Enabling mining innovation through virtual worlds

What if you could fully understand every aspect of a mining operation, find innovative ways to improve it, and know every nook and cranny of it without ever having travelled to it? You can with Dassault Systèmes and the virtual world of the mining technology. The technology takes customers on a transformative innovation journey that is a true leap forward into the 21st century and beyond.

The mining industry is at a tipping point in its history, in need of innovation to ensure it remains sustainable and able to better weather challenging economic times. That is why there has been a growing call from leading industry executives over the past several years to bring philosophy and technology proven in other industries into mining.

Mining executives are seeking to move beyond technologies currently used in the industry to answer increasingly complex questions that will enable them to develop sustainable businesses that can succeed in any economic climate. To do this, they are looking to make transformations within their businesses, to bring consistency to their businesses through its operational level to the c-suite is the objective of improving the efficiency of capital improvement needs, it is critical to improve it, and know every nook and cranny of it without ever having travelled to it.

In mining, we call this the 3DEXPERIENCE Mine, a platform that spans exploration, mine planning, mining construction, operations, through customer delivery, and ultimately mine closure. 3DEXPERIENCE Mine helps mining companies understand, control and increase the value of their businesses. With data from across all aspects of the operations, it is also a collaborative engine, with end-to-end traceability and decision-support.

3DEXPERIENCE Mine provides a single version of the truth by centralizing, sharing and managing all data such as: resources, reserves, mine designs, plans, production schedules, analytics, historical data, etc. Through this, it provides an immediate, global understanding of how well processes are functioning right now, this week and this month with the ability to rapidly identify problems and introduce improvements. It also drives advanced simulation which will allow more complex scenarios to be researched.

On a large scale, for example, one can walk through a virtual version of a mine site before construction, while at the same time review the economic impacts of changes to the configuration of equipment, the plant, or locations of stockpiles or haul roads. Out-of-left-field ideas, such as the utilization of blimps to in lieu of the building of a railway network to connect the mine to a port, could also be explored.

A smaller scale, engineers may use the virtual world to test the assembly of a virtual version of a modular plant before it is fabricated and shipped to site. As a virtual version of a mining business and its operations, the Virtual Mine will enable collaboration in new ways, bringing together the best and brightest minds from inside and outside of the company.

Mining companies can connect to their vendors in 3DEXPERIENCE Mine to create a virtual team of experts. A mining company may use the system to gather data on equipment performance with the objective of improving the efficiency of its global fleet by say, 10%. To meet this goal, real-time data could be incorporated from production schedules to account for maintenance routines, or reshuffling done on the fly with work orders issued to equipment operators to keep production on track within shift.

When equipment breaks down, data can be shared with the vendor to gain their assistance in diagnosing and resolving the problem. Questions that could be answered might be:

- How can performance be improved by identifying equipment, uptime, maintenance time and other issues causing downtime?
- Will changes in capacity, equipment utilization and routing are needed to most effectively increase productivity and lower costs?
- What is the best strategy for part sourcing?

Together with mine plans, schedules, optimal routing, stockpile utilization and processing, all options can be simulated with 3DEXPERIENCE Mine to come up with the best options. However, a more interesting possibility is utilizing mining data to find modular equipment designs that are optimized for specific types of mines and mine deposits, making them more efficient.

In another scenario, imagine a sudden rise in commodity demand. Mining companies will want to maximize the opportunity while not escalating costs and decreasing productivity. Corporate, strategic planners, operations decision-makers, and planning engineers can work together, leveraging geological models, market data, logistics data, historical data and other information to simulate different ramp-up options to find the lowest-cost, most economically sustainable options for ramping up production and then scaling down when necessary.

Since 3DEXPERIENCE Mine spans the mine site to customer delivery, it enables mining companies to deploy demand-based scheduling. This keeps mining companies to demand-driven production, providing key performance indicators to planners that enable them to make smart adjustments to plans to maintain peak efficiency.

3DEXPERIENCE Mine and its Industry Solution Experiences, Dassault Systèmes provides ready answers to questions mining companies have, such as:

- To rapidly scale up/down production, what changes would be required at specific mines (infrastructure, plant capacity, personnel, etc.)?
- What is the most economical way to implement changes?
- When re-opening or closing mines, is it cost-effective to reallocate equipment to/from operations?

The world of virtual experience is rapidly changing the way that mining innovates and runs its businesses.