reduction factor (CSRF), open pit excavation sequence, FEM element type/order

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