

Blasting

921290

Blast design for armour stone production - Part 1

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Special blast design options are needed to produce armour stone in commercially required quantities from virgin sites or aggregate quarries, temporarily converted. Blast geometry and drilling, explosives, and detonation methods must be matched to product requirements. Geological characteristics must be such that in situ block size exceeds product dimensions. An idealised transformation curve of block size distribution by blasting is illustrated. Influences of discontinuity properties on block size are discussed.

921291

Blast design for armour stone production - Part 2

Wang, H; Latham, J P; Poole, A

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Blast geometry is of primary importance when producing armour stone. Burden and hole spacing are first considered. Single rows of holes are preferred to multiple rows, as their use produces blocks with less damage. Bench height optimisation is considered. Explosives, charging, and detonation methods are discussed, with primer and priming, initiation sequence and time delay, and decoupling taken into account. Blast design recommendations for the production of armour stone are listed.

921292

Presplitting has arrived

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Rock Products V94, N6, June 1991, P53-60

Presplitting, long standard practice in many areas, is now finding applications in quarrying. The smooth, clean highwalls and the dewatering effects of presplitting which allow use of ANFO explosives are two advantages. Organisational problems and cultural resistance to its adoption are, however, present. The principles of presplitting are outlined, and the open hole, decoupled column, and air shock methods used in quarries are described. Guidelines for presplitting in quarries are presented. The economic balance between increased productivity and greater drilling activity remains to be clarified.

921293

Rock motion simulation of confined volume blasting

Preece, D S

Rock Mechanics Contributions and Challenges: Proc 31st US Symposium, Golden, 18-20 June 1990 P873-880. Publ

Rotterdam: A A Balkema, 1990

The discrete element code DMC (Direct Motion Code) for modelling rock motion associated with blasting is described. It employs spherical elements and vectorising of all the code for efficient implementation on CRAY type mainframes. It has been further developed for study of rock mass bulking during motion. Bulking mechanisms and their treatment are discussed. Confined volume blasting, used in retorts for in situ oil recovery from oil shales, has been simulated. Distributions of permeability are compared with those measured in the Occidental Oil Shale retorts 7 and 8.

921294

Low frequency blast vibrations from Indiana surface coal mines

Siskind, D E

Rock Mechanics Contributions and Challenges: Proc 31st US Symposium, Golden, 18-20 June 1990 P881-888. Publ

Rotterdam: A A Balkema, 1990

A study to evaluate prevalence of serious low frequency vibrations and the relative roles of geologic structures and blast delay intervals in producing such vibrations is presented. Data were collected from 9 sites in Indiana. Near surface abandoned workings were found at 6 sites. Thick, unconsolidated, low velocity surface deposits or thick glacial till deposits were present. Monitoring procedures, measured vibration amplitudes, vibration frequencies, and blast design influences on amplitude and frequency were studied. A predictive equation for low frequency vibration generation is derived.

921295

Optimization of rock fragmentation in bench blasting

Mojtabai, N; Farmer, I W; Savely, J P

Rock Mechanics Contributions and Challenges: Proc 31st US Symposium, Golden, 18-20 June 1990 P897-904. Publ

Rotterdam: A A Balkema, 1990

Heap leaching of oxide and sulphide ores is practised at the Cyprus Miami Mine, Arizona. Design of blasts in a copper porphyry orebody was altered to give powder factors of 0.26-0.71 kg/cubic m in three different types of rock, defined in terms of geological structure. Specific surface area, muckpile particle surface area per unit volume of blasted rock, was estimated photographically, and correlates closely with powder factor and rock type.

921296

Fractal-based approach to determine the effect of discontinuities on blast fragmentation

Ghosh, A; Daemen, J J K; van Zyl, D

Rock Mechanics Contributions and Challenges: Proc 31st US Symposium, Golden, 18-20 June 1990 P905-912. Publ

Rotterdam: A A Balkema, 1990

Size distributions of in situ blocks of schist and dacite and of the blasted fragments were estimated from photographs of the face and muckpile at an open pit copper mine. Fractal dimensions of the size distributions of blocks and fragments are used to determine the parameters of the Schumann distribution. Comparison of Schumann distribution curves before and after blasting is used to give percentage of blast fragments formed by natural discontinuities.

921297

Fractal concepts applied to bench-blast fragmentation

Crum, S V

Rock Mechanics Contributions and Challenges: Proc 31st US Symposium, Golden, 18-20 June 1990 P913-919. Publ

Rotterdam: A A Balkema, 1990

35 blasts in various rock types using a range of bench sizes and burden ranges, and different explosives and shot configurations were analysed. Fragment size distribution was seen to show strong statistical dependence according to a Weibull distribution. Fractal dimensions were calculated for each blast, assuming entire fragment range would exhibit Weibull dependence. The range of fractal values seen supports Turcotte's suggestion that fragmentation is scale invariant as zones or planes of weakness along which material fails occur at all scales.