ABB Ability™ Operations Management System for Mining
Closing the loop between short-term planning and real-time operations

- Improved responsiveness to unplanned events
- Reduced production variability
- Increased productivity by up to 10 percent
**ABB Ability™ Operations Management System for Mining**

ABB Ability™ Operations Management System for Mining – or OMS – coordinates and automates the weekly production schedule with real-time production execution. It creates a shift-based plan that tracks working progress and reacts to disturbances in real-time, having a positive impact on operational efficiency while lowering costs.

**Challenges in production planning**

The more autonomous a mine becomes, the greater the need for an over-arching management system that tracks, monitors and re-allocates resources such as water, electricity, machines, vehicles and people.

A production schedule requires the evaluation of a complex set of operational constraints. The production planning team must constantly review variables such as:

- Current ore body properties
- Restrictions in equipment availability
- Material transport systems
- Storage levels
- Planned maintenance activities
- Operators skills and availability

---

**Diagram:**

- **Maintenance plan**
- **Mine design plan**
- **Mobile equipment**
- **Mine services**
- **Production plan**
- **Mine activities**
- **Fixed equipment**
- **Mine plan**

---

Often, mine planners must build weekly, short-term plans with limited visibility of what is going on in the mine.

Meanwhile, mine operators must constantly adjust the operation to ever-changing day-to-day, hour-by-hour situations.
Unite high level planning with low level control

OMS gives mine operators visibility of who is completing which task, whereabouts in the mine and with which equipment. It is a real-time scheduling, dispatch and tracking application that integrates the short interval control and closed loop scheduler into the same digital platform.

Short interval control – allows mine operators to monitor and schedule all activities, so critical problems are immediately handled. The mine planner, by means of the manual scheduler, creates single tasks from standard operation cycles. Dashboards enable mine activities to be reviewed, based on key performance indicators, metrics and targets. Any variances are highlighted so operators can act – either immediately or at the end of the shift.

Closed loop scheduler – combines high-level planning with low level control. It allows the mine production planner to achieve new levels of production scheduling efficiency from bench preparation to crusher. The mine operator acts as a dispatcher, re-assigning resources in real-time, depending on the actual situation in the mine and following the production plan more effectively. “What-if” scenario analysis and re-planning help take better decisions, maximizing financial returns for current feed material and production targets.

When high-level planning is combined with low-level control, the mine operator acts as a dispatcher, optimizing resource usage in real time and following the production plan more effectively.
Enable true IT/OT integration with ISA-95

By integrating operational technology (OT) and information technology (IT), OMS operates in closed loop, scheduling activities according to real-time availability and capacity of crew, mobile equipment and material.

An auto-schedule engine considers all the constraints from mobile and fixed equipment through artificial intelligence (AI) algorithms. The operator selects the optimal equipment usage and dispatches it in real-time.

Frequent reports are automatically generated from various mine-wide systems and coordinated via a central database. This lets short-term planners remotely perform detailed analyses and monitoring of their entire mobile fleet. Combined with activity data, performance analytics can be carried out that can significantly improve efficiency.

OMS follows the ISA-95 standard within its scheduling environment enabling:
- Mine operation model to be described
- Real-time feedback from planning and control levels of the mine
- Automatic rescheduling, offering mine planners’ significant time savings

How OMS is implemented
1. **Optimize data flow and visibility** – existing data is cleansed, thereby enhancing data flow, mapping the most important metrics, KPIs, variances and task information.
2. **Optimize execution plan communication** – communication of pre-shift task planning and inter-shift feedback of task execution are optimized. Visibility of production enabling tasks is enhanced.
3. **Optimize decision-making support** – task schedule is optimized with automated decision-making support for resource assignment, and near real-time auto-schedule support for inter-shift disturbance reaction.
Scenario 1: Power outage
Should there be an unexpected change in production, such as a power outage on a specific mine level, the OMS instantly lets mine planners and operators re-schedule activities to compensate for the shortfall. Resources and equipment are re-allocated and other activities are dispatched to those affected.

Scenario 2: Missed drilling cycle
If a drilling cycle is missed during a blast round, the local operator reports a machine failure and the estimated delay that may be caused. The shift manager is notified immediately on their dashboard. The shift manager and the mine coordinator can run “what-if” scenarios to simulate different solutions. Since all staff see the same information, they can jointly decide what actions to take in real time. There is no need to wait until the end of the shift. A new machine is assigned to maintain the targets needed.

Scenario 3: Unplanned maintenance
OMS receives breakdown notifications automatically from the maintenance system, when confirmed by the operator. The breakdown is flagged in the dashboard and the impact on the production execution schedule is evaluated. The mine planner now knows how much time he has to react, before the schedule’s critical path is affected.
Benefits

Advanced short-term planning and increased automation lets the mine act as an ore factory: becoming part of one integrated mine-to-port operation. It has:
- improved responsiveness to unplanned events
- reduced production variability
- improved overall equipment effectiveness (OEE)

As such, OMS is estimated to increase productivity by between 5 to 10 percent using the same resources and additional face utilization.

- **Protect production and development plan**
  Reduces variability and improves responsiveness to unplanned events.

- **Maximize production output**
  Ore inventory can be tracked and controlled to allow maximum flow and optimal grade.

- **Less personnel stress**
  Closed-loop feedback for task and maintenance reduces the burden of planning for the mine planner and operator.

- **Balanced use of resources**
  Allows the mine planner to optimize resource usage based on targets, metrics and KPIs.

- **More consistent production flow**
  Throughout blasting, crushing and haulage to surface, production flow is maximized.

**ABB Ability™ MineOptimize**

ABB Ability™ MineOptimize is a framework that simplifies and unifies engineering, optimized solutions, digital applications and collaborative services to bring new levels of performance across the mining enterprise. Collectively, this framework helps mining end-users achieve the most efficient design, build and operation of any mining or mineral processing facility.

The digital applications pillar of the framework supplies advanced libraries and software that maximizes visibility, reliability, productivity and energy efficiency.

One such digital application is ABB Ability™ Operations Management System, which provides production scheduling, dispatch and fleet management, near real-time planning, short interval control and agility.
Bringing mining operators and supervisors closer to understanding where the entire mine stands with respect to overall goals of the day, week, month and year.