

Copper-gold miner boosts strategic planning value and maximises productivity with SOT

Diversified metals miner | Copper and gold | SOT | Australia



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Overview

This copper-gold miner was seeking to maximise the net present value (NPV) of their open pit operation through the optimisation of their long-term schedule. With two processing plants and a number of unique constraints, the outdated software they had used to date had identified the highest margin areas of the deposit but had not delivered an optimised schedule accounting for ore types.

Challenge

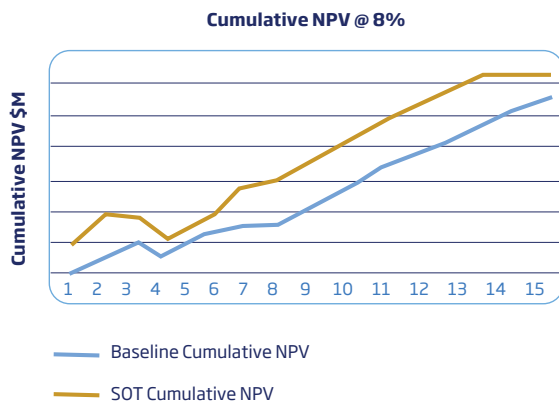
Most mine scheduling software tools will help to deliver a schedule that can be achieved from a practical mining perspective, but are not focused on optimising the NPV of the deposit. Each deposit has unique constraints, operating parameters and dependencies that make identifying the areas and order of which to mine them very difficult. Each area has unique tonnages and grades that, when combined with the operational and processing constraints, can produce an intractable number of options to schedule the extraction of the material. Given these varying complexities, there is an enormous responsibility on the mine planner to maximise the value of the deposit by developing a schedule that is not only economically viable, but also practical to deliver.

One of the major challenges in achieving this outcome is associated with the mine planner having enough information and time to investigate the most beneficial scenarios among the millions available to subsequently select the schedules that will provide the most value to the business. In selecting a more advanced optimisation tool, the company was looking to:

- Extract additional value from existing gold-copper reserves.
- Implement flexible and robust processes around planning optimisation.
- Test and compare different mine schedule scenarios that would enable the mine planners to evaluate different strategies.

Solutions

SOT, RPMGlobal's Intelligent Optimisation software, is the mining industry's leading strategic financial optimisation tool for both underground and open pit mines. SOT maximises productivity and profitability outcomes by optimising the NPV of the mine schedule. SOT's evolutionary search algorithm optimises long-term mine schedules to increase NPV, decrease capital investment and shorten the payback period, thereby freeing up capital to be used elsewhere in the business. It allows the mine planner to assess cash flows, mine life and equipment utilisation and rapidly re-optimize when conditions change. SOT is purpose-built for scenario planning and comparisons and is a stand-alone software. It can use any long-term schedule as an input which is then optimised taking into consideration items such as production constraints, dependencies, product prices, contaminant costs, recoveries and a raft of other important factors. The output is an optimised schedule that is aligned with a mining operation's business goals and objectives. This is a tool that is indispensable for mine planners, freeing up time to analyse multiple strategies and select the options with the highest value to the business.



Impact

The operation chose to deploy SOT to review and optimise options for the existing Life of Mine [LOM] schedule.

The primary objective was to increase the NPV, however profitability index, peak profitability index, periods and quantities below target and multi-objective were also considered. SOT ran over 6,800 different schedules and included over 15,000 blocks. The SOT optimised schedule generated dependencies enforcing slope constraints, while mining in locations that maximised value but also obeyed the ore type quantity constraints. Other key benefits the customer achieved through the use of SOT included:

- As the graphic below depicts, SOT successfully identified a 20% increase in NPV from the existing plan in a shorter life of mine plan. The optimised schedule delivered significantly more material at the start of the mine life which tapered off towards the end. The SOT schedule redistributed the extraction of the different ore type.
- The operation also harnessed RPMGlobal's Open Pit Metals Scheduling solution (OPMS), enabling the blocks to be imported into SOT and the project subsequently configured with slope constraint rules, the financial model, equipment constraints and plant constraints. After some initial runs, the optimisation parameters were configured and a SOT run was carried out with the optimisation objectives of maximising peak NPV. The workflow between OPMS and SOT meant the schedule could be run in OPMS to visualise the outcome and report the results.
- With SOT implemented, users can undertake further runs for sensitivity analysis, such as varying costs and assessing impact. Any changes contemplated to the fleet and any updates to projected metal prices can be very quickly reflected in updates to the project and the schedule can be re-optimised under the new conditions.

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