

JK Value Based Ore Control

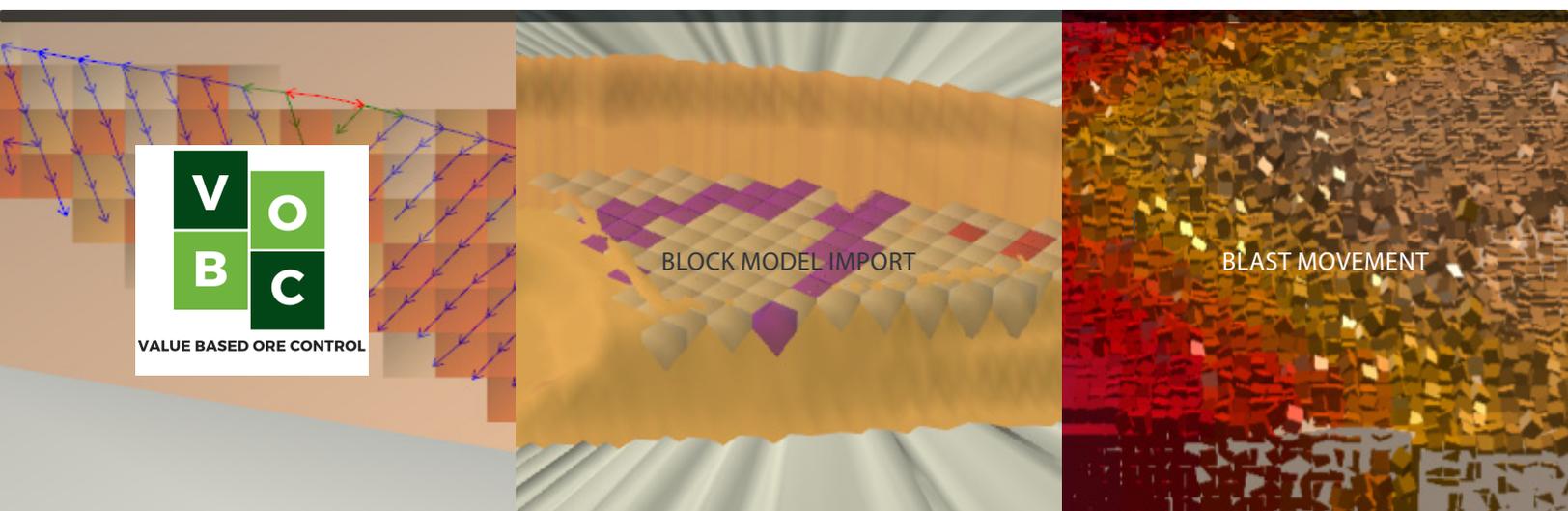
OPTIMISE YOUR BLAST WITH OUR LATEST INNOVATION
IN BLAST MOVEMENT TECHNOLOGY

JK Value Based Ore Control (JKVBOC) is an engineering tool to simulate and predict blast movement in open pit mining to make pro-active decisions. Real drill patterns, rock properties and explosive charges are imported into a physical engine that calculates movement based on a 3D discretization of the bench and explosive decks. In-situ grades are then displaced to the final position to produce a post-blast grade distribution and muck pile shape. The total simulation time lies between 30 and 90 minutes depending on the size of the blast, thus JKVBOC can be used to evaluate ore loss and dilution in real time, or to perform several pre-blast simulations to evaluate different blast pattern, blast timing and initiation options.

JKVBOC represents the in-situ rock by discretising the volume into small (2-3 m) blocks. Each block is assigned rock properties and any information available in the mine block model by matching its position to the cells in the block model. The initial velocity of each block is determined by adding the energy contribution

from all surrounding explosive decks defined by the blast pattern and explosive properties. Confinement conditions are represented by importing the real bench topography (active pre-blast surfaces) with associated free faces or by creating a geometry with confined, free and buffered faces designed to match the real conditions in the field.

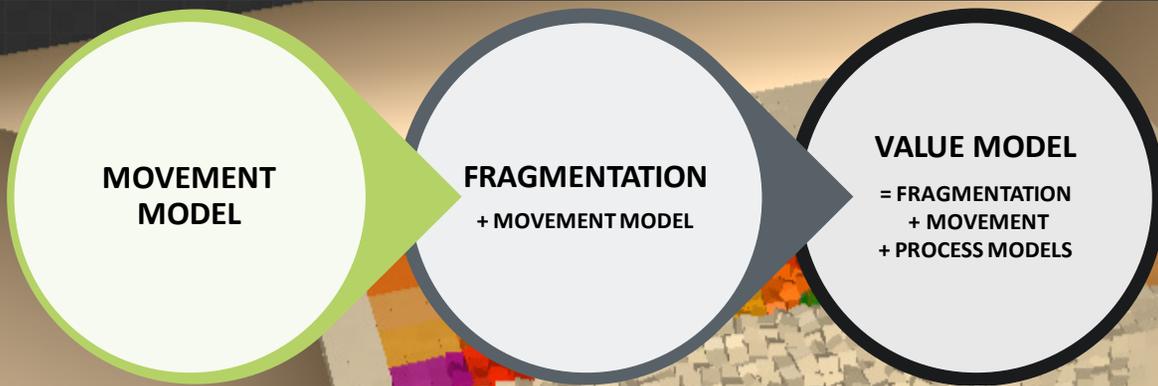
A physics engine displaces the blast blocks to the final resting position, representing all collisions with the environment (confined faces, topography) and between blocks, as well as gravity and frictional forces. The model is calibrated to match the internal displacement and/or muckpile surface according to the needs of the mine, to ensure the displacement parameters represent the behaviour of the rock mass. The final grades in the muckpile are exported as text files to input into mine planning, ore control and digging software to account for ore loss and dilution and to optimise digging and other downstream processes.



Multiple simulations can be run daily to assess alternative blast designs

JKVBOC Development

The Blast Movement Model is the first stage of development of the JKVBOC tool. Further stages of JKVBOC development are planned which include integrated fragmentation and movement models, and value based models.



Benefits

- Real blast patterns, explosive and rock properties used to simulate displacement
- Short simulation time enables multiple simulations to run daily in a standard commercial desktop or laptop computer
- 3D post-blast grade distribution for ore control and blast pattern evaluation for estimating, managing and minimizing ore loss and dilution
- No man-power at the bench required after calibration
- Any information in the block model can be mapped after the blast, enabling multi-purpose blast optimization (ore control, environmental management, etc.) based on the original block model information

Remarkable precision in simulation to maximise value of the orebody

Post-blast block model grades automatically generated for ore control

Ore-waste boundaries can be imported into ore control tools



JKTech is proudly owned by The University of Queensland and is the technology transfer company for the Sustainable Minerals Institute.

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