# Calculation Management with Confidence: Creating Robust, Auditable Processes in the Mining Industry

In the marketplace of technical products and processes, growing competition has required faster development and higher efficiencies in almost every sector. Companies go to significant effort to invest in their most important assets – namely, the products they deliver. These products are comprised of various designs, techniques, and intellectual property, all of which are managed across an organization with careful thought and attention.

There's a fundamental process behind these company assets that is often overlooked, and its lack is responsible for aches and pains that most engineers face on a regular basis. What's often missing is calculation management, a process that treats your calculations like the vital, valuable company asset they are. Recently, Diavik invested in tools and processes for making the most out of the calculations they perform.

The technical processes involved in a diamond mine comprise a large amount of variables, parameters, and potential for inefficiencies. At Diavik these processes are regularly analyzed to give them a more precise understanding of their future yields, and to find efficiencies along the way. To perform this analysis, they have traditionally relied on spreadsheet tools, but are now trying to move beyond the limitations they experience using spreadsheets alone.

*The Diavik Diamond Mine*

As the Superintendent of Process Technology at Diavik, Yuri Kinakin uses a host of analysis techniques to ensure that Diavik is using the best techniques available for processing their materials. Traditionally, they relied on spreadsheets and other mathematical software to coordinate their workflows and analyze them for accuracy and improvements. Recently, Yuri moved some of Diavik's analysis requirements into Maple, the calculation management tool from Maplesoft, in order to simplify their calculations and provide better insight compared to what was available with their previous tools.

The large amount of parameters involved in Diavik's processes can result in some complicated calculations. The matrix multiplications they perform have traditionally taken more time and effort to complete than necessary. "We use our spreadsheet tool more than we want to," Yuri noted. "Maple just made it easier – calculations we used to do in previous tools can be done in Maple using only a few lines."

Another common task for Yuri and his team requires fitting curves to a set of throughput data they gather regularly. They are interested in finding the probabilities that their throughputs will exceed specific quantities; thus accurate probabilities become valuable information in each process plan. Instead of doing polynomial fitting in other tools, Diavik used Maple's curve fitting package, which was designed specifically for this kind of work. Using Maple, Diavik was not only able to get accurate fits for their process data, but they could provide transparency for their analysis, making calculations easy to understand across the entire team.

As Diavik takes positive steps to manage their process calculations better, they hope to use Maple for even more of their work. Similar to many technical organizations, they are still reliant on a variety of spreadsheets that, while functional, don't provide them with the flexibility or simplicity they need.

"Our spreadsheets can be unnecessarily complicated, and over the years, we've seen them grow into something very big and clunky," Yuri commented. As more calculations are transitioned to being managed by Maple, Diavik hopes to provide easier, more auditable reports that allow other teams to validate the work being done.

Although Yuri has only been using Maple at Diavik for a few months, he has already experienced time savings in his process planning. By making complex calculations easier to perform, Yuri has been building a stronger foundation of calculations that can provide more accurate solutions to the questions he had previously been trying to answer using spreadsheets.

Yuri's approach to calculation management is a sign of the growing need across industries to treat calculations as a valuable, structured asset. Of course, many professionals have their own personal preferences for where to do their calculation work, and adopting new tools can be hard to justify. Spreadsheet-based tools have become ubiquitous for quick and simple mathematical needs, but many companies only explore new tools as a reaction to the problems they've run into. By that time, they're already experiencing losses from their underperforming tool, and pressures to find a replacement run high. The current pace of technical projects requires a proactive approach to managing calculations properly, in a way that cuts out the redundancies and downtimes associated with the often-disorganized techniques of the past. By using Maple to perform calculations in a robust, fully-documented environment, Yuri is helping Diavik make the most out of the intellectual property they've been building over their decades-long history.

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