

# STRATEGIC MINE PLANNING IS ESSENTIAL TO ENSURE LONG-TERM VIABILITY IN CHANGING TIMES

The new Strategic Mine Planning (SMP) solution from Dassault Systèmes allows mining operations to update their planning and modelling quickly by assessing all options available to ensure long-term viability. In the wake of the ongoing Covid-19 pandemic, SMP was used to evaluate 1,600 options in less than 15 hours, resulting in a NPV increase of 5%.



**Andy Mulholland**, GEOVIA Business Consulting Director

Dassault Systèmes has developed a new Strategic Mine Planning (SMP) solution centred on its 3DEXPERIENCE® platform. It aims to optimise geoscience, mining and production operations, according to Global Business Development Director **Andy Mulholland**. Dassault Systèmes already has a wide footprint in the mining industry.

To illustrate the flexibility of the process, 23 pits were recently analysed from eight directions. In this instance, the net present value obtained for each pushback direction was considered. About 1,600 directional alternatives in the nested pits were evaluated in less than 15 hours and then narrowed down to three of the best pushback directions, based on the customer’s KPIs. Of these, one was the most feasible and easy design implementation to yield the maximum performance of the final mine pit over a long duration, delivering a net present value increase of 5%.

The Covid-19 pandemic has had a devastating impact on the global mining industry. According to S&P Global Market Intelligence, it has disrupted 275 operations across 36 countries. The total revenue at-risk from impacted mining projects globally is over \$8.8 billion. Yet mining remains an essential industry. Therefore, the strategic importance of proper planning cannot be underemphasised.

“Planning plays a fundamental role in the evaluation of any mining operation, from the initial resource estimate to the project feasibility stage. Such planning also has to be inherently flexible, taking into account the viability of a resource, whether or

not it is economically feasible to extract, how long this will take and the best sequencing of such extraction. What's more, all of this has to be analysed over the entire life of mine, which could be anything from 30 to 40 years or longer," comments Mulholland.

Assumptions around mining costs are largely dependent on the mining method selected. While caving is an effective mass-mining method, it is an upfront decision that effectively locks you in to this approach. Underground and open-pit options, on the other hand, give the operator more control through the life of the mine. Even the mining direction can be altered over the life of mine to track the ore body more accurately.

The SMP solution is critical to guide investment decisions during the exploration or feasibility stage as it can be used to update resource and reserve models. Understanding what is viable to extract, in addition to the grade and value in the light of fluctuating commodity prices, results in an updated life of mine estimate. Procurement decisions in terms of capital equipment, for example, can then be optimised.

"Hence, it is essential for mining companies to be able to run as many different scenarios as possible to generate multiple options for dealing with a range of contingencies. This underscores the true value of a mine in relation to its costs in real-time, to drive investment decisions in as smart and as proactive a manner as possible given the current volatile market conditions. The advantage of the SMP solution is that it does not merely generate a myriad of potential outcomes," elaborates Mulholland.

Dassault Systèmes has the necessary tools to be able to isolate those options least sensitive to the variables under consideration for added robustness and improved decision-

making. For example, a plan with a slightly lower net present value for a mining operation may be far more robust and less susceptible to uncertainty.

This will resonate with both mining companies that have just completed strategic planning updates for a July financial year-end, meaning their planning may need reviewing, as well as those who are just starting to plan for a December financial year-end, which means they need immediate assistance in embarking on this important process.

Dassault Systèmes can provide the SMP solution as a service for existing customers in order to generate as many scenarios as needed, or they can acquire the technology solution directly along with detailed training. For open-pit and underground operations, it is probably more of the latter. In terms of caving, SMP is offered as an integral outcomes-based service. "Here we update the mine plan accordingly, provide the options and the best scenarios and then report", notes Mulholland.

In tandem with pit design, a robust production plan must take into account several strategic questions such as the estimated life of mine, the mining rate and subsequent processing rate, the location of the dump piles and the critical infrastructure required. In this instance, Dassault Systèmes ran 9,680 sequences with different cut-off grades, prices and production capabilities and capex, generating a so-called 'hill of value' in under 24 hours. "Hence, production becomes more manageable, stable and sustainable. An efficient mine with an optimal production plan guarantees surety of a mining project in the long term, whilst minimising risk," concludes Mulholland.

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— Andy Mulholland





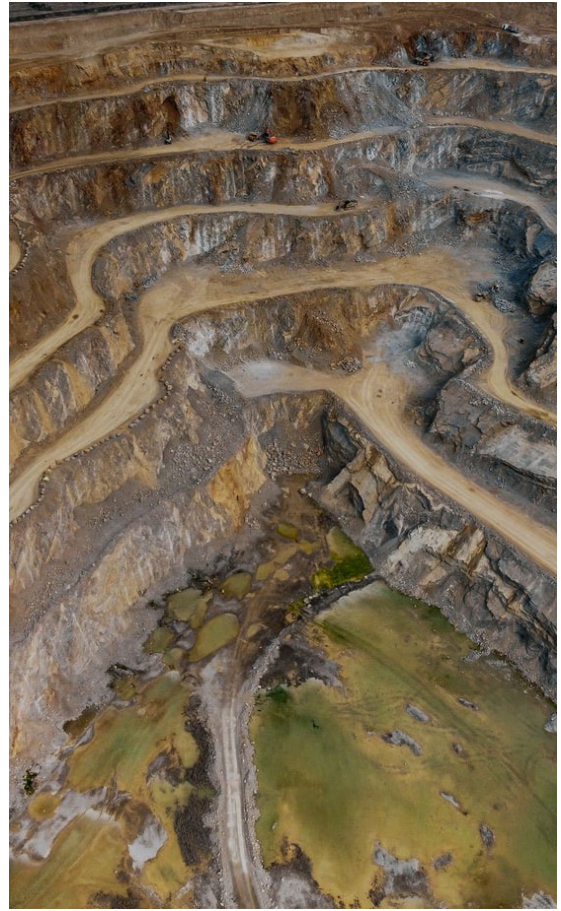
## STRATEGIC MINE PLANNING FOR OPEN PIT, UNDERGROUND & CAVING

### SOLUTION CAPABILITIES

- Aggregate input data, assumptions and constraints into a central location
- Leverage historical data to correctly define mining parameters
- Determine trends and correlations between historical data
- Incorporate mine status, geotechnical constraints and operational risk
- Couple the geotechnical domain with mine extraction to model interactions (e.g. cave back propagation to material flow to cave draw points)
- Run thousands of scenarios in a design of experiments to ensure the most robust plan is selected
- Project lifecycle governance with approval traceability and version management

### SOFTWARE COMPONENTS

**3DEXPERIENCE®** platform, GEOVIA, SIMULIA, EXALEAD, ENOVIA



For further information about the **3DEXPERIENCE®** platform from Dassault Systèmes for the mining industry, visit <https://www.3ds.com/products-services/geovia/products/geovia-3dexperience/enterprise-collaboration/>

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