

Digital Transformation in the Golden Age of Mining Technology

Earning a Social License to Automate



In this second of a three-part series, read about how changing times have had an impact on mine safety and technology for sustainability, and how operators prioritizing all of these are reaping the benefits.

By Marc Poulalion, senior industry marketing manager, Aspen Technology

Technology drives improvements to the bottom line as it always has, but in today's environment, profitability isn't the only important metric anymore.

There was a time before the information age when mining consistently made the list of the most dangerous industries in the world for the number of injuries and fatalities that it produced each year. Safety incidents were simply accepted as part of the reality of working in an inherently dangerous industry, and while efforts were made to minimize these events, they still occurred.

Since the 1990s however, due partly to the increasing visibility of the instantaneous news cycle enabled by the internet, increasing accessibility to regions where mines operate, and most recently social media, the volume and scale of safety events reached a point where mining companies were starting to see it affect their license to operate. Mining companies were already starting to address these issues and many first world societies introduced legislation and regulation to provoke change within the industry.

With the increased visibility, changing regulatory frameworks, and the underlying ethical and moral issues at play, the general approach to health and safety within the mining industry swung quickly from the notion of accepted risk to the common zero harm and zero tolerance policies which most mining companies strictly adhere to today.

Public perception influenced by a range of sources led to a paradigm shift in a traditionally conservative, slow-to-change industry. Mining companies quickly took the positive effects seen through organizational and cultural changes and implemented them into their operations worldwide. This is why, generally speaking, safety incidents have reduced internationally, not only in first world regions where regulation and legislation were introduced. The industry agrees that safer mining equals better mining.

The positive impact of prioritizing safety and sustainability

Recent studies have shown that since the start of the new millennium, mining has dropped out of the top 10 lists of

most dangerous industries as a result of implementation of advanced safety systems, better prevention education, more detailed safety processes, and the introduction of technology. Automation of certain parts of the value chain remove the human element from potentially hazardous environments.

Technology has also made unpredictable safety events, more predictable, and therefore more manageable. The narrative has changed from accepting that mining is inherently dangerous to questioning if it even needs to be so, especially because the technology to enable safer operations worldwide is now available, and the range of available solutions continues to expand.

While still a crucial focus of every major mining company in the world, more recently safety is being prioritized alongside sustainability. In the same way that safety became a key focus, the increasing visibility of the environmental and social impacts of mining have led to mining companies once again seeing their license to operate at risk if they're not actioning strategies to minimize their impacts on the environment and the societies in which they operate. The industry is also now seeing that more sustainable mining equals better mining.

As a rule, mining companies are heavily invested in doing the right thing by their shareholders, the people they employ, the societies they operate in, and the environment. Unfortunately, those goals can at times be juxtaposed or worse still, be diametrically opposed, which leads to an extremely challenging balancing act. Volatile world commodity markets and the ever-changing nature of the economics behind mining amplify this effect.

Investment in technological solutions that affect a mining operation's degree of sustainability often has the desirable side effect of also improving productivity and profitability. As such, technological solutions that can affect those factors at-scale are highly sought after and currently seeing surges in adoption, which will only continue well into the future.



Technology's role in safer, more profitable and more sustainable mines

It's important to note that in many mining operations today, technology is making the difference between a profitable, safe, sustainable and competitive operation, and one that's not. The mining industry has expanded and bred an extremely competitive marketplace where tenths of a percent scale of improvement can make a difference to not only the revenue figures, but the social and environmental factors. Mining companies that have developed strong partnerships with their tech providers are among the most competitive and profitable in the market.

Mining companies are moving toward automation to remain competitive. Boards of directors for each mining company have shareholders to report to and operate in competitive markets with rapidly changing fundamentals. Therefore, any edge that helps them maintain or gain the lead must be at least considered, and anything that will make the difference between an operational mine and one on care and maintenance, must be implemented as a matter of urgency.

With demand for metals being underpinned by global 2050 net zero targets, the electrification of the personal vehicle market, and global efforts to decarbonize and develop renewable energy resources, the number of mining operations is set to increase substantially. Current supply will be completely outstripped by demand in the near future, especially if newer discoveries are developed sub-optimally.

New mines will lead with technology

For the newer operations coming online, the decision points of technological adoption will be much simpler relative to existing operations. Mining companies that demonstrate corporate principles centered on safety, sustainability and profitability, thereby protecting their license to operate, will find they are more attractive to debt and equity financing providers who will be more certain of their return on investment.

Lenders of today are similarly becoming more invested in sustainable operations, with many having introduced policies to simply not finance projects that are, or are at least seen to be, more deleterious to the environment or pose too great a risk to the societies in which they operate.

Existing operations face the challenges of the classic "business as usual" discussion which presents an uphill battle when attempting to implement new strategies and approaches to an already operational business. At times, "if it ain't broke, don't fix it" is the prevailing school of thought, with many mindsets fixed on day-to-day operational productivity and monthly or quarterly tonnage targets.

While demand will be strong for decades to come, the ability to gain financing, mine as sustainably as possible, and ensure the safety of the employees and societies in which mines operate, present key challenges and risks that can, at least partially, be influenced or even mitigated with the right communication, partnerships and technology.