



# Open Cut Coal Solutions

Integrated mine planning tools for open cut coal operations



# A complete solution



## Dynamically link your mine designs and schedules

Deswik uses best practice mine planning techniques embedded in next generation software enabling you to spend more time analyzing and planning scenarios rather than manipulating data. Built on our core software modules Deswik.CAD and Deswik.Sched, and linked via Deswik.IS, our integrated approach to mine planning helps our clients to deliver more with their mine planning expertise.

Our software incorporates design and scheduling features across the core platform and associated modules, including:

- » Comprehensive core functionality for open cut coal operations at both long and short-term planning horizons:
  - 3D mining reserve solids with integrated Gantt scheduling
  - Audit, interrogate and manipulate geological models
  - Superior Boolean processing for accurate 3D solids
  - Detailed process management via Deswik process maps.
- » Deswik.AdvOCC, with advanced open cut coal tools for:
  - Reconciliation
  - Detailed reserving using shells projection
  - Truck limited haulage
  - Margin ranking and pit shell optimization
  - Advanced scheduling functions including objective targeting and rules based resource path generation.
- » Deswik.DD to automate and optimize range diagrams and dozer push designs.
- » Deswik.Agg to aggregate complex seam and ply grids or solids into run of mine reserves.
- » Deswik.OPDB to develop comprehensive open pit production drill designs.
- » Deswik.Blend to optimize complex blending and material flow from pit to product.

# Strong technical solutions tailored to specialized industry needs

Deswik has developed a fresh and innovative range of unique tools that span the value chain from receipt of a geological model through to reporting for costing. Our integrated planning tools give our software the proven capability and reputation of taking a project from the design stage to a schedule faster than ever before.

## Unified design & information management in 3D environment

- » Powerful design tools automate creation of designs. Best-in-class solids manipulation allows perfect 3D representation of each reserve block.
- » Attributes for scheduling are created and manipulated during the design process and stored directly on designs, freeing the design process from cumbersome, disconnected spreadsheets and databases.

## Superior interoperability

- » Spend time engineering, not transferring and manipulating data.
- » Native support for many file types, and generic import tools that provide many options for seamless information transfer.
- » Convert unused data into knowledge. Effortlessly extract data from other diverse databases on site, directly into the design or scheduling environment.

## Flexible data manipulation without opaque scripting

- » Use Deswik's transparent Microsoft® Excel style formula builder without knowledge of arcane scripting languages.
- » Using Deswik improves efficiency and self-sufficiency by removing thousands of lines of computer code that previously required specialist intervention to fix or change.
- » Completing all calculations, from simplest to most complex, in an open format improves governance by making the entire plan readily auditable.

## Best-in-class reserving

- » Fastest, most automated reserving tools for open cut coal.
- » Reserve conventional, structurally complex, steep dip or partially underground mined deposits with speed and accuracy.
- » Grid or solids-based aggregation, pit optimization

on block models or solids, margin ranking and many other tools make this the ultimate reserving package.

## Geological data from any source

- » Work interchangeably with grid models, implicit models and hybrids.
- » Import gridded seam models from all major geological packages.

## Integrated scheduling & blending

- » Remove or minimize planning horizon interfaces by using a common platform for short, medium or long term scheduling.
- » Convert design data directly into schedule tasks and easily update with design changes or survey updates.
- » Gantt chart based scheduling is easy to work with and is more readily understood by all stakeholders.

## Landform and Haulage modeling

- » Don't just calculate trucking, take it to the next level using the most flexible landform and haulage scenario analysis tools on the market.
- » Rapidly test and refine haulage strategies, selective material placement scenarios and other material transport options in a single model.
- » Market leading integration with scheduling environment allows dynamic modeling of 'truck limited haulage'. Automatically account for changing from 'excavator limited' to 'truck limited' and back again, ensuring production estimates are not overstated.

## Superior reporting

- » Simple and powerful reporting from both schedule and 3D environment improves communications and stakeholder buy-in.
- » Save time communicating your plans with fast, professional plotting tools including full CAD-style annotation and presentation.

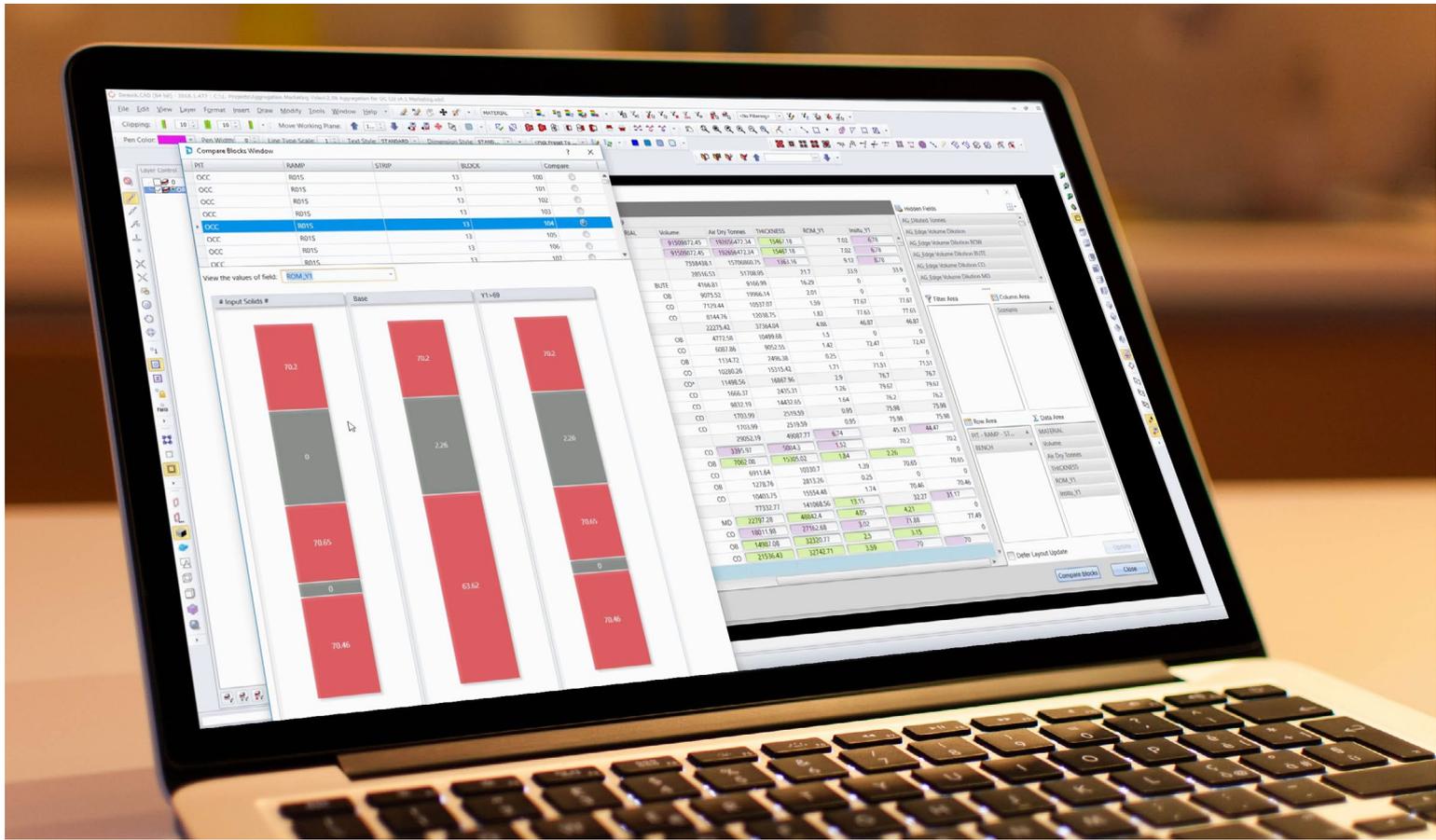




## Deswik.AdvOCC

### Advanced functionality tailored to the specialized demands of open cut coal operations

- » Advanced reserve projection
  - A CAD-based feature that introduces advanced reserving processes and tools using the shells projection methods.
  - Incorporate access ramps down each projected highwall for more detailed reserves.
  - Using reserve solids, grids or block models, vary the revenue to calculate the pit shell delivering the maximum undiscounted cash flow.
- » Automated road design tool
  - Determine cut & fill requirements from road centerlines, with solids creation and surface updating.
  - Design to gradient, bench and berm limitations with cut and fill balancing for dropcuts.
- » Truck-limited haulage
  - Specify the available truck fleets and Deswik dynamically models the mining and dump schedules based on trucks available.
  - TLH is appropriate for modeling mixed-fleet haulage scenarios.
- » New landform and haulage options
  - Incorporate conveyor systems with fixed and mobile conveyor load points, modelling interaction with normal truck haulage circuits.
  - Include trolley assist haulage options into landform scenarios.
- » Advanced resource leveling
  - Access to scheduling features such as backwards pass leveling, multi-field or sink rate targeting and time usage models.
  - Short term manual scheduling via interactive resource paths or import resource paths from other packages.
- » Interactive spoil balance tool
  - Interactively modify pre-strip horizons with instant spoil balance feedback.
  - Detailed reporting on individual and cumulative block spoil room.
- » Dragline spoil pile design
  - Automatically create multiple detailed dragline spoil designs and solids for use in dragline planning or Deswik.LHS.
  - Options available at the click of a button, to include low-wall berms and central low-wall ramps in designs.
- » Reconciliation
  - Generate as-mined, as-designed and difference solids from initial, design and final surfaces.
  - Detailed reporting of compliance to plan from a 3D perspective.
- » Margin calculator
  - Wizard-based calculation of Net Present Value and incremental, cumulative and maximum cumulative margins from reserve solids.
  - Import, export and run multiple scenarios against defined costs and revenues.



## Deswik.Agg

Simplifying complex aggregation processes to create fit for purpose Run-Of-Mine (ROM) reserves

- » Auditable, rule-based approach delivers the flexibility to tailor aggregation settings to any deposit.
- » Set rules for thickness, material type or quality and apply different loss and dilution factors (roof, floor or edge).
- » Ensure mined horizons satisfy constraints by incorporating pre and post requisite testing.
- » Manage and run multiple rule sets simultaneously for rapid scenario generation and comparison.
- » Assess effect of equipment selection by defining multiple equipment types with different loss and dilution parameters.
- » Transparent pivot-style reporting interface highlights factors influencing aggregated ROM tonnages between scenarios.
- » Graphical side-by-side comparison shows the physical impact of different aggregation constraints.
- » Generates final mined working section grids or solids with all calculated aggregation values.
- » Auditable outputs are suitable for downstream planning processes such as margin ranking and production or dump scheduling models.

“Work with grids or solids to create mineable working sections at the block or deposit level”



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## Deswik.OPDB

### Fast, efficient drill and blast design for open pit mining methods

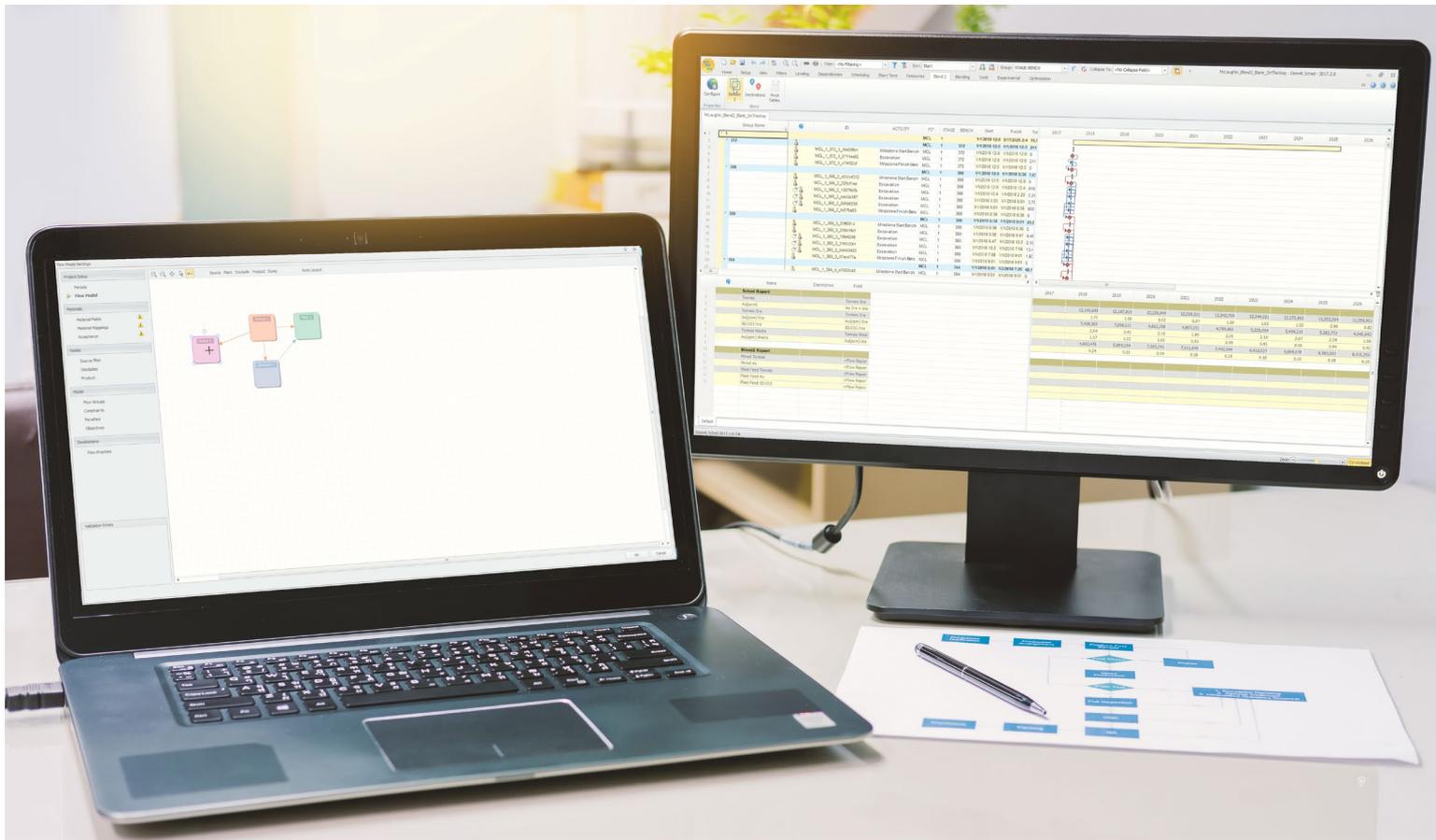
- » Construct hole templates with design parameters such as fixed/variable collar or toe spacing, angle changes and variable toe horizons.
- » Rapidly generate drill patterns using pre-defined hole templates then manually adjust as required to final design considering previous design and geological structures.
- » Audit drill patterns against blast hole distribution and location constraints.
- » Update hole layouts against survey and design changes, fast and intuitive hole numbering.
- » Export design data ready for direct import into BMI's BlastPlan Pro design software.
- » Plot any combination of plan and section views for drill pattern designs.
- » Rapidly set up plot templates with tables referencing key design information that updates for each plotted drill design.
- » Export to various data formats and upload the design directly to the drill rig.
- » Distribute drill designs and GPS guidance files to surveyors in either DXF or CSV formats.

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## Deswik.DD

### Automated dragline and dozer push section design tool

- » Intelligent, rapid selection of multiple blocks using automated vertical dependencies.
- » Cut / Move operations: all operations including the profile operations will show previews on mouse movement of how the result will look after selecting a location.
- » Reference points allow users to dig dump and position draglines in a rules based manner to allow for section automation and time saved when adapting to plan changes.
- » Parameters used for every operation are preserved for auditing purposes.
- » Section steps can be copied along strike or down dip to significantly reduce the design time required to complete a single or multi strip dragline/ dozer scenario.
- » Assumed blast profiles can be swapped out for surveyed post blast scans to provide up to date and accurate pass factors with significant reductions in rework.
- » Export pass-by-pass results and dimensioning straight to Microsoft Excel.
- » Write attributes back onto solids for direct integration with Deswik.Sched.
- » Support to use spoil design tool outputs from Deswik.AdvOCC.



## Deswik.Blend

### Optimize your product value with material flow modeling

- » Build a network of sources, stockpiles, dumps and plants to model material flows and transformations to products and waste through an intuitive graphic interface.
- » Materials can be modeled on either a raw or product basis and incorporate unlimited variables.
- » In multi-period mode - make the optimal decision of where to send material once mined, develop product strategies considering capacity and blending constraints to maximize value across multiple periods.
- » In single period mode - make the optimal decision of when to mine and where to send material once mined, develop plans considering mining, capacity and blending constraints to achieve product targets on a period-basis.
- » Integrated seamlessly within Deswik.Sched eliminating any manual transfer of data.
- » Extend the results to Deswik.LHS for haulage scenario analysis including stockpile reclaim and reject placement trucking.

“Make the optimal decision of when to mine and where to send material once mined”

# Our industry leading consulting solutions include

-  Mine planning, design and scheduling
-  Ongoing engineering and training support
-  Software implementation and reviews
-  Equipment selection and optimization
-  Mine rehabilitation, water analysis and closure
-  Technical due diligence, peer reviews and audits
-  Scoping, pre-feasibility and feasibility

