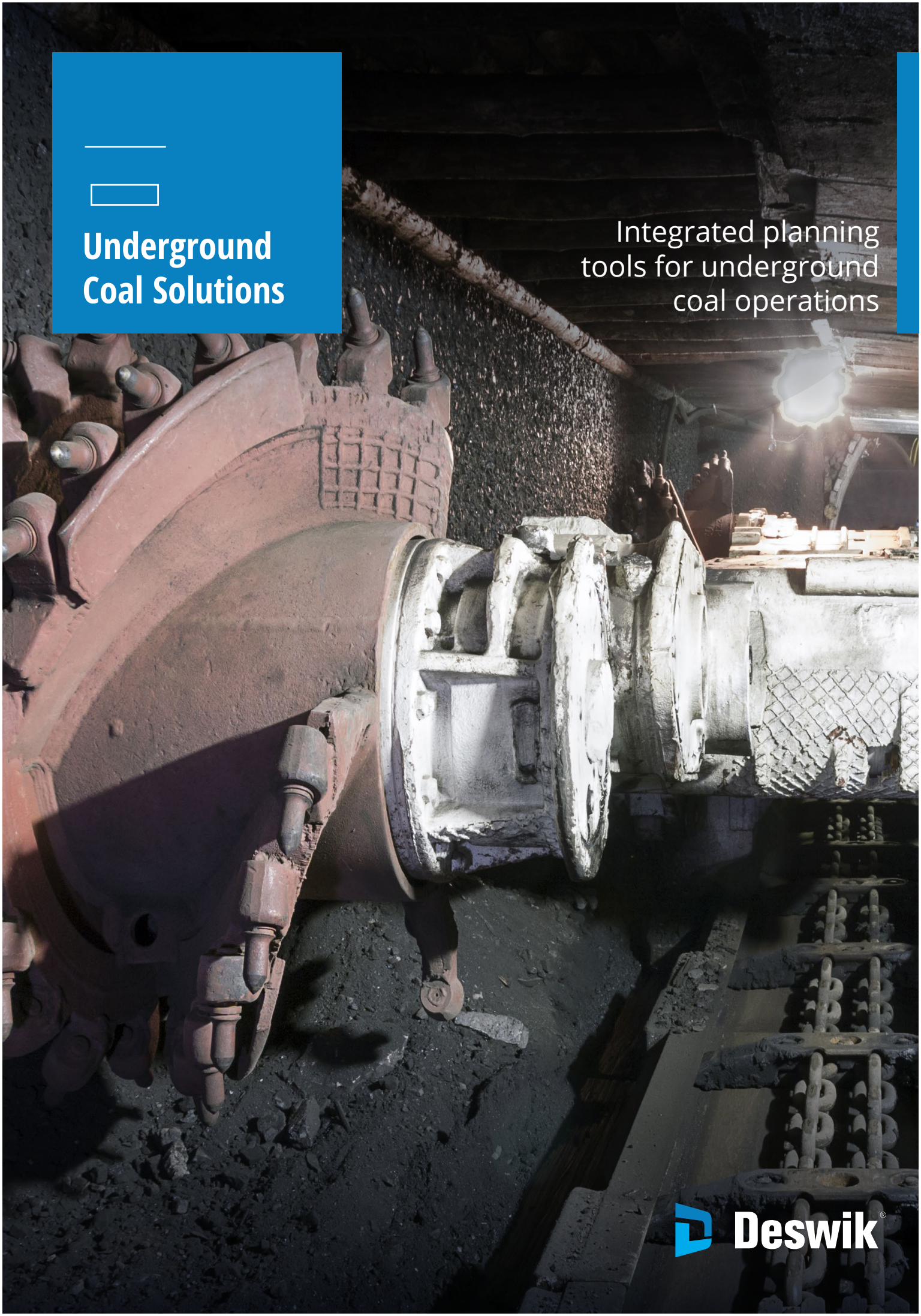
# Underground Coal Solutions

Integrated planning tools for underground coal operations



Deswik®

# 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 underground coal operations at both long and short-term planning horizons:
  - 3D mining reserve solids with integrated Gantt scheduling
  - Complex grid manipulation
  - Polygon zone interrogation
  - Detailed process management via Deswik workflows.
- Deswik.AdvUGC, with advanced underground coal tools such as:
  - Underground design toolbox for gridded roadway panels and longwalls
  - Easy reconciliation tools for compliance auditing
  - Advanced scheduling functions including backwards pass resource leveling, objective targeting and resource path importing.
- Deswik.Agg to aggregate complex seam and ply grids or solids into working sections, including Longwall Top Coal Caving (LTCC) horizons.
- 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.

- Design, reserve and schedule short, medium and long term.
- Accurately model and schedule in 3D LTCC, variable cut horizons, stone drivage, and all interactions with surface mining and infrastructure.
- Undertake economic analysis including cash margin ranking.
- Create a master site schedule and use critical path analysis tools on both production and outbye projects with Deswik.Sched.

**3D design environment**

- Powerful automated design tools for rapid centreline layouts.
- Best-in-class solids creation for true 3D representation of development and longwall reserves.

**Geological data from any source**

- Interrogate complex seam quality models, including multiple ply and seams, with ease.
- Work interchangeably with grid models, block models, implicit models and hybrids. Import grids and models from all major geological packages.

**Integrated scheduling**

- 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.

**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.

**Defined constraints**

- Transfer surface constraints to the seam using polyline projections.
- Create longwall subsidence zones and project them onto the topography.
- Visually assess the true impact of seam faulting and dip in a 3D environment.

**Zone interrogation**

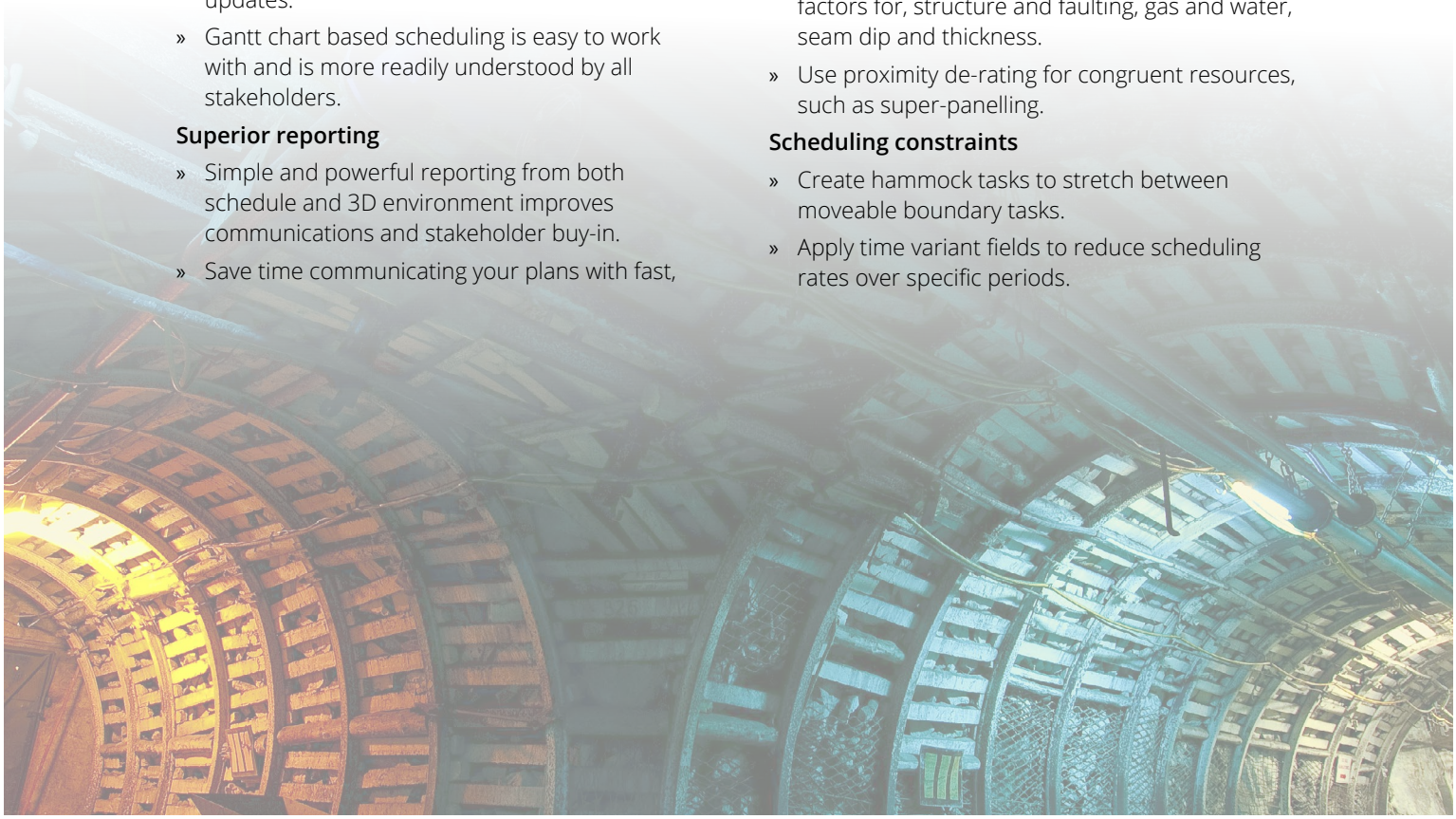
- Create influence polygons around known seam structures and account for abutment zones with increasing support requirements.
- Generate effective hazard mapping with transferable effects on schedules.

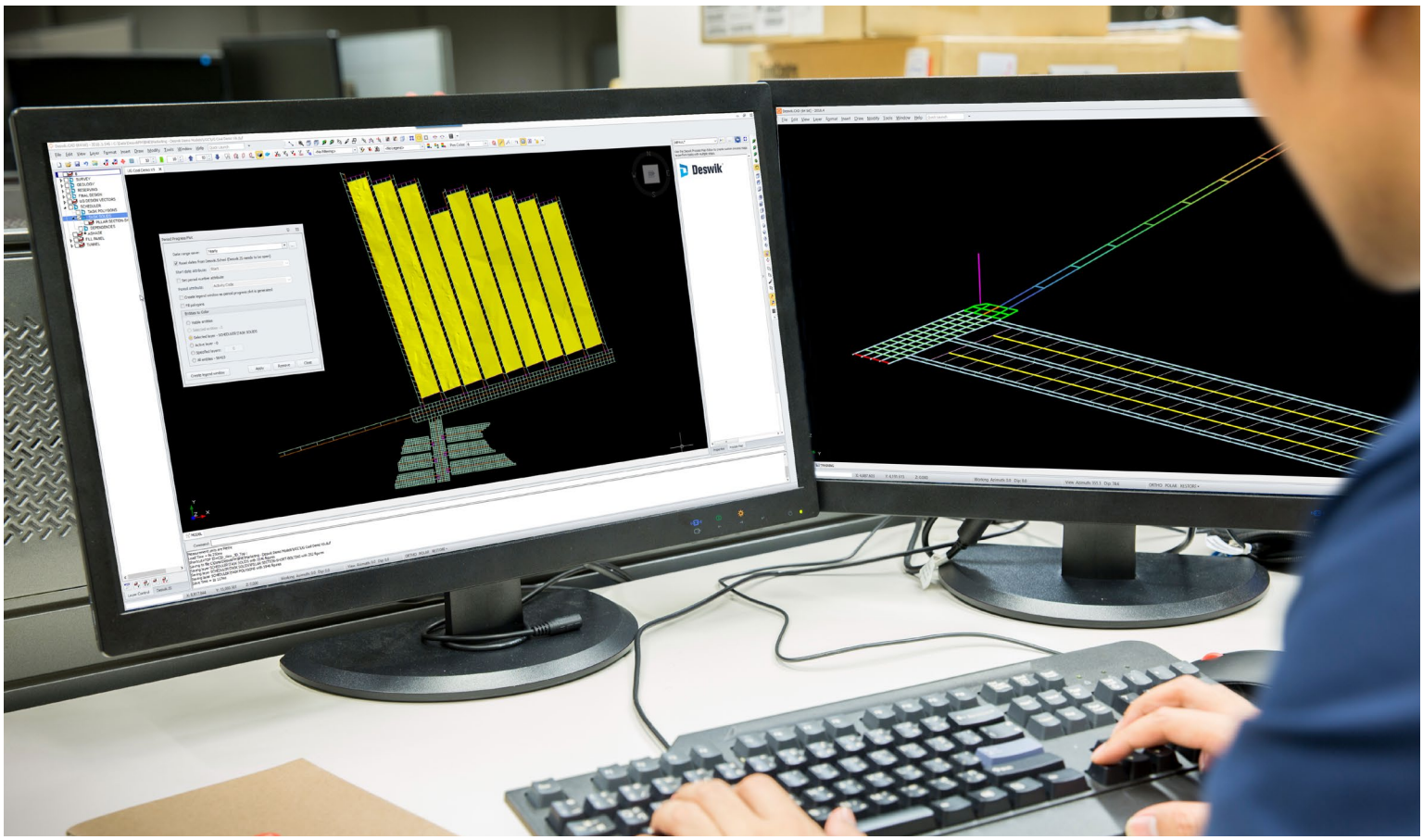
**Resource-based rates**

- Build machine production rates with easy-to-understand formula builders with de-rating factors for, structure and faulting, gas and water, seam dip and thickness.
- Use proximity de-rating for congruent resources, such as super-panelling.

**Scheduling constraints**

- Create hammock tasks to stretch between moveable boundary tasks.
- Apply time variant fields to reduce scheduling rates over specific periods.






# Deswik.AdvUGC

## Advanced functionality tailored to the specialized demands of underground coal operations

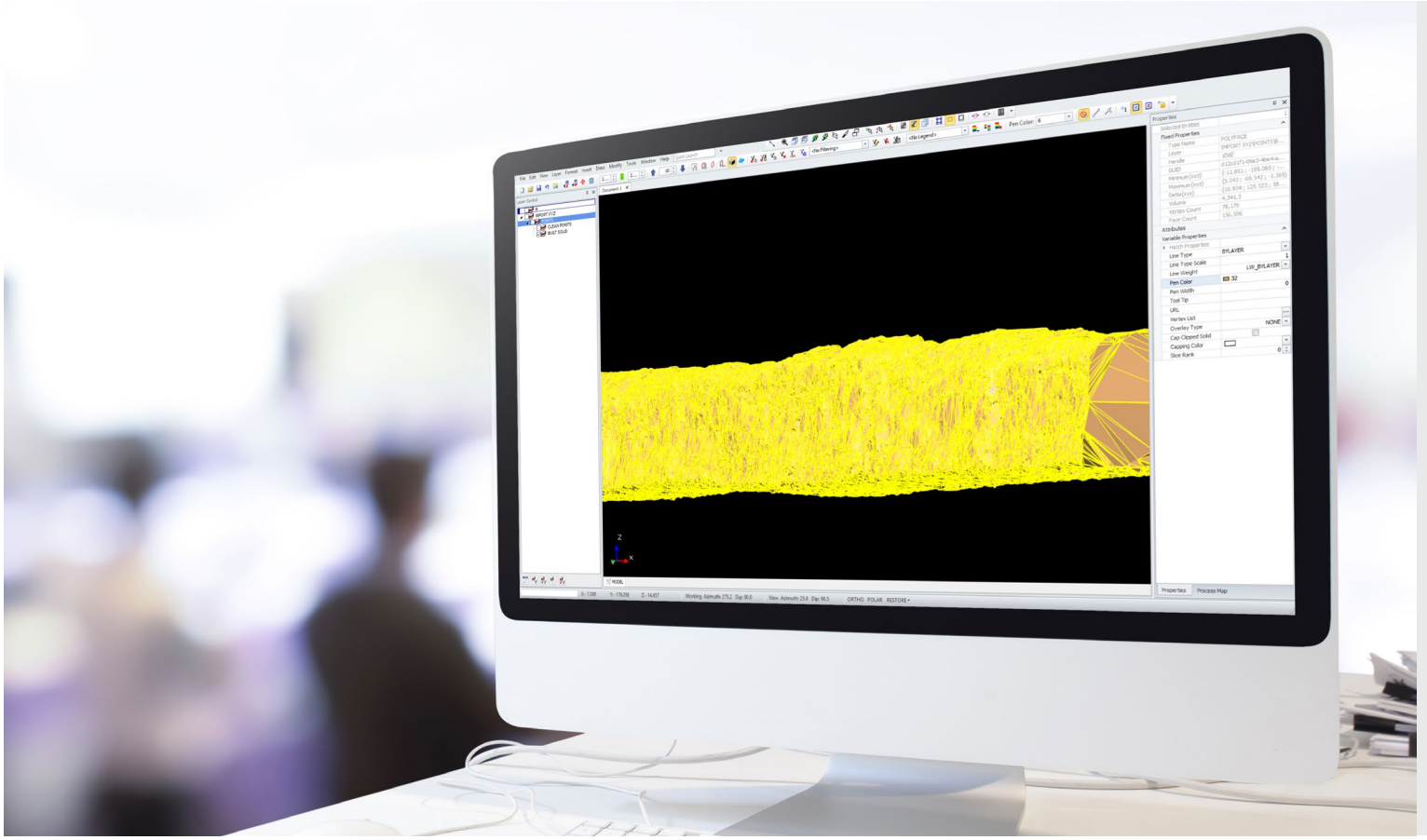
- Underground coal design toolbox
  - Automates centreline creation for longwall panels and gridded roadways such as mains, gateroads and development panels.
  - Generates the metadata required to process design lines into 3D reserve solids via the Deswik.IS.
- Auto development designer
  - Uses rule-based processing to modify design lines for irregular and special development.
  - Automates standard polyline manipulation tools as well as formula-based attribute assignment.
- Process tunnel as-builts
  - Generate as-built solids from any combination of floor, roof or rib line survey pickups.
  - Able to generate from a single rib pickup line using a nominated cut height and survey pickup height.
- Process CMS
  - Import CMS polylines or triangles and stich them together to create a closed solid.
  - Rapidly generate shells around CMS point cloud data.
- As-built reconciliation
  - Detailed reporting of reconciliation between as-built and design solids from a 3D perspective.
  - Calculate overbreak and underbreak incrementally against design centrelines.
- Advanced resource leveling
  - Access to 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.
- 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 as required.
- Calculate Stereonets
  - Import strike azimuth and dip data to generate geotechnical Stereonets directly in the Deswik.CAD design space.
  - Supports Schmidtt, Wulff, Rose and observation diagrams.

# Deswik.Agg

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

- Work with grids or solids to create mineable working sections at the block or deposit level.
- 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.

"Rapidly identify the economic limits of deposits"

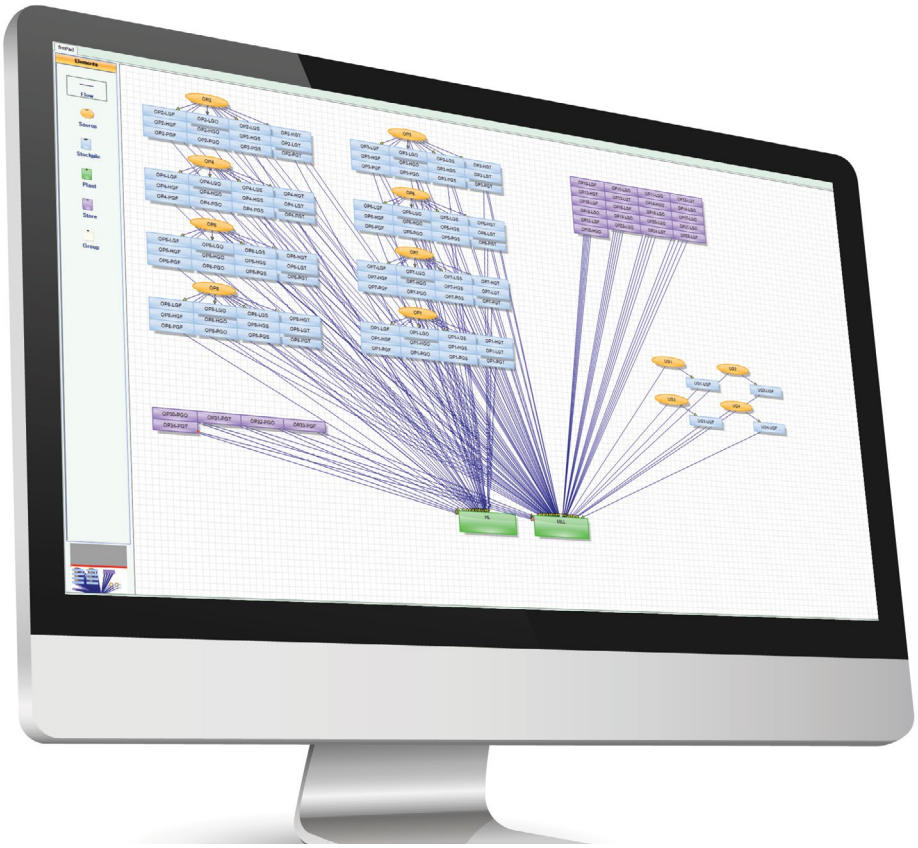


# Deswik.AdvSurvey

## Fast, efficient point cloud handling

- Generate a solid from scans including multiple drives and cross-sections.
- Automatically generate a survey outline on the floor of the drive from the scan data.
- Removes the need for doing manual surveys along the drives to pick up wall outlines and surface features for volume calculation.
- Clean up tool – utilizing user-defined parameters, the tool automatically removes features inside of a scan such as vent bags, cables and pipes, rock bolts so that the solids generation tool can be used to create a clean solid.
- Build pillars from room and pillar mining styles.
- Reconcile an existing stope or development design with an as-built.
- Use intensity values for visualization of structures and comparison with surface scans.
- Import large scan data files from open pit and underground scanners through common file formats and convert to points, surfaces or grids.
- Allow users to control their results.
- Integration with Deswik's mine design, scheduling and data management modules.

"Generate quality survey solids from high-resolution scan data in less time"



# Deswik.Blend

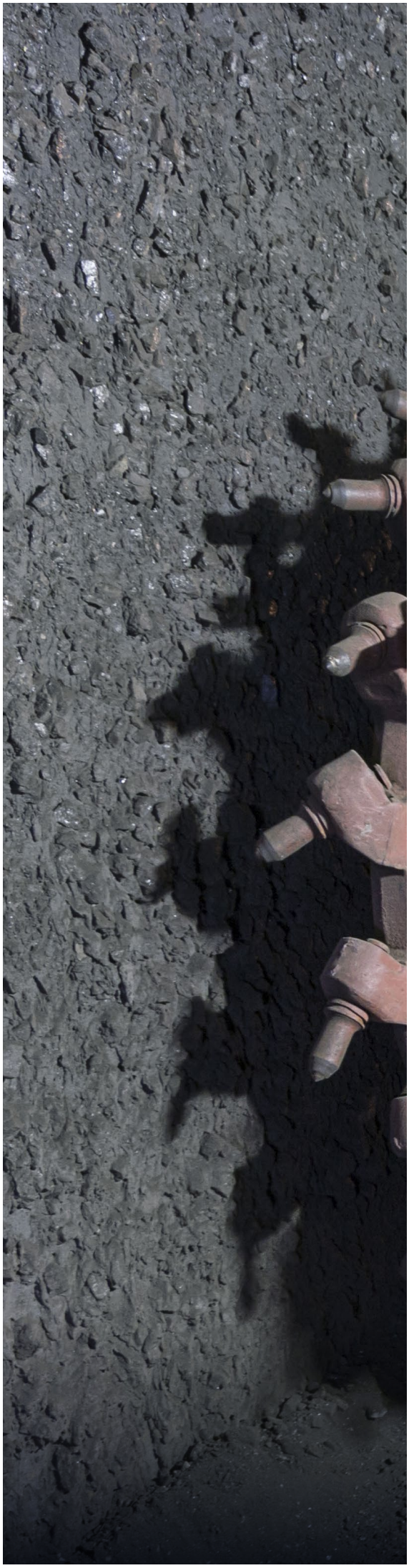
## Optimize your product value with material flow modeling

- 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 & 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



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