

JKTech Mining Consulting

Blast Audits and Optimisation



Blast audits assess the quality of the blast design and implementation process and provide an insight into problems in blast fragmentation, diggability and damage. The audit's results combined with the knowledge and tools at the JK centre provide practical solutions to improve the blasting process.

The auditing procedures identify the following parameters and characteristics in order to optimise the blasting process.

Rock / Ore Characterisation

The breakage characteristics of the rock /ore are very important for the design and optimisation of any mine to mill process. Rock mass structure, in situ block size and strength are all factors characterising the rock mass in terms of its blastability. Micro fracture network, grain size and texture properties are all important in comminution processes such as crushing and grinding.

Blastability

Rock mass blastability is a function of the mechanical properties of the intact rock (i.e. stiffness and strength) as well as the rock mass structure (i.e. insitu block size). Zones within the mine with similar strength and rock mass structure characteristics are identified as blasting domains as they should blast in a similar way.

Comminution Characteristics

It is essential to understand the comminution properties of different ore types to optimise the intergrated mine-to-mill operation. A comminution audit will:

- Conduct surveys around the grinding circuit for each ore domain
- Collect data on the operating conditions of the grinding circuit
- Collect feed samples for JKBreakage tests
- Determine full size analysis and percent solids on all slurry samples

Drill and Blast Audit

A detailed drill and blast audit is undertaken to understand the implementation of blast design, the explosive performance and to quantify the blast results such as fragmentation and blast damage.

Actual blast design parameters such as hole depth, burden, spacing, and stemming heights are measured and compared with the design parameters. Variation and operating standards can then be identified.

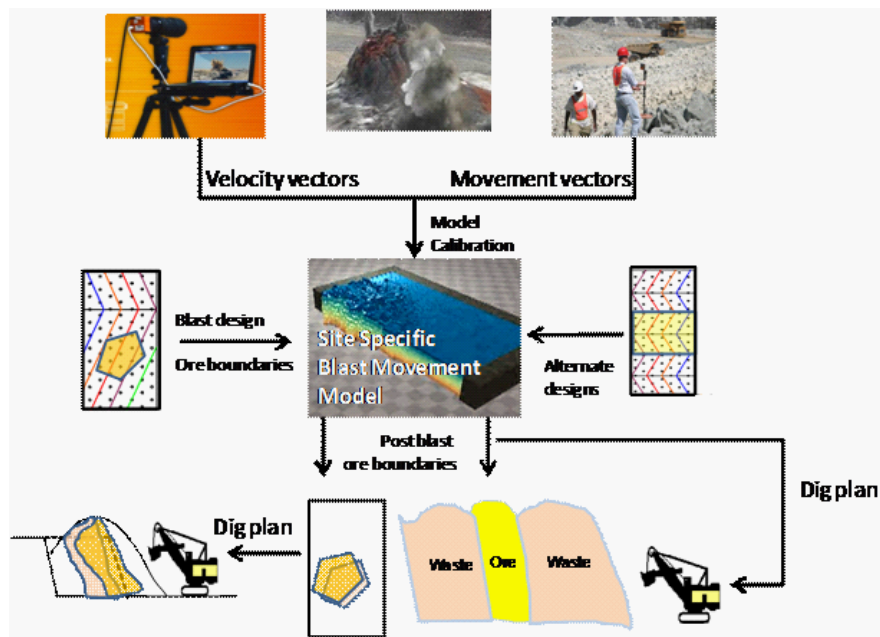
Fragmentation Assessment

Photographic techniques enable the analysis of fragmentation distribution resulting from blasts. This information is then used to establish a fragmentation model for existing blast practices. The effect of subsequent blast design changes on fragmentation can then be estimated using JKSimblast.

Dilution & Ore Loss Management

Blasting is necessary to fragment and loosen the rock mass to provide efficient excavation. However, blasting also causes a non-uniform movement of the rock and the consequence can be ore loss (when ore moves to an area marked as waste and is discarded) and dilution (when waste is incorrectly characterised as ore and sent to the plant / concentrator).

The JKMRC and BRC have developed tools to measure and model blast induced movement to predict ore loss and dilution. JKTech consultants use these tools and implement practical solutions to minimise blast induced dilution and ore loss.



Open Cast Blast Optimisation

The greater the amount of explosive energy in cast blasting reduces the amount of overburden to be handled, but increases the risk of damage to the underlying coal by:

- Fracturing and crushing the coal seam near roof and,
- Breakage and displacement of coal edge.

Open cast blast optimisation solutions follow a similar methodology wherein the effect of blasting on downstream process, such as coal loss and coal fines are understood and then optimised to increase the overall profitability rather than just blasting. This methodology has been successfully applied at several large open cast coal mines by the JKMRC and improved coal recoveries.

JKTech Services

- Consulting (comminution, flotation, mineralogy, mining & geometallurgy)
- Process Mineralogy and In-House Instrument Analysis
- Specialist Software (JKSimMet, JKSimFloat, JKMultiBal, JKSimBlast)
- Specialist Equipment (ore breakage characterisation, flotation characterisation)
- Metallurgical Laboratory Services
- SMI Knowledge Transfer

Contact

Sarma Kanchibotla
Mining Consulting Manager

Telephone: +61 7 3346 5915

Facsimile: +61 7 3365 5900

Email: s.kanchibotla@jktech.com.au

JKTech's range of technologies is supported by the ongoing research activities of the Sustainable Minerals Institute at The University of Queensland.

