



HITACHI ABB POWER GRIDS

# Condition-based malfunction forecasts for mining operations



- CASE STUDY
- Deployment of a prognostic asset management solution at a copper mine

## The customer

Due to increasing cost pressure on its mining operations, a leading diversified natural resource producer needed to strengthen its asset management program through innovative digital solutions. Strategic focus was placed on copper mining operations in Africa.

## The challenges

The company needed an accurate, consolidated and transparent reporting solution at the core of its mining operations, to provide critical insight and foresight for strategic and operational decisions. It wished to minimize maintenance costs and effort, while maintaining equipment reliability and availability.

The company needed to move away from generic, time-based maintenance schedules, to customized equipment-specific maintenance plans that allowed for increased flexibility around schedule and scope.

## The solution

The company configured, tested and deployed Hitachi ABB Power Grids' Lumada APM solution at one of its cornerstone mines in the Democratic Republic of the Congo. The solution was first rolled out to cover the mine's main crusher, two cyclone pumps and the semi-autogenous grinding (SAG) mill. After a very successful deployment phase one, it was extended to cover the ball mill, pebble crushers, feeders and conveyors in phase two.

The advanced prognostic capabilities in Lumada APM utilized condition and process data recorded for all crucial mining assets to optimize maintenance schedules and anticipate risk of failure. The asset models included load, vibration and lubricant data, which were recorded manually on site during monthly inspections. In addition, electrical and temperature data from the online monitoring system were also included to provide a total future risk assessment.

It was challenging to normalize data that was collected at non-uniform intervals, and under varying load conditions, but this was quickly solved by the experienced Lumada APM team. The solution was successfully trained to recognize indicators that were deviating from normal conditions and alert operators to potential future malfunctions.

The initial configuration took approximately five weeks, followed by two rounds of validation. In three months, the solution was integrated into production workflow and business processes, providing managers and operators with vital insights.

While the initial implementation was stand-alone, the prognostic reports can be easily integrated with an enterprise asset management (EAM) and/or workforce management (WFM) solution a later stage.

## The results

The company now uses Lumada APM for regular forecasting of future malfunction risks and maintenance needs. Lumada APM forecasts equipment conditions using current and historical condition data from various operational scenarios. Future conditions are correlated to equipment-specific malfunction modes to obtain end-of-life forecasts.

The prognostic dashboard visually summarizes potential malfunctions at a component level so operators can quickly identify which parts need to be repaired or replaced, by what future point in time. These results are also aggregated to provide an overall summary of the asset's health, enabling operators to make quick decisions about each piece of equipment.

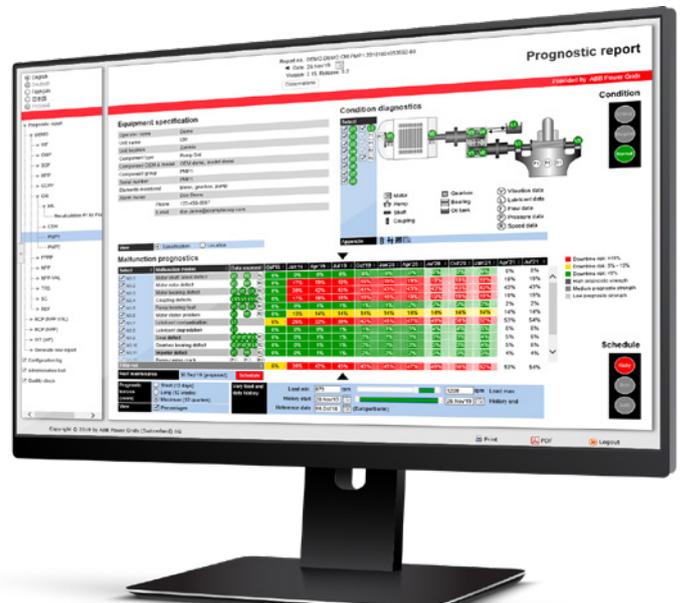
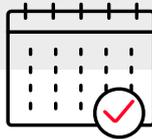
## Lumada APM's next-level prognostics solution delivered many benefits:

Significantly reduced downtime costs by avoiding lost production from unscheduled delays and by prioritizing and grouping maintenance tasks based on malfunction risk profiles.

Significantly reduced maintenance costs by better preparing for maintenance and replacement tasks. This resulted in less frequent scheduled maintenance without compromising asset availability and worker safety.

Established a more robust and transparent decision process by effectively leveraging the wealth of asset data collected. Both ground-level operators and high-level managers have access to insight and foresight that helps them make better decisions every day.

The company successfully avoided a critical equipment malfunction that had previously resulted in an estimated cost of almost €200,000 and 12 hours of downtime.



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