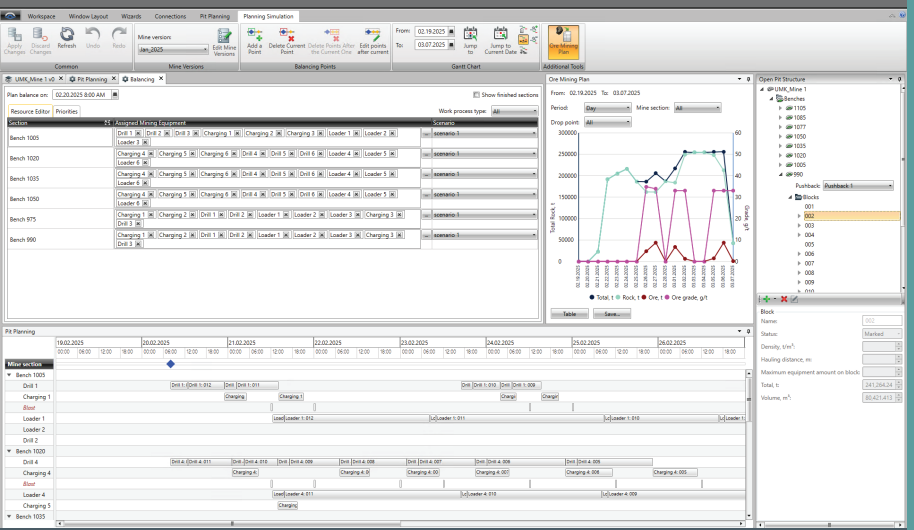
SIGHT POWER

MINE ADVISOR™ OPEN PIT DIGITAL MANAGEMENT:

Optimizing Mine Design and Planning, Logistics, Emissions, and Mine-to-Mill Integration

OPEN PIT DIGITAL OPERATIONAL MANAGEMENT IN THE NUTSHELL

- **Starting Point:** Utilizes a Whittle shell for green-field or the existing geometry for brown-field operational or both
- **Automated Grade Control from exploration to stockpile:** Integrates geological models with drilling and lab assay data for automated ore blending/head-on grade control
- **Interactive Block Planning:** Automated block delineation and sequencing
- **Road Network Adaptability:** Accommodates both actual road networks and simplified haulage routes models
- **Smooth planning transition:** from long-term to integrated medium- short-term planning
- **Consistent Topology:** Maintains consistent geometries through topological covering, preventing block overlaps
- **AI-Driven Optimization:** Employs AI-based genetic algorithms for short-term scheduling, considering operational constraints



Shift-based scheduling interface

KEY DIFFERENTIATION

- Seamless transition from long-term through medium-term to short-term mine planning
- Integrating short-term mine planning with Fleet Management Control System for actual vs. planned production criteria reconciliation
- Planning down to a single machine operation on a shift/daily basis
- Ability to modify plans at any level and automatic plan updates based on last shift report
- Real-time ore-flow tracking, grade control and stockpile management
- Live connection to maintenance and reporting systems

IT'S NOT A MIRACLE:

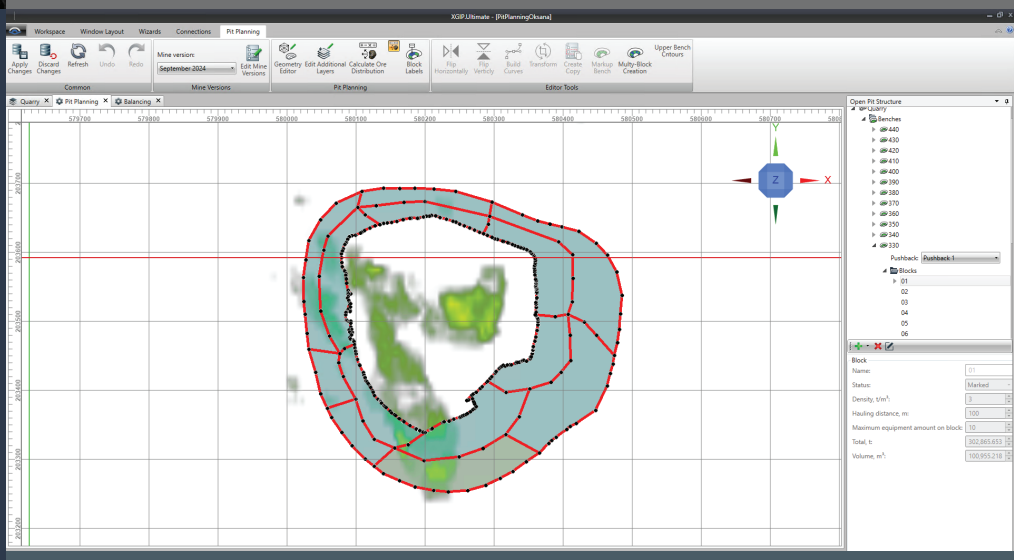
IT'S ABOUT WHAT WE DO AND HOW WE DO IT

WHITTLE SHELL AS A STARTING POINT

The design of each open pit mine typically begins with defining the ultimate Whittle Shell. The Whittle's Pit Optimization is a technique used to determine the ultimate pit limit, which is the most profitable pit configuration. Whittle shell generation includes creating a block model, generating cones, and conducting economic evaluations, followed by further pit optimization.

After generating the Whittle shell, clients often face challenges with consistent optimal planning. They typically lack tools that allow for plan adjustments at various planning horizons without the need to manually rebuild all plan components, making it difficult to promptly respond to changes dictated by the current economic and operational situation.

DIGITAL MODEL (AKA DIGITAL TWIN) OF AN OPEN PIT AND GEOMETRY PLANNING



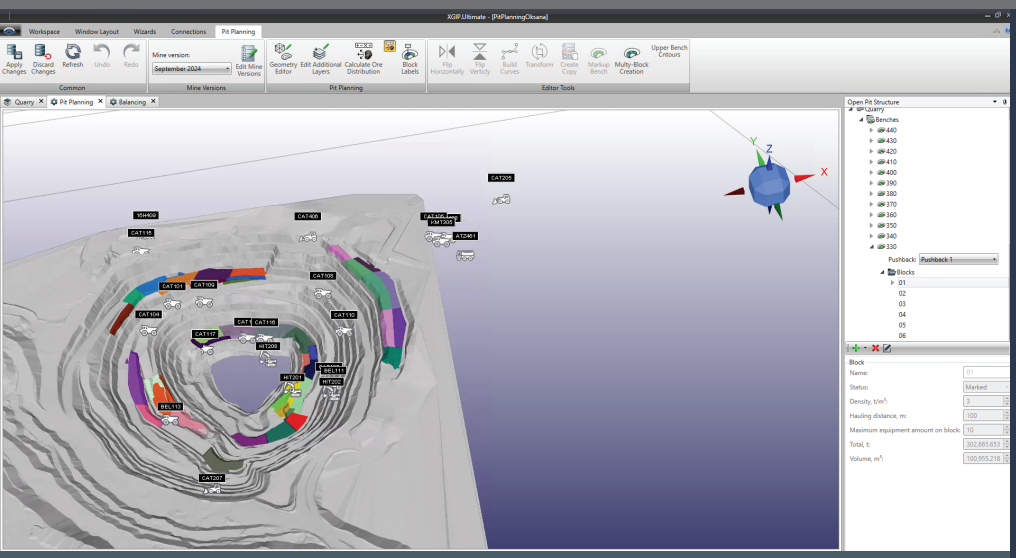
Interactive Block Planning: automated block delineation and sequencing

Mine Advisor™ Open Pit Planner implements a unique technique for automated open pit planning, providing maximum flexibility and effectiveness. The integrated digital data model, also known as the digital twin of a mining enterprise, contains a model of an open pit and all related information. This information is stored in a structured database and used for open-pit planning.

Long-term planning involves preparing the target open-pit geometry for the required period. Geometries can be created using the available tools or imported from third-party software. Flexible management of the target geometry includes combining several mining processes in one plan and moving required benches to the next stage as needed. The actual open-pit geometry is stored in the database and regularly updated according to mine survey data.

Once the target geometry is defined and the actual geometry is loaded, more detailed bench planning becomes possible. Based on the target and actual geometry, bench geometries are calculated and divided into blocks. The blocking procedure creates a topological model where all blocks are connected. Changes in any block are automatically applied to adjacent blocks, eliminating errors associated with overlapping geometries. Major block parameters, such as volumes and content, are calculated automatically during editing and can be quickly assessed.

The system supports setting mining constraints and suggests the optimal sequence of block extraction. The planning system implements the concept of working areas, defined as a combination of a current mining activity and dedicated resources. Multiple tasks can be carried out simultaneously in different parts of the mine. Each area consists of a sequence of blocks, with resources distributed amongst working areas and each area being assigned a specific mining activity. The operational scenario determines the equipment used in each area and the stages of block mining, including drilling and blasting operations.



Integrating short-term mine planning with real-time Fleet Management Control System

THE OPTIMIZATION OF SCHEDULES FOR TRUCKS AND OTHER MOBILE EQUIPMENT

After geometry planning is completed and resources are assigned, the system performs simulation modeling of mining operation scenarios using AI-based decision-making. This scenario modeling includes optimizing a dynamic dispatching system for managing trucks and other mobile equipment, considering various parameters. As a result of this modeling, a mining plan and an ore supply plan are developed.

The operational planning simulation can specifically optimize and reduce daily emissions from drilling, blasting, hauling and loading by tailoring the process to the parameters of the equipment in use.

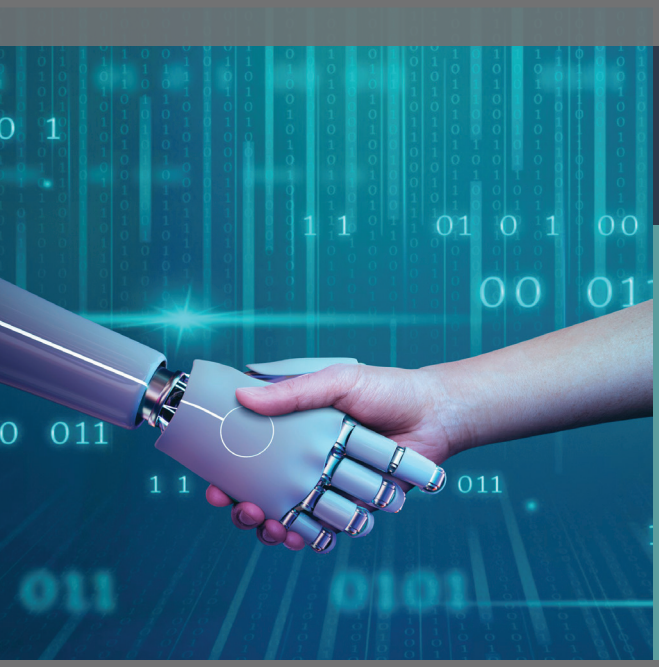
The described simulation is implemented by a specialized simulation module that uses the road network model. The system is designed to utilize several levels of road network abstraction, ranging from a detailed real road map for short-term operational planning to a generalized haulage routes network. This allows users to create realistic long-term or mid-term plans even at the earliest stages of open-pit planning.

FUEL CONSUMPTION AND EMISSION LEVEL OPTIMIZATION

SightPower's Digital Mine™ platform transforms mining companies by creating digital twins of mining facilities and equipment, while integrating them with operational workflows. Based on Digital Mine™ platform we propose AI-based operational planning tools to optimize and reduce every-day emissions from drilling, blasting, loading and hauling, tailored to the parameters of equipment in use.

THE GRADE CONTROL

Using information from the geological model, the user can assess the concentration and volume of minerals, as well as calculate the total rock volumes that must be removed from each bench. As new data is received, such as the results of laboratory research on blast holes chippings, it is integrated into the system, updating the geological model. This allows for more accurate forecasts for further planning.



AI-BASED PLAN OPTIMIZATION: OPTIMIZING DECISIONS FOR EACH SHIFT

The optimization of mine planning is achieved using AI-based self-learning algorithms that vary the priorities of different working areas to achieve optimal parameters for the final mining plan for each shift. Integration with Fleet Management Control Systems (such as Wenco or Modular Mining) allows for promptly receiving data on the actual progress of mining operations, automatically adjusting forecast indicators, and conducting more accurate simulation modeling.

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