



ABB Ability™ Operations Management System for mining

Raising the bar of operational excellence
in mining through digitalization

Open. Flexible. Scalable.

ABB Ability™ Operations Management System for mining (OMS) is a suite of digital applications for operational excellence that helps translate long-term business goals into realistic detailed shift schedules and constantly adapt to changing conditions during the execution. It replaces pen, paper, spreadsheets, and bridges siloed tools, offering modern ways to plan and control day-to-day activities; enforce safety and compliance; monitor and manage operational performance in mines, processing plants and across the entire enterprise.

ABB has a good understanding of the automation and optimization potential, how to effectively close the gap between mine planning and execution, then feed the extraction data into the stockyard, the plant, the laboratory, and other departments. Users get the decision support to calibrate all mining-specific operational constraints in real time using consistent and validated information across multiple systems.

Table of contents



TAP ON THE TEXT TO
GO TO THE CHAPTER

04–05	More automated, consistent and reliable execution from mine to market
06–07	Converting from a conventional to a Digital Mine – there is no single path
09–10	Showcasing the art of possible through collaboration and best practice harmonization
11	Our approach to connecting siloed teams and tools
12	End-to-end visibility and orchestration
13	Raising the bar of operational excellence with ABB Ability™ Operations Management System for mining

More automated, consistent and reliable execution from mine to market

Mining today operates in a very dynamic and complex environment. Easily accessible deposits are rapidly depleting and new ore reserves are in remote and harder to reach locations, thereby having an impact on operational costs. Ageing mines yield ore with lower concentrations which demands more efficient processing plants to extract as much mineral as possible. More demanding safety, environmental and water pollution regulations are compelling companies to better monitor and control processes, energy and emissions, as well as quality of the materials coming from the mine, and the tailings.

In ever-changing day-to-day, hour-by-hour situations, any significant improvements in production rate, unit cost and quality require visibility of what is going on in the mine, lab, processing plant and enterprise. Let your teams get control of the data they need for a safer, more efficient use of personnel, equipment and material, with faster reaction time.

As digitalization progresses, it brings its own set of challenges with the data flow between the siloed IT and OT applications, incomplete or unreliable information – making interoperability a basic

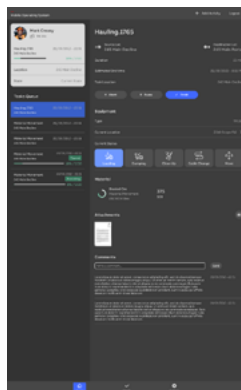
expectation. This calls for partners that are competent in building integrated, open architectures, and have a clear focus on the entire value chain and enterprise. Flexible and scalable deployment of functionalities is the best approach to convert traditional mining into world-class, fully connected, agile and self-optimizing operations.

Trust our 130+ years of experience in the industry and ABB Ability™ Operations Management System (OMS) – a suite of digital applications purpose-built for mining and minerals processing. We bring a new way to think about the data flow between an integrated set of tools, producing reliable metrics critical for your success.

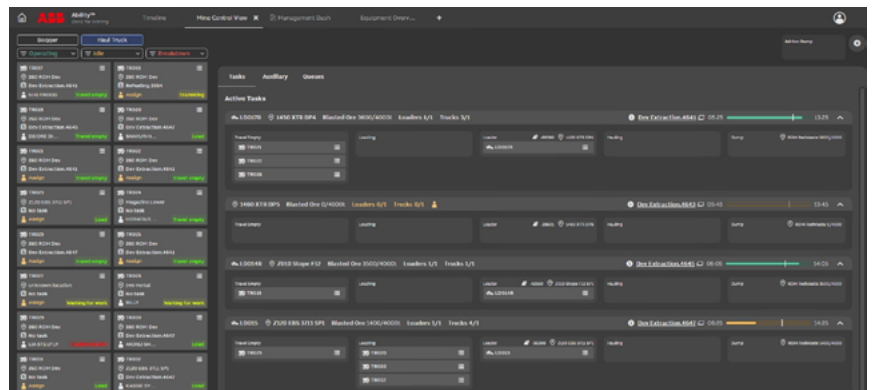
ABB OMS solutions – covering mining-specific **Manufacturing Execution System (MES)**, **Short Interval Control (SIC)**, **Fleet Management System (FMS)**, together with **Process and Production Information Management System (PIMS)**, **Laboratory Information Management System (LIMS)** and **Analytics** – are the foundation for all operational collaboration based on the latest industry standards. They will help you satisfy changing market demands dynamically and profitably, be ready for Industry 4.0 and a greener society.

01 For mining – Mobile Operator Station

02 For mining – Haulage Control



01



02

Take the right actions for your operational performance objectives

Mining customers are leveraging ABB Ability OMS software to drive improvements in speed, flexibility, dependability, quality and costs

Companies working with ABB typically achieve up to:

- **10%** increase in mining productivity thanks to digitalized Short Interval Control (SIC)
- **25%** cost savings from integrations thanks to interoperability
- **30%** less data inputs by hand thanks to more automated self-service dashboards and reports.

“We like building on our people’s capability and experience by working with technology innovators to bring in integrated digital tools... It also allows our people to move into more highly skilled roles and tasks.”
– Gold Fields

03 For mining – role-based self-service dashboards





Converting from a conventional to a Digital Mine – there is no single path

Just like there is no single site layout or mindset of people working there, there is no single path to digitally connected, optimized and autonomous mining. And no company can realize this industry vision alone. Wherever you are on your transformation journey – and especially when you are still using pen, paper and spreadsheets – ABB can help you convert from a conventional

to a more modern mining operation that is safe, efficient, and sustainable.

- **Pick applicable use cases and tie them to your business strategy.**
- **Engage both on-site and remote personnel through the existing Continuous Improvement Initiatives.**

Digital use case examples



Focus area:
Mine

Automated shift scheduling

- Import weekly plan from other system
- Define tasks, resource requirements Simulate "what-if" scenarios

Dispatch & status tracking

- Assign tasks to operators & machines
- Provide digital work instructions
- Monitor task progression, KPIs, adjust

Mobile Tablet for Operators

- Execute tasks safely
- Declare location & metrics
- Report issues to be addressed

Fleet management

- Mobile & fixed equipment data
- Visualize status in near real time
- Access downtime, OEE, other KPIs



Focus area: Processing plant, material handling, laboratory

Connectivity & data management

- Exchange information with L4 ERP: sales, production planning, maintenance, quality
- Log, store L2 production & process data
- Integrate data with other 3rd party apps

Process trends, alarms analysis

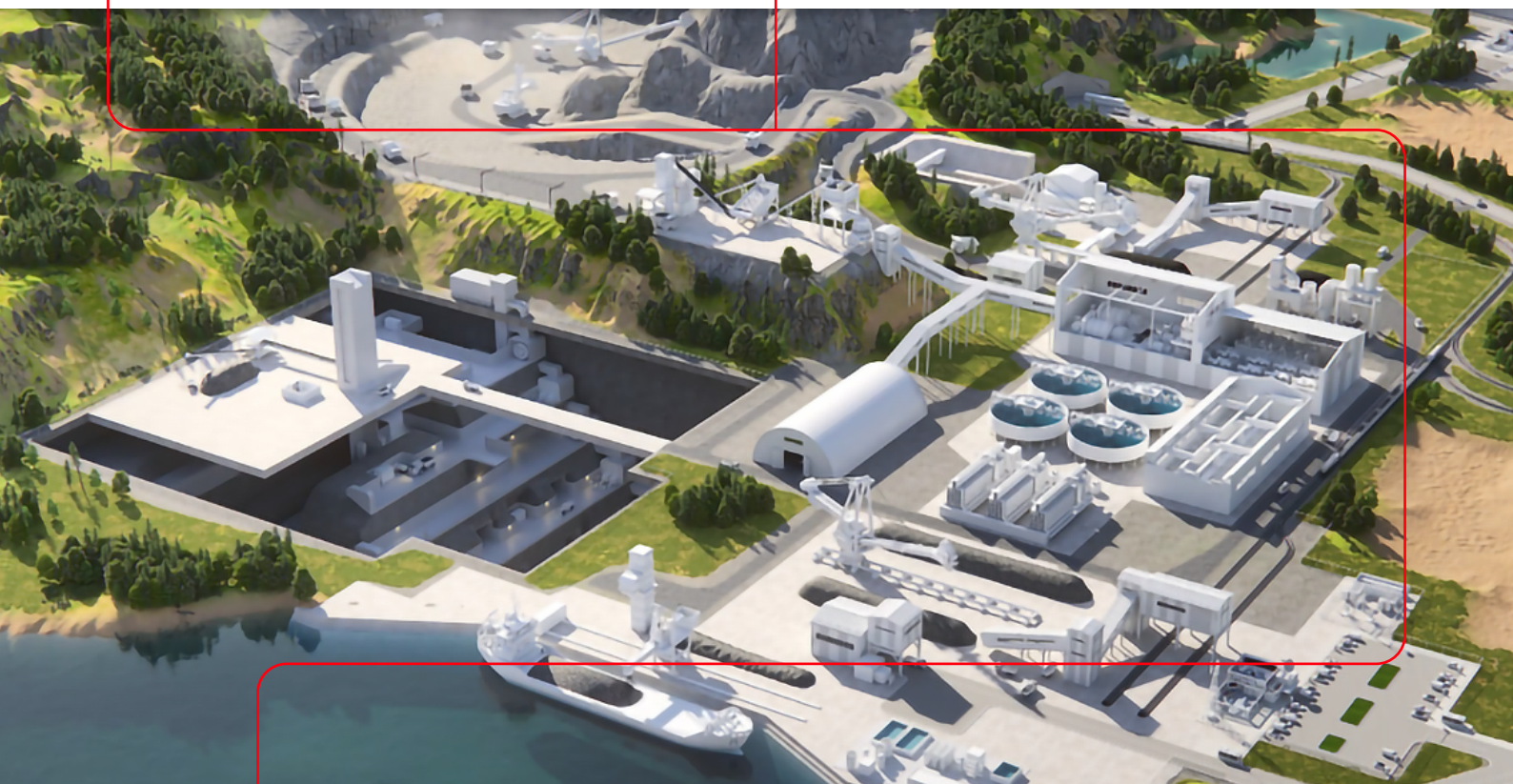
- Reduce nuisance alarms
- Analyze process trends
- Follow up and comment
- Correct & validate data

Inventory management

- Track material movement
- Optimize material flow
- Build product genealogy
- Provide mass balance reporting

Quality management

- Simplify & automate lab tasks
- Document & analyze performance
- Statistical Process Control (SPC)
- Replicate best practices



Focus area:
Management/Enterprise

Self-service KPI dashboards

- Planned vs actual, throughput, costs
- Basic energy cost tracking, specific consumption & emissions calculations

Remote Operations Center

- Centralized maintenance support
- Technical center, process know-how
- Simulation, advanced analytics, AI/ML

Maintenance support

- Downtime management, analysis
- Reliability analysis/Pareto
- Maintenance KPIs

Scalable data models

- Compliant with ISA 9, OPC UA
- "Plug-and-play" architecture
- Configurations shared across sites

Partner with true problem-solvers with on-the-ground experience

Process know-how produces the right partner

In a digital transformation project, the identification and harmonization of the processes, and the change management goals for the user community are as important as the software implementation. Having an experienced partner during the project execution phase helps our customers navigate the complex program, ensure positive outcomes and user acceptance, with tangible results.

ABB accompanies you for every step of your project, from the digital maturity assessments, building a secure solution architecture and commissioning, to customized training and continuing support. With ABB Ability™ Operations Management System's suite of applications, miners

gain the flexibility needed to manage evolving operations at reasonable ownership costs. Customers can start with a blueprint, adjust configurations, scale up or down in response to mergers and acquisitions or greenfield projects.

Ease of use with modern interface

Most OMS user interfaces and navigation between displays have been co-created with the mining personnel. Engaging a UX specialist to reflect organizational culture and ensure that employees are both confident and comfortable with the transition from analogue to digital systems. With easily configurable tools and dashboards, planners, supervisors, managers, business analysts can make changes on the fly.

“ABB has proven for many years to be a reliable partner in developing one of our strategical pillars, to be the best-in-class in operations. This, together with the ability of their managers and technicians to understand the process challenges and needs, has made us decide to continue with them in the current projects on digitalization and decarbonization.”

– Votorantim





Showcasing the art of possible through collaboration and best practice harmonization

ABB Ability™ Operations Management System (OMS) pushes the boundaries of true interoperability among all entities involved in the mining operations.

Day-by-day mining operations require a complex network of many information flows between the business systems, planning, execution, electrical and process control, positioning systems, health and safety sensors and many other applications. The more automated a mine becomes, the greater the need for an over-arching management system that tracks, monitors and re-allocates resources such as people, machines, vehicles, water, electricity, material transport systems based on current ore body properties, storage level restrictions, maintenance, equipment and people availability, skills, certification expiry and other constraints.

With tight integration links between previously siloed tools and processes, OMS applications help close the existing gaps and enhance the speed at which information is exchanged. They help teams

become more responsive to the pull from the market, react to operational disturbances in near-real time, improve adherence to plan, scale best practices and become more predictive.

Flexible data modeling capabilities, secure architecture, use of communication protocols such as OPC UA, lightweight MQTT messaging and other standards which are most fit for purpose for mining operational environment, allow to tailor projects to customer's current ambition level. Starting from basic Short Interval Control, real-time monitoring/reporting and OEE, then gradually introducing additional software components, fully automated data collection systems and advanced analytics use cases – thus increasing the delivered value and moving towards the vision of autonomous mining.

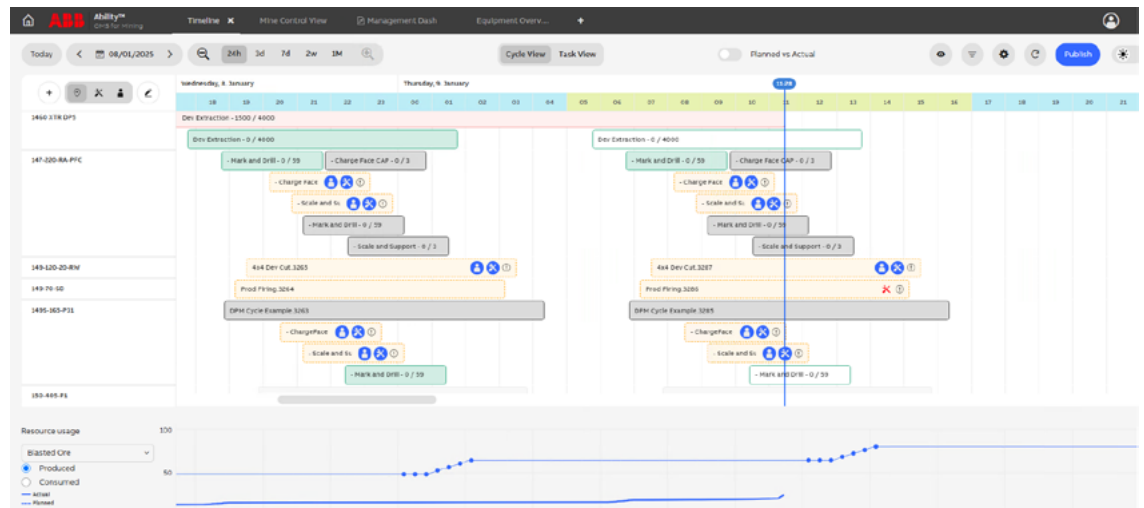
Seamless business and production processes integration

Automation synergies and off-the-shelf ERP integration fast-track the digital transformation
Miners on the path to Digital Transformation and autonomy choose ABB for our overall understanding of the automation and emerging technologies

landscape. As OMS algorithms identify the best resource allocations and execution sequences, it helps to have a partner that deeply understands the full technology stack when establishing robust interfaces to these.

“The performance requirements of a software package that exchanges and processes granular events rich information in real-time, when compared to a software package designed for periodical manual entry, are like comparing chalk and cheese. That’s where ABB plays a big role.”
– Enterprise Transformation Partners

04 ABB Ability™
Operations Management
System Timeline

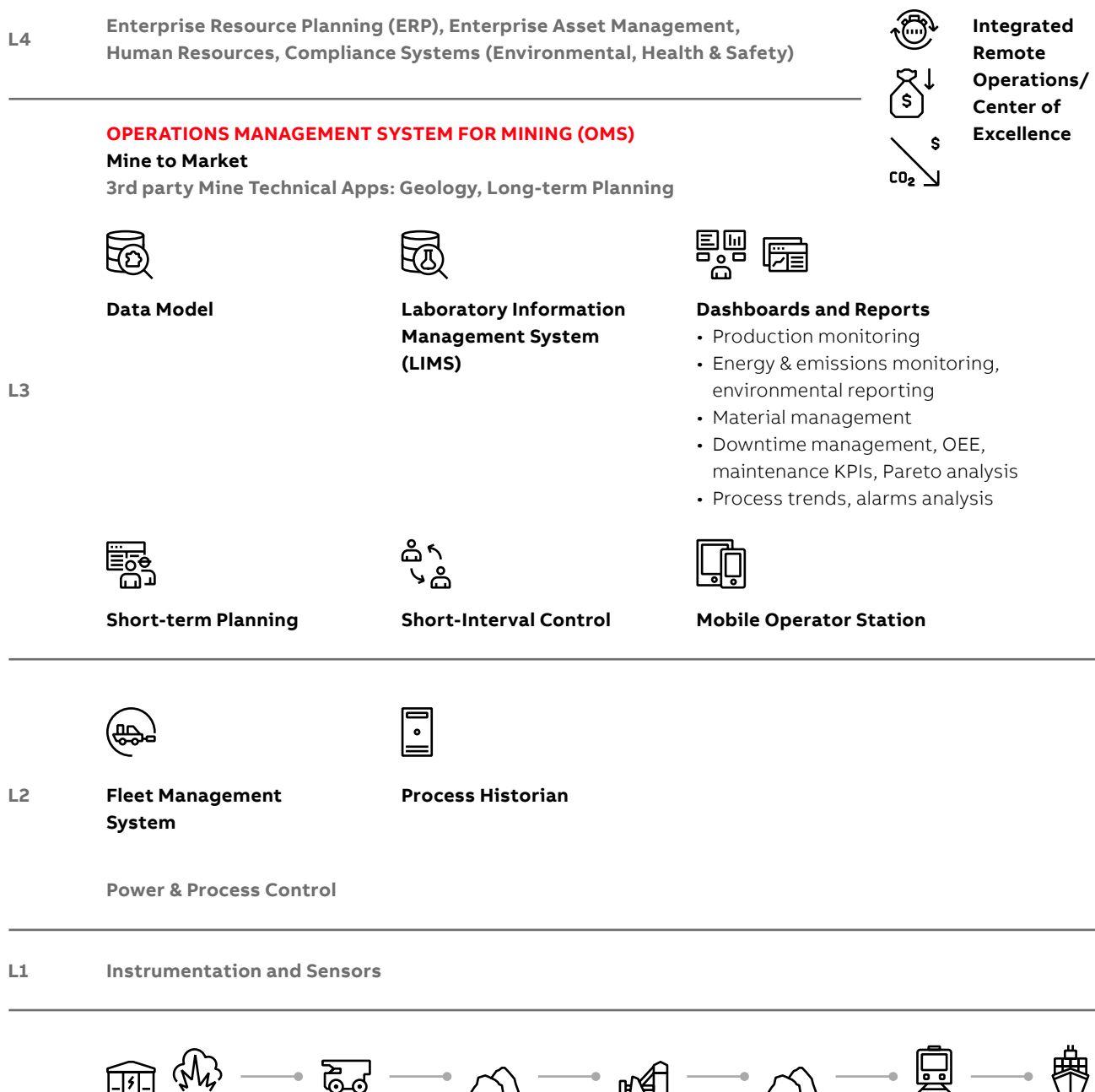


Our approach to connecting siloed teams and tools

Feature	Benefit	Description
 Data Model	Define a universal language and framework for information exchange	Configuration of ISA95 and other standard classes for <ul style="list-style-type: none"> • Process segments (loading, drilling, blasting, bolting) • Equipment classes (trucks, loaders, drilling machines) • Materials (consumables, consumed and produced – electricity, water, ore, waste)
 Connectivity	Seamlessly integrate equipment, operational and business systems	Connectivity towards <ul style="list-style-type: none"> • ERP (collecting orders, sending production results) • Maintenance management systems (collecting equipment availability, sending maintenance requests) • DCS, Historian, LIMS, mobile equipment, FMS Interfaces to scheduling engine, remote clients (operator HMI, mobile equipment HMI) and other systems
 Dashboards & Reports	Operational performance visibility with unique data validation and drill-down methods to uncover hidden potential	Visualization and configuration tools that enable users to design web dashboards & reports based on their own equipment and operational data (real-time or historical), use them to present and analyze that data, collaborate and continuously improve. <ul style="list-style-type: none"> • Production monitoring, process trends, alarms analysis • Material management • Energy & emissions monitoring, environmental reporting • Downtime management, OEE, maintenance KPIs, Pareto analysis
 Short-Term Planning Production Management in mines	Break down medium plan into realistic daily shift schedules with real-time feedback from execution	Production Management function includes: <ul style="list-style-type: none"> • Import of higher horizon mine plan from specialized tools • Download of recipes, configuration of production cycle workflows, task requirement definition with optional paths • Flexible, reliable management and dispatch of production orders to teams (Plan, Publish, Dispatch, Execute actions) • Real-time monitoring of task status, production vs plan
 Short Interval Control Workforce & Equipment Management in mines	Allocate tasks to specific equipment & operators, compare scenarios, re-plan & optimize resources	Configuration of task allocation within shifts (Ready action), <ul style="list-style-type: none"> • Balancing an interplay of teams, tasks, people, equipment • Accurate inter-shift management and tracking of staff • Feedback to planner to improve future plan accuracy
 Mobile Operator Station Digital Work Instructions	Replace pen & paper to execute tasks safely, speed up issue resolution and protect production targets	Guides the operator with the required task steps, safety checklists, drilling plans (Start, Pause, Resume actions). <ul style="list-style-type: none"> • Log shift notes, production states, material properties • Enables instant messaging between operators and supervisors to report and act on disturbances. • Integration with positioning and safety sensors, automated data collection when applicable
 Fleet Management	Increase automation in underground mines operating mixed fleets	Underground fleet management system (FMS) for mobile and fixed equipment: recording of production states, maintenance downtime and operational delays for OEE and other KPIs.
 Laboratory Information Management System Quality Management	Correlate quality with downtime and production information, ensure compliance	Quality management with ABB's LIMS support laboratory process with: <ul style="list-style-type: none"> • Laboratory tasks, like sample identification, analysis plan and task list, testing and analyzing, periodical instrument calibration, verification, and validation • Information management tasks, like data collection and storage, status and progress supervision, audit trail, reports, graphs & statistics, compliance certificates • Statistical Process Control (SPC) analysis

End-to-end visibility and orchestration

Workforce evolution, loss of expertise, decarbonization pressures are motivating the industry to automate and digitalize. Implementing ABB Ability™ Operations Management system for mining makes the process easier for people involved in corporate initiatives around safety, productivity, and sustainability.



Raising the bar of operational excellence with ABB Ability™ Operations Management System for mining

Benefits:

- **Flexibility to protect production** plans in a safe manner reduces variability, improves responsiveness to unplanned events and overall productivity
- **Operations transparency** coupled with ore tracking and **seamless data flow between systems** minimizes costs and maximizes production output of optimal grades.
- **Improved product quality based on dependable processes**, enhanced regulatory compliance capabilities
- **Balanced use of resources** based on targets, metrics and KPIs and less personnel stress with closed-loop feedback
- **Secure, real-time information exchange with the enterprise** provides teams with access to all types of operational data, enabling decision support towards corrective actions and performance improvements

Integrated Remote Operations & Centers of Excellence

ABB Ability™ Operations Management System for mining increases efficiency and the speed at which teams identify and respond to changing conditions through Integrated Remote Operations

Centers (IROCs). The goal is not only to enhance situational problem-solving, but also recognize when an issue calls for a well-thought-out, systematic optimization and a more strategic approach across sites.

Customer Success and Services

Thanks to the subscription model, OMS users benefit from the on-going software development to future-proof their investment and their operations. After successful project deliveries, easy configurability and updates, our continuing services provided by the regional customer success teams ensure that results and utilization are preserved, and total cost of ownership is reduced.

References

- [Five business drivers for adopting digital operations in mining](#)
- [Gold Fields revolutionizes operations with ABB's digital platform](#)
- [Digitalizing production scheduling and short interval control in mining](#)
- [10 lessons from 10 years of Remote Operations Centers](#)
- [Cyber security considerations for industrial plants.](#)





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