JK SimBlast

Explosive Energy Distribution

2DBench

- horizontal plan at any elevation
- vertical section in any direction

2DRing / 2DFace

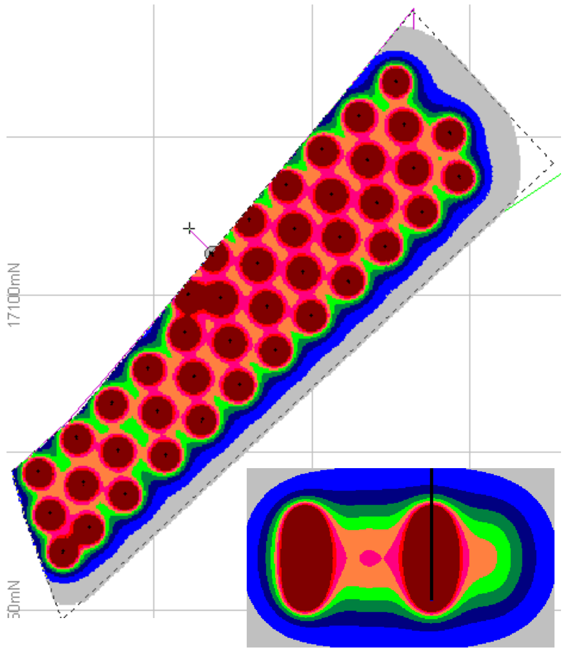
- parallel at any distance to design plane
- normal section to design plane in any direction

2DView

- planar region in any orientation

JKBMS

- display multiple distributions in 3DView, with filters

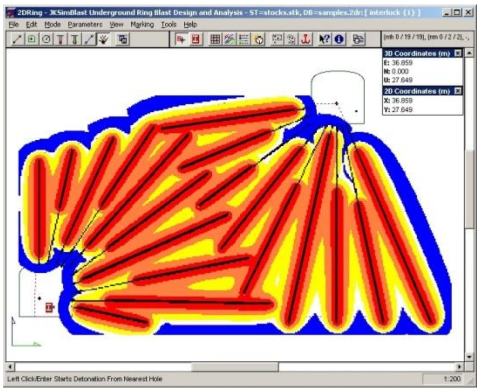


The three dimensional distribution of explosive energy around blast holes is calculated in much the same way as electrical potential fields can be determined around charged wires. Each column of charge is treated as a source of energy which spreads out with only geometric attenuation. The equations can be solved in terms of energy density or mass density to give results expressed in MJ/t or MJ/m^3, or the more common form of kg/t or kg/m^3 rock (MJ/m^2 are also calculated, equivalent to an energy flux).

The resultant contours of explosive energy are fully three dimensional and can be used as an effective design tool to determine optimum burden and spacing or to check for anomalous charging in a blast design. In the JKSimBlast design modules, it is a simple matter to set or alter any hole diameter or length, any deck's length or explosive density or energy, or the rock density, to suit every application.

The simplest and most common description of energy distribution in a blast is *powder factor*. But this number is just an average for the entire blast, and does not allow for variations in burden, spacing, bench height, hole diameter, charge length or explosive energy.

By extending the concept of a powder factor for the volume affected by each hole, it can be seen that a single point in the rock will see a contribution to its overall effective explosive energy concentration from every hole, based on the distance to, and the amount of explosive in, each hole. The total distribution is calculated from the sum of the contributions from all holes at each point.



In 2DBench, 2DRing, 2DFace, the contour ranges and areas can be copied to the clipboard for external analysis, or an energy distribution can be saved to a file for display in JKBMS.

SOFT-BLAST
software in blasting
www.soft-blast.com
soft-blast@soft-blast.com

JKSimBlast

Fragmentation

2DBench

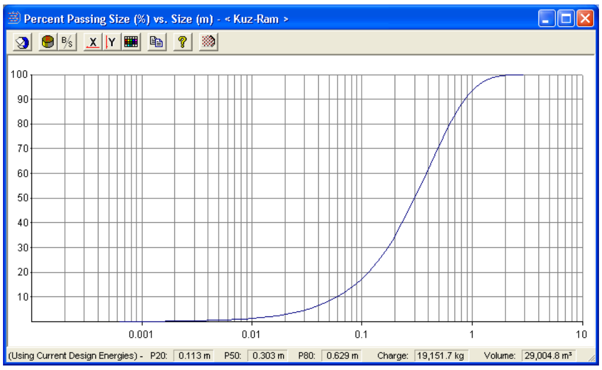
- standard Kuz-Ram fragmentation model
- JKMRC Fines Correction (Crush Zone + Kuz-Ram)

2DRing

- proprietary FragmentO model

JKBMS

- import fragmentation results from 2DBench, 2DRing or measured results from other sources
- display in single or multiple-view charts
- export data to Excel



Fragmentation is the liberation and breakage of the *in situ* blocks that make up the rock mass. It is probably the most fundamental blasting outcome because of its direct influence on the economics of mining.

If the size distribution of the resulting rock fragments varies significantly from the optimum, the performance of mining machinery, crushers and downstream processes can be adversely affected.

JKSimBlast has three models for predicting fragmentation from a blast:

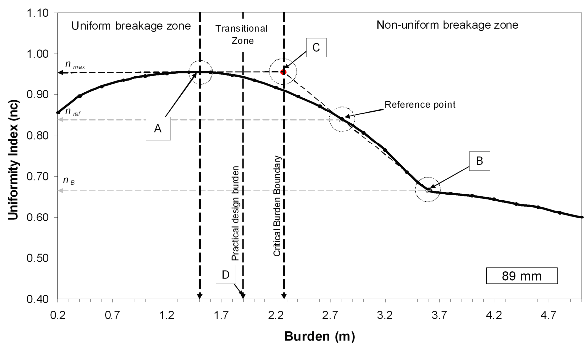
- standard Kuz-Ram
- JKMRC Fines Correction
- FragmentO

The Kuz-Ram model, for open cut blasting, is in common use in the mining industry. It combines the Kuznetsov equation for the 50% passing size, the Rosin-Rammler relationship to determine the overall distribution, a modified Lilly blastability index for rock properties, and Cunningham's uniformity coefficient for blast geometry and explosive distribution.

The JKMRC Crush Zone model predicts the extent of crushing around a blast hole and applies it to the fines portion of the Kuz-Ram results.

FragmentO is a single ring analysis for underground blasting, by modeling the extent of both near and mid-to-far field fracture zones

FragmentO is aimed at the feasibility stage in mine development, or for design evaluation in an operating mine, with a unique methodology to infer critical burden conditions.



All JKSimBlast fragmentation analyses produce a size distribution chart, with query functions and an option to export the graph data for external evaluation.

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