

Further optimise your mining processes

The innovative ABB Ability™ MineOptimize portfolio connects and optimises all stages in the lifecycle of any mine, mineral processing plant and enterprise, from design and build to operation and service, writes Martin Knabenhans.

Strategic mine planning and optimisation throughout all lifecycle stages are essential for miners' competitiveness. The mining industry has the task of producing a primary product whose value is decided on international exchanges, and which fluctuates widely depending on global demand: in the past 50 years, the average price of metals has varied by a factor of up to 600%. At times of slumps, it is the mines with the least productive technology that struggle. Another factor that puts a premium on technology is the fact that over the past 10 years the grade of the ore that is mined has declined 40% and the ore bodies themselves have become deeper and more remote. To tackle these issues, operators have to make the most of their suppliers' R&D departments, and the good news is that significant advances have been achieved on many fronts. This means that when new mines are being planned, and old ones upgraded, the option is there to optimise production in a way that until recently would have been unthinkable.

What makes a difference

One set of advances has occurred in the comminution process. Other areas of progress include the increased efficiency of ventilation and the reliability of hoist systems. For example, the ABB smart ventilation concept wires airflow sensors into the ABB Ability™ System 800xA distributed control system. This can then optimise air quality throughout the mine and, as a result, halve the electricity needed to run its fans.

On the power supply and electrification side, the mining industry is looking for ways to reduce energy consumption, cut costs and pollution by transitioning from diesel to electricity. Latest versions of sophistication of the automation process have also transformed the way a modern mining facility works. Finally, digitalisation is creating additional value and visibility from mine to port and from plant to enterprise.

In each of these areas, ABB has been responsible for defining what counts as state of the art. In the comminution process, for example, it has pioneered the gearless design in which the mill cylinder becomes the rotor of the motor, which allows the torque to vary without the need for gears. It has since continually raised the power rating of its drives. This allows a rise in the quantity of ore processed, which offsets the decline in its quality. We also power and control high-pressure grinding rolls with our RollXtend solution so that they can operate without water - useful if your mill is 3 km above sea level in the Andes, like the Toquepala mine in Peru, where



An ABB Distributed Control System is in operation at the Boliden Garpenberg underground mine

ABB provided a number of large gearless mill drives. For many decades, ABB has been known as a world-class supplier for turnkey electrification and automation solutions as well as for dedicated mining systems for hoists, gearless or ring-gear mill drives and material handling.

Latest digital developments

Together with our customers and partners ABB started years ago to think about how mining operation and maintenance can be improved and what the next level of mining will look like. These collaborations triggered many innovative development activities for digital applications and services. Today, the ABB Ability™ MineOptimize portfolio is ready to deliver additional value with truly integrated digital mining applications for unmatched operation, maintenance, process and production optimisation. The ABB Ability MineOptimize™ digital applications are based on the ABB Ability automation and information management platforms. They are based on proven standardised building blocks, are horizontally and vertically connected, and ensure the right people have the right information at the right time.

Digital applications include:

Process and Power Control - increases operator effectiveness by unmatched focus on situational awareness in order to avoid operation errors that cause loss of productivity

Advanced Process Control - reduces energy consumption and increases productivity while maintaining the desired quality automatically, 24/7

Asset Management and Condition Monitoring - minimise unplanned down time and increase equipment availability, while helping to optimise maintenance activities

Operation Management Systems - create a new level of visibility in mining operations. They allow the operator to react in real time to any disturbance and assist planning with automatic scheduling.



Surface operations at the Garpenberg underground mine in Sweden

Production Information Management - systems consolidate data on plant and enterprise level and provide insight information as well as KPIs in easy to understand dashboards and reports.

These applications unleash the full potential to deliver sustainable profitability and create full visibility over your integrated mining operations.

Collaborative services connect our specialists with customer teams and equipment on site in real time and include:

Remote Assistance - enables a secure connection between ABB and the customer in order to provide real time guidance through remote access and augmented reality

Predictive Maintenance - enables us to deliver a plant where the equipment alerts you through intelligent cloud-based data analytics when it needs to be serviced

Performance Optimization - services are designed to increase your productivity and keep it on the highest level through remote monitoring of KPIs to guarantee that process optimisation is running at the target level.

Planning and engineering mine projects with integrated solutions from mine to port and from plant to enterprise brings substantial capital savings through early involvement.



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