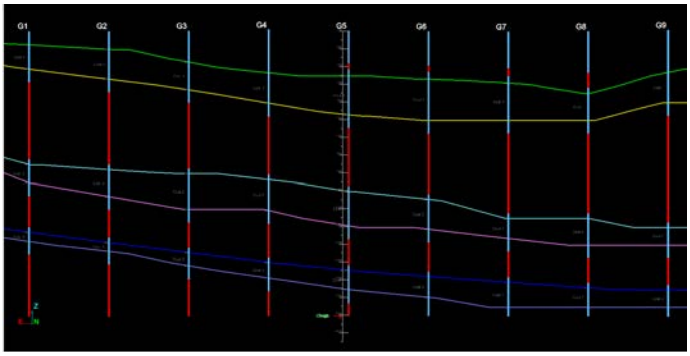
Scaled depth of burial for optimal blasts

Automated calculation and update of charge rules based on specified site blast outcomes optimises blast confinement and ensures consistent design.



A coal operation recently adopted Maptek™ BlastLogic™, which handles a range of drill & blast tasks from recording data through design to reporting and reconciliation.

When generating a charge design for each hole, site practice had been based on rule-of-thumb and 'gut-feel' and then carrying out a number of checks, including for confinement. A new approach was sought to optimise blasting practices.

The scaled depth of burial (SDOB) calculation in charge design provides an indication of confinement of an explosive charge based on variables including explosive quantity, explosive location and hole diameter.

Rather than calculating the SDOB values as a manual 'check' for charge confinement, Maptek designed an algorithm whereby desired SDOB values are input to determine the correct explosive position to achieve the user-specified confinement. The process is accurate and able to be repeated at the click of a button.

Achieving consistent outcomes removes user-generated variability, where various approaches may have been adopted in identical circumstances, in order to achieve the design criteria.

The concept was extrapolated beyond confinement in the stem zone and applied to through-seam coal scenarios. Required standoffs are now calculated around coal seams to provide consistent protection from potential blast damage, automatically adjusting for product selection and hole diameter.

When Maptek started working on a solution using the site dataset, we were able to reproduce the existing plans, where the differences incurred were due to the variability in the original process. Although our results were more consistent, there were concerns about following a different process, requiring thorough consultation with site engineers. The initial solution also required additional logic to resolve edge case scenarios.

Time saving with consistent outcomes

The biggest benefit of the Maptek solution was in saving time and removing variability around blast confinement and coal seam protection. Now the drill & blast engineer simply specifies the desired confinement values, and BlastLogic calculates the charge plan that will achieve the required result.

> In complex scenarios, one day's work can now be reduced to minutes.

Being able to solve scaled depth of burial in BlastLogic is not limited to design scenarios – it is dynamically recalculated at any point in time for the most recent hole position, geometry and down-hole geological conditions. BlastLogic automatically uses the established rule to recalculate the charge plan.

Engineers can now spend the time saved preparing the design to make sure the desired confinement values are optimal, rather than trying to create a charge plan which conforms to a pre-conceived value.

The unique BlastLogic platform allowed Maptek to devise this solution. While standard options are in-built within the program, the scripted charge rule approach allows for virtually unlimited customisation of a charge design. If it's possible to calculate a result, then it's possible to achieve in BlastLogic.