



# HOW AI HELPS BOOST MINING SAFETY AND PROFITABILITY

➤ *Predictive technologies take the mining world by storm, providing new insights to help them avoid dangerous situations and costly mistakes.*

The adoption of digital technology in the heavy-duty industry, such as mining and mineral processing, has taken longer compared to other industries, such as oil and gas. Although both are very intensive users of large assets, there is a widespread idea that mining is naturally a wear industry, where most equipment deteriorates very quickly, and its failures are unpredictable. Therefore, being able to manage frequent shutdowns and the excessive preventive maintenance of critical equipment has, historically, been the standard practice in this industry.

A combination of volatile commodity prices, remote and wireless technology advances, as well as higher costs to produce has encouraged these companies to focus on increasing



the life cycle of assets and commit to increasing operational excellence. An area that has recently become an opportunity for digital technology to provide relevant value to the mining processing industry is to efficiently operate with minimal human intervention and predict failures before they lead to downtime or asset degradation.

According to the Occupational Safety and Health Administration (OSHA), more than 20 percent of the accidents in the industry occur during unplanned downtime or machine failures. Out of the 80 percent of accidents that happen during normal routine maintenance, many occur due to lack of subject matter expertise, lack of having a preliminary diagnostic before approaching the machine and defective work methods.

Beyond safety, cost is another issue that arises with standard preventive maintenance. Mining companies have designed in redundancy at extra cost, like conveyors and slurry pumps, to have “spare parts” available during unexpected malfunctions. Additionally, the sheer cost of downtime could take a major hit on revenue for mining companies – our own customers have indicated that unplanned downtime costs three times as much as planned downtime.

By using AI software in the operations, companies avoid unplanned downtime by predicting and mitigating asset performance issues and increasing equipment effectiveness through machine learning and AI. The benefit available today for this industry, through autonomous and predictive maintenance, is enormous. With double-digit potential reduction in maintenance costs and up to 10 percent increase in production, it is no doubt that leading mining companies are turning their focus to digital transformation of maintenance processes.

## **Moving from Preventive to Predictive**

Preventative maintenance involves processes and activities that do not treat or address the underlying problem and often prolong or delay the inevitable. This often means additional downtime or replacement costs through early change out of equipment. We have seen many examples of additional preventative maintenance activities that are executed poorly, through incorrect change out and have introduced further issues. This all leads to more work and ultimately increases the safety risk.



## ABOUT THE AUTHOR



Laura Stridiron has 20+ years in industrial maintenance and global field service across multiple industries. As a member of the AspenTech Asset Performance Management marketing team, Laura looks to use this background to communicate how the powerful solutions address the recurring frustrations of customers is the most value added way. She holds a bachelors in Mechanical Engineering from Virginia Tech and an MBA from Indiana University.

Predictive maintenance is a different approach; it employs powerful AI and machine learning to analyze a wide range of factors and variables in production, can determine from that analysis which variables will lead to certain patterns and behaviors of plant equipment, both fixed and mobile equipment. It categorizes asset conditions as into three buckets: normal behaviors, anomaly behaviors or failure patterns. The system can then alert mining companies to failure, well in advance (weeks, even months) of the actual breakdown of the equipment, and it is all based on early warning signs and

patterns found in operational data. For example, when the system monitors asset behavior, if it detects something that deviates from normal conditions it will send an alert to staff – this gives staff the opportunity to make appropriate adjustments and plan ahead to better accommodate downtime if the equipment needs to be serviced, shifting production schedules accordingly.

Apart from leading to predictions of potential failures, predictive maintenance technologies also provide relevant insights to asset operators on variables that need to be

manipulated to extend its lifecycle. It can prescribe specific maintenance actions and spares that may be required to fix a predicted failure, reducing the number of hours of man-machine contact at site, improving safety as a result. It also plans the optimal maintenance timing, and it stages all resources when “wrench turning” is required, to minimize the impact on production schedules. Effectively, predictive maintenance technology does it all.

An interesting use case of predictive maintenance technology at work is a diamond mine that applied predictive

maintenance to a variety of equipment. It detected immediate behavior anomalies in the mine’s primary crusher, where maintenance personnel then found a leak in the hydraulic line. They were able to replace the line before damage or disruption was incurred, stopping a major pending failure that would have been costly.

The right predictive maintenance software will utilize existing hardware and data captured with minimal impact to operations, so mining companies can deploy quickly and jumpstart their digitalization journeys. These solutions also give companies peace of mind that their assets, people and the environment are protected from unexpected breakdowns. Effective predictive maintenance technology also must have quick time-to-value – adoption should not take years to implement; implementation should be swift, a matter of weeks. Additionally, with the use of existing resources, organizations should be able to continually improve and expand these predictions.

The benefit of predictive maintenance technology in the mining environment is tremendous – it will help support mining companies well into the future, modernizing elements of it that are in need of an Industry 4.0 overhaul. Committing to digital transformation is not easy to do, but mining executives will be in a better position because of it in the years to come, making mines safer and more profitable environments.