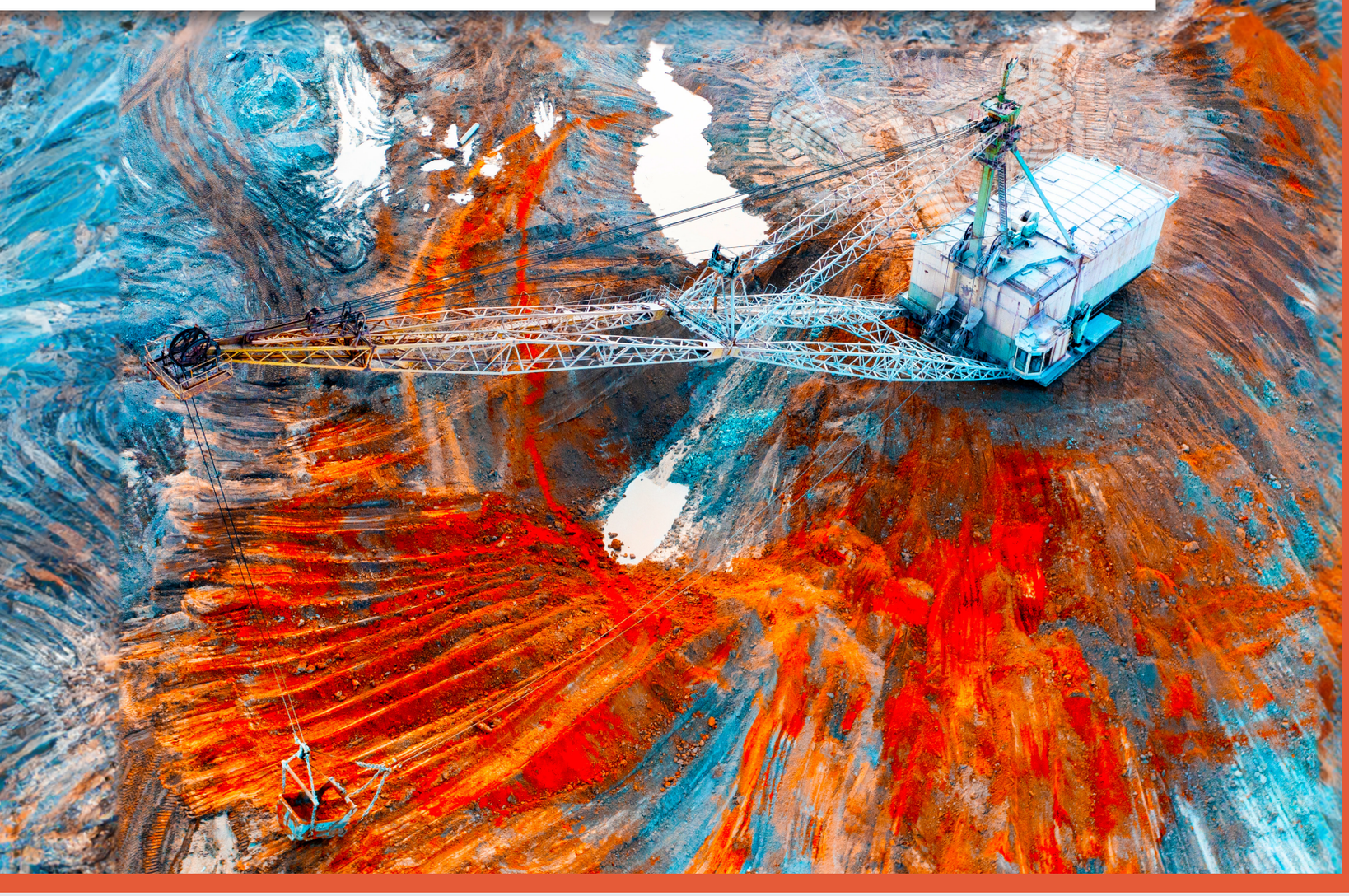
Reliability Solutions for **Mining, Metals & Minerals**

Intelligent Field Device Management | Machinery Health Management | Workflow & Collaboration



Field-Proven, Software-Centric Reliability Solutions

Emerson's AMS Reliability portfolio helps the world's largest mining, metals and minerals operations improve reliability of critical assets throughout the value chain.



AMS™

EMERSON™

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Face the Challenges of Safety, Location, and Resources that Complicate Mining

Mining is a dirty and potentially dangerous process. More than that, however, mining organizations must deal with a complicated set of challenges that span safety and compliance, finely tuned operations, remote locations, and both natural and human resources. Optimal efficiency and maintenance of equipment lie at the heart of the issues.

Whether in the pit or in the processing area, mining teams must find — or unfortunately sometimes respond to — equipment vibration that can lead to dangerous conditions and risk to the process and personnel. Without proper monitoring, teams cannot know when machinery is about to cause problems.

Mine sites are dynamic environments often in remote, inaccessible locations.



Maintenance costs typically comprise 30 to 50 percent of a mine's total operating costs.



More than 60 percent of the total mine workforce can be almost exclusively focused on servicing or repairing complex assets in the field.





AMS Condition Monitoring Services Can Support Mining Operations 24/7

To help mining organizations get the most out of analytics software and solutions, Emerson's Condition Monitoring Service takes on the heavy lifting of building a comprehensive monitoring strategy.

Monitoring through an Emerson Cloud Hosted Solution or a customer-hosted installation, Emerson's highly skilled and ISO-certified analysts can provide remote condition monitoring of critical plant assets. This core team can serve as machinery monitoring support and supplement plant programs by offering easy-to-read, actionable reports pulled from monitored data.

- Access insights before significant disruption
- Reduce operation and maintenance costs
- Connect to certified experts anytime
- Customize a program that best suits your needs

Stay Ahead of Challenges

Emerson helps position your mining teams to anticipate and successfully meet challenges. Armed with monitoring and prediction, diagnostics and intelligent design, comprehensive understanding and planning, you have tools to reduce downtime, improve safety everywhere, and alleviate concerns about staff, resources, and costs.

Optimize equipment operation while reducing unplanned downtime

- Uncover developing faults to move from unplanned to planned downtime
- Optimize operations by creating a comprehensive picture of machinery health
- Reduce the frequent shutdown and startups of assets
- Apply diagnostic solutions to shovels and other pieces of key equipment

Improve safety and compliance even in remote locations

- Meet challenges using actionable machinery health information
- Comply with regulations more easily by using applications set for purpose
- Create a safe environment through remote access to production equipment
- Activate remote condition monitoring to reduce exposure to isolated locations

Ease staff, resource, and cost concerns

- Automate processes to assist staff
- Detect faults early to reduce costs
- Address water, fuel, and other resource costs
- Reduce operational costs



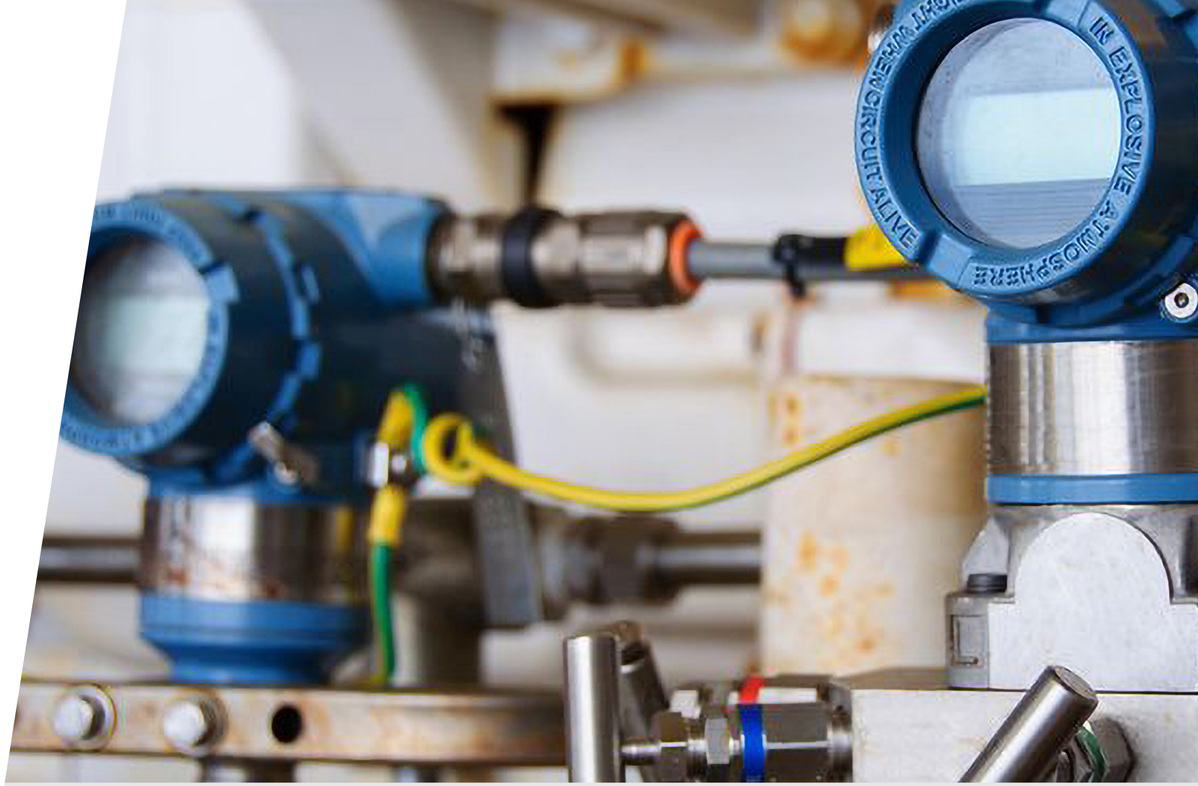
Machinery Health Prediction Helps Phosphate Mine Protect Critical Draglines and Save Millions

A team at a mid-Atlantic phosphate mine needed to improve its ability to identify equipment issues early and safely, allowing adequate time to plan repairs, while minimizing costly downtime. The solution called for best-in-class vibration monitoring solutions and predictive maintenance capability to be installed on vital heavy-duty draglines at the phosphate mine.

Optimized operation: Predictive maintenance capability has improved overall production through avoiding unplanned downtime, minimizing monitoring costs, and reducing machinery repair costs.

Safety improvements: Safety has been improved, because technicians no longer collect data manually on a moving operational dragline.

Staff improvements: A cellular system allows teams to send all data back to their existing server; technicians evaluate from their desk; an e-mail alarm alert system assists with quick response.



Control and Commissioning on a Tight Schedule

A remote mine needed to start up quickly. After choosing Emerson for their DeltaV process control and AMS Device Manager commissioning tools, they engineered the solution in multiple world areas, pulled the system together on site, and commissioned with one technician. This single person could complete all device commissioning from the control room within the allocated time.

Electronic marshalling with DeltaV CHARMs saved them team 40 to 50 percent over traditional workflows. In fact, electronic marshalling helped the project team overcome late engineering changes, while Smart commissioning helped keep commissioning off the critical path, ultimately delivering project success well within the four-month timeline.

Product Application:

Mineral Transportation

Conveyer Belts, Chutes, Trucks, Electric Shovels, Reclaimers, and more

Move Material Continuously Without Slowdowns

The mining process relies on continuous material transport — 24/7/365. Whether a shovel or a conveyor, the tools that transfer the materials have many moving parts and are subject to failure, but improved uptime can be achieved when teams are guided by actionable data analysis that is collected wirelessly.

Emerson streamlines the gathering of equipment health data as well as the analysis of that data. Software tools make data analysis, decisive action, and communication easy.



What's your opportunity?

- Avoid lost revenue from slowdowns in material transport.
- Improve maintenance efficiency and safety.

Associated Products - Mineral Transportation

AMS Wireless Vibration Monitor	AMS Asset Monitor	AMS 6500 Machinery Health Monitor
		

AMS 6500 ATG	AMS Machine Works
	



Case Study – Conveyer Monitoring

Wireless Vibration Monitoring Helps Prevent Unscheduled Shutdowns of Critical Conveyors

When a North American mining company experienced vibration in some of its conveyors that were, for safety's sake, not available for standard route condition monitoring by technicians, Emerson helped develop the solution.

Today, Emerson wireless field sensors on the conveyers send data to AMS Machine Works for consolidation and for analysis. An OPC UA connection carries data from AMS Machine Works to the cloud where tailored dashboards show information from all of the conveyors. Alerts go out when necessary and direct the team to investigate and work towards a fix.

The team now can take actions that prevent downtime, component damage, and risks to safety. In fact, network connectivity is helping the organization move toward digital transformation and will empower them to use the data to pursue improvements in efficiency towards a greener and more sustainable overall process.

Read Story

In this Case Study:

AMS Wireless Vibration Monitor



AMS Machine Works



Prevent Failures in the Grinding Mills

Grinding operations often become the process bottleneck at mining sites. By predicting potential equipment issues, companies prevent bottlenecks and can increase throughput and increase overall production with substantial financial benefits.

Emerson can help mining operators optimize performance and reliability of mills and implement continuous monitoring to predict and prevent failures that can lead to shutdowns. Expert data analysis — in the hands of mining personnel — is part of the solution.



What's your opportunity?

- Improve comminution and grinding consistency by early problem detection.
- Promote ease and consistency of operation across all shifts with tools that embed expert knowledge in the team.
- Improve operation of SAG mills, which typically consume considerable amounts of energy, by avoiding equipment inefficiencies.

PeakVue Plus puts expertise in your hands right now

- Traditionally, raw vibration data was not routed to the control room because it required specialized training and tools to extract actionable information from the data.
- Emerson's PeakVue™ Plus technology cuts through the complexity of machinery analysis to provide a simple, reliable indication of equipment health. PeakVue Plus focuses on impacting, a strong indicator of overall asset health on any type of rolling element bearing machine.

Associated Products - Grinding

AMS Wireless Vibration Monitor	AMS Asset Monitor	AMS 2140 Machinery Health Analyzer
		

AMS Machine Works	AMS 6500 Machinery Health Monitor
	



Case Study – Mill Monitoring

A Balance-of-Plant Prediction Monitor and Advanced Fault Detection Software Helps Avoid Shutdowns of Horizontal Ball Mill

A customer in Egypt needed to run their horizontal ball mill as long as possible while minimizing the risk of a sudden failure in the gearbox bearings and internals. They sought to implement a continuous and intensive monitoring system that would monitor the gearbox condition and alert them to stop the equipment if vibration conditions rose to pre-determined levels.

Seventeen days after implementing machinery health software from Emerson, the software began to detect a condition outside of the equipment parameters. The customer team decided to stop the mill for inspection. The bearing cage was repaired immediately to prevent further damage or failure. After the repair, the mill was back in steady operation with full capacity.

"With the [Emerson Online Machinery Health Monitor], we can determine the right time to order spare parts and effectively plan for overhauling and stoppages."
– Mechanical Manager

Read Story

In this Case Study:

AMS 6500
Machinery Health Monitor



Product Application:

Flotation and Water Resources

Flotation Cells, Hydrocyclones, and more

Improve Water Resource Usage and Mineral Recovery Through Optimized Equipment Operation

Water and resource consumption in a mining operation contribute to a delicate balance. Use too much — or too little — and profits quickly evaporate. Hydrocyclones can, when operating ideally, tip the balance toward the good by enabling optimum ore particle separation and metallurgical performance — without waste of resources or process time.

For hydrocyclones, as with other equipment in the mining industry, periodic route-based data collection can be insufficient to indicate health and it can put personnel in potentially risky environments. Emerson's AMS 6500 Machinery Health Monitor provides online condition monitoring tailored to the frequency and the types of data that mining organizations require. With this monitoring, organizations can more easily anticipate issues that develop during normal operations and respond quickly to sudden changes during transient conditions.



What's your opportunity?

- Personnel stay out of harm's way and data collection is as frequent as necessary.
- Technicians evaluate conditions from their desk.
- E-mail alarm alert system can easily be implemented.
- Find potential faults easily and more surely with assistance from expert software and multi-source data gathered in a single location.

To monitor and get ahead of roping and plugging issues common to hydrocyclones, Emerson recommends monitoring the overflow and the underflow of the cyclones. These points can be collected using standard accelerometers. Gross scan values from accelerometers mounted on the overflow and the underflow are compared and enable the operator to determine the condition of the flow.

Live simultaneous gross scans provided from the AMS 6500 present live information on the flows present in a hydrocyclone. The speed, resolution, and data collection configurability of the AMS 6500 combined with the AMS Machinery Manager's advanced vibration analysis and reporting tools provide ease and certainty in identifying and understanding the failure modes common to hydrocyclones.

Associated Products - Flotation and Water Resources

AMS 6500 Machinery Health Monitor



Control the Refining Process, and Monitor Equipment Health for Continuous Output

Refining requires a set of interdependent processes that rely on rotating equipment to be up and running. When any process area goes down, loss of production and resources are risks to the company and to the environment.

Emerson's unique set of solutions includes process control, high-quality instrumentation, and equipment health monitoring. Although each element is not required in every Emerson solution, the benefits of a full Emerson solution are hard to beat so users can maintain consistent throughput.



What's your opportunity?

- Substantial reductions in downtime and increases in asset availability through improved use of equipment.
- Reduction in staffing requirements through predictive maintenance. Some users have seen 70% fewer unplanned work orders and 80% fewer work hours.



Case Study – Field Device Management
(Valves & Instruments)

User Avoids $3.3 Million in Costs With Plant Asset Management Program

Recently, a mining company in Canada co-deployed Emerson's DeltaV control systems with AMS Device Manager, which originally was used solely as a time-saving commissioning tool. Later when they initiated an improvement project, the teams used DeltaV and AMS Device Manager to set up device alerts and used AMS Device Manager Audit Trail to track activity and identify bad actors. The alert templates were created and shared for all devices that were part of the site-wide installation.

The plan also turned valve maintenance around. Rather than reacting to valve issues, the team set up a valve reliability program so that during planned shutdowns they ran offline diagnostics using the Valvelink™ SNAP-ON application from AMS Device Manager. The user team could see patterns in valve performance and could predict when issues could arise, which all contributed to uptime and productivity.

In this Case Study:

AMS Device Manager



AMS Device Manager Audit Trail



ValveLink™ SNAP-ON™ Application



Product Application:
Heap Leach and Tailings Dam

Help Avoid Tailings Dam Failures and Related Environmental Damage

Partnering with mining companies around the world, Emerson offers many solutions to issues related to tailings dams and heap leaching. From helping to assure tailings stability, to monitoring pipelines for anomalies, to monitoring pumps, users rely on Emerson to reduce waste and avoid environmental harm.

Because pumps play a key role in this mining area, Emerson helps mining companies monitor the health of these assets to ensure continued functionality and optimized water recovery. Situations might require online monitoring or they might require technicians to gather data in the field at certain time intervals.



What's your opportunity?

- Improve tailings dams safety
- Prevent environmental harm
- Promote continuous operation

Gather Route Data Efficiently, Safely, And Smartly

When data must be gathered by field technicians, Emerson's intuitive and easily-used AMS 2140 Machinery Health Analyzer is ideal. Technicians wirelessly upload route data and corrective maintenance jobs from the field to AMS Machinery Health Manager for analysis and reporting.

To save trips to the field, technicians can receive immediate actionable information from PeakVue Plus, embedded in the 2140. In addition, the 2140 provides machinery health management software that integrates data from multiple technologies — including vibration, oil analysis, thermography, and balancing into a single database.

Associated Products - Heap Leach and Tailings Dam

AMS 2140
Machinery Health Analyzer





Data and Control Wherever and Whenever Needed for Safety and Process Availability

For optimal safety and operations, data and control should be made available as the users need them, whether in the field or in a central control room. From a single station, Emerson customers can access control and device information. Even better, that information can be shared across the organization on mobile devices, industrial handheld devices, and control stations — connected via a network and accessing a central database.



What's your opportunity?

- Information where and when needed
- Quick start up
- Safe access to expert data

Associated Products - Control Rooms and Data

AMS 2140 Machinery Health Analyzer	AMS Optics
	

AMS RELIABILITY PORTFOLIO

Emerson's AMS portfolio helps the world's leading mining, metals and minerals companies enhance asset visibility, reduce maintenance costs, increase equipment uptime, and improve overall operational efficiency. AMS technologies enable a transition from reactive to proactive asset management strategies, empowering businesses to make data-driven decisions and optimize asset performance.

Machinery Health Management

AMS 2140 Machinery Health Analyzer



- Carried to the field by technicians for periodic monitoring of rotating equipment across the mining organization.
- Brings testing and analysis power to the field by providing many of the same advanced analysis capabilities as the online system, including PeakVue technology.

VIEW ONLINE

AMS Wireless Vibration Monitor



- Vibration data is delivered to all areas of the mine via a self-organizing wireless mesh network.
- Operations and maintenance teams have real-time information to machinery health.
- Any control system or plant historian can access vibration data, PeakVue measurements, and temperature readings.
- Alert broadcasts provide actionable information.

VIEW ONLINE

AMS Asset Monitor



- This edge-analytics device and software solution uses CHARMs-based technology to collect vibration and process data from BOP assets.
- Auto analytics alert personnel to common faults for common mining rotating machinery assets like fans, motors, gearboxes, and pumps.

VIEW ONLINE

AMS 6500 Machinery Health Monitor



- For mining assets that might require quick response to sudden changes during transient conditions, online condition monitoring provides tailorable frequency and the types of data necessary.
- The versatile, scalable system delivers online condition monitoring as needed.

VIEW ONLINE

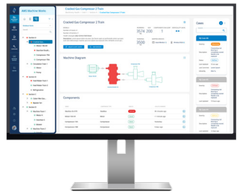
AMS 6500 ATG



- Provides team members as-needed access to asset conditions via a QR code.
- Simple and fast access. Download the app to a mobile device, use a QR code to connect to the asset monitoring system, and view asset data.

VIEW ONLINE

AMS Machine Works



- Integrates data from various data-collection methods into a single database — including information from thermographic and lubrication programs.
- Teams view data and trends to improve the reliability of rotating equipment of mining assets.
- Persona-specific alerts help teams understand potential faults and give site-wide visibility to asset health.

VIEW ONLINE

Teams Across the Mining Organization have the Tools They Need to Make Informed Decisions and Act

Workflow Management & Collaboration

AMS Optics



- Bridges operational technology (OT) and information technology (IT).
- Personnel can perform exception-based analysis versus inspecting every piece of data collected.
- Simplifies multivariate analysis and principal component analysis to assist in finding trouble spots.

VIEW ONLINE

Intelligent Field Device Management

AMS Device Manager



- Teams across the mining organization have real-time online access to intelligent instrument and valve diagnostics and alerts.
- Provides a view of device health and troubleshooting information when an issue is found.

VIEW ONLINE

AMS Trex Device Communicator



- Simple issues can be addressed on the spot, avoiding unnecessary, and potentially destructive, invasive physical investigation of the problem.
- With a Trex communicator in hand, personnel can diagnose device issues accurately in the field.

VIEW ONLINE



Go Boldly™

CONNECT WITH A MINING INDUSTRY RELIABILITY EXPERT

Request a consultation to discover how Emerson's team of mining industry condition monitoring experts can help you initiate, expand, or improve your current program or projects.

Contact Us

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