

**Apply Condition Monitoring to Move
Toward Zero Unplanned Downtime.**



Electric Rope Shovel Monitoring

A Unique, Field-Proven Application for Online Vibration Monitoring



Unplanned downtime can be both risky and expensive.

The mining pit is an inherently dangerous environment. The daily interaction between man and large, moving machinery creates an environment of ongoing risk. Add to that the unexpected shutdown of an electric rope shovel and the result is a real threat to both personnel safety and production goals.

The severe duty motors and complex gearboxes typically required to operate a shovel puts it at constant risk of breakdown. Something as common as sweeping a wall can break teeth in the gearbox and bring your production to a standstill. Keeping spare parts on hand is cost-prohibitive; and if a hoist or swing motor goes out, you'll need a crane – and at least one entire shift – to replace the part.

The time, effort and money you spend to secure the parts and expertise to quickly fix the shovel will be far less than the value of your lost production time. Personnel will be pressed to move quickly to complete the necessary repairs which can potentially put them in harm's way. Even if the repairs are completed without incident, the rushed efforts to get the shovel operational can raise the likelihood of mistakes and introduce new problems. If a swing drive is improperly installed or a hoist motor aligned inaccurately, it won't be long before your next costly unplanned shutdown.

Move from unplanned to planned downtime on complex assets.

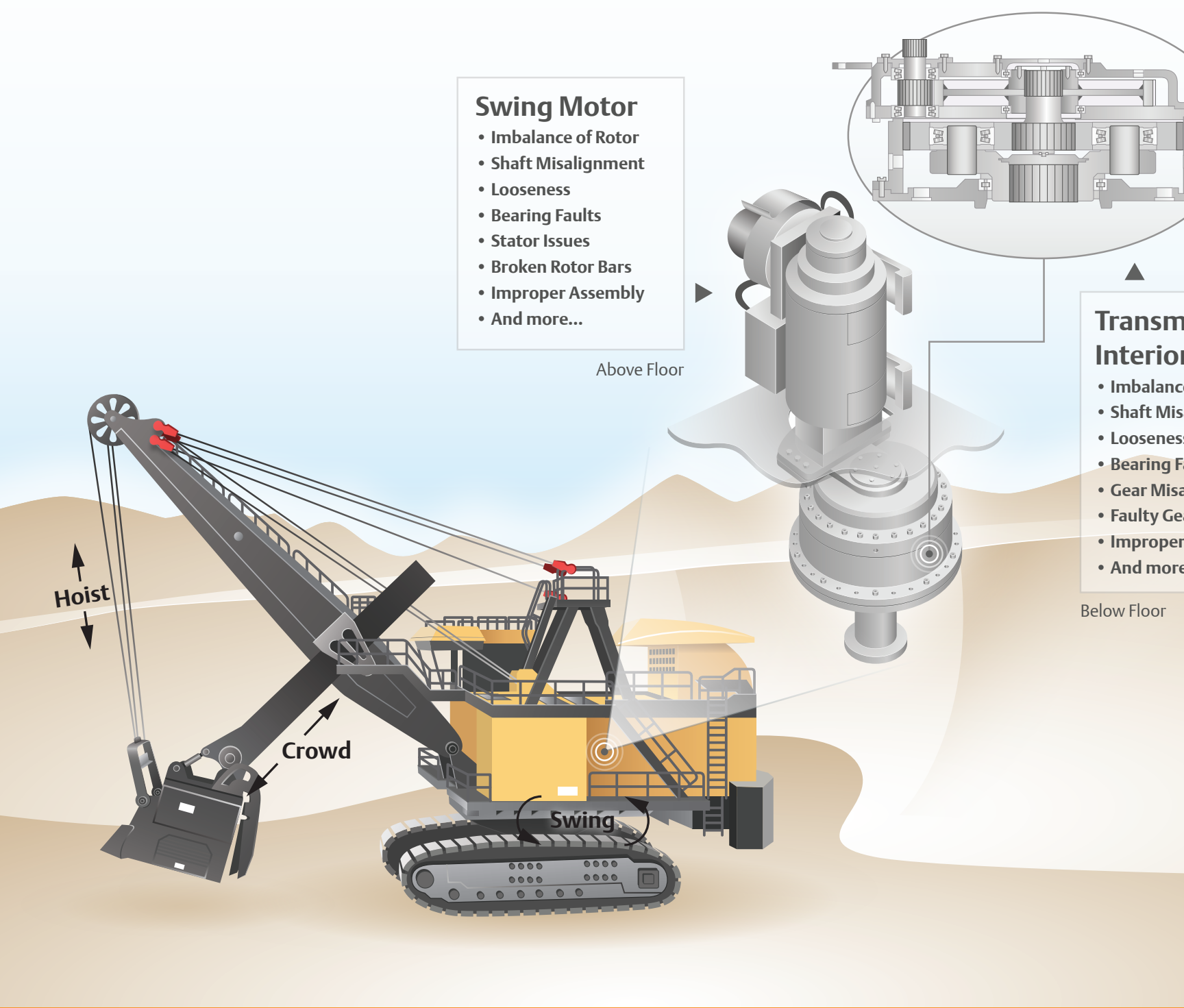
Everything on a shovel is subject to failure, and eventually you will experience a breakdown. The impact of the failure can be significantly reduced by monitoring the condition of key shovel components – the crowd, hoist, and swing drives. Traditional periodic data collection methods are of some value, but they place personnel in harm's way as data must be collected on an operating shovel under special test conditions. And periodic methods can easily miss problems that can quickly unfold between collection times. Ideally, monitoring of these drives is performed during normal operating conditions. However, a shovel's very low RPM operation under heavy and constantly changing loads presents a unique challenge to most monitoring technologies.

The AMS 6500 has a proven history of monitoring critical rotating equipment in a wide variety of applications. Emerson technology enables problem detection within the unique vibration characteristics of rotating equipment – characteristics found on many types of ore extracting assets, including the electric rope shovel.



What is the real price tag?

When you add up the cost of lost production, under-utilized personnel, parts, installation expense... what is the real price tag for a day of downtime in the pit? If you aren't monitoring your electric rope shovel, you are operating every minute at risk.



Gain visibility to developing faults.

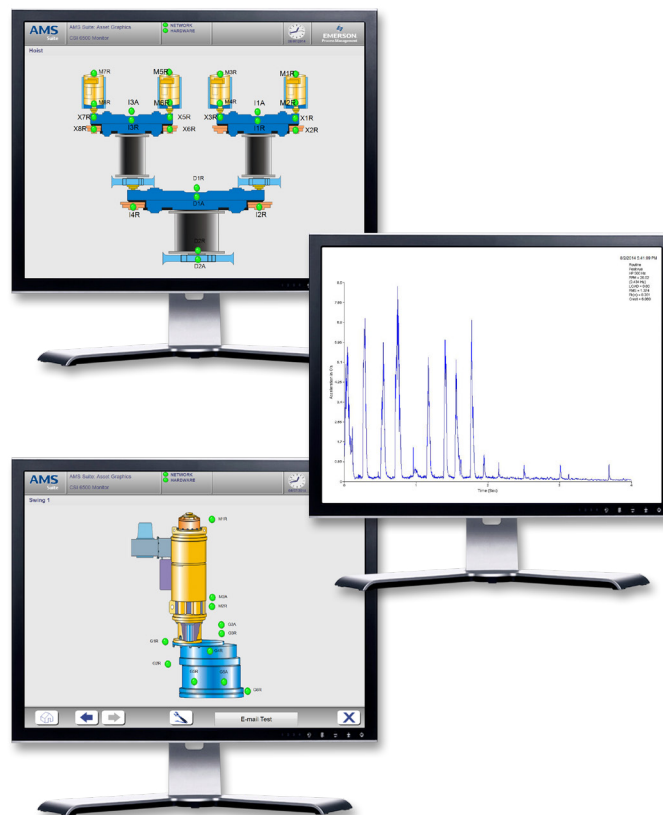
There are a variety of mobile mining assets available in the pit – each with unique condition monitoring needs. On an electric rope shovel, the AMS 6500 monitors the hoist, crowd, and swing drives for developing faults.

Understand machinery health using advanced technologies.

Changing vibration levels don't always mean the machinery health is changing. Collecting vibration data in context with machine operating condition is essential to accurately diagnose the health of the shovel. By applying an approach called adaptive monitoring, the AMS 6500 adjusts the monitoring strategy based on changing machine conditions such as load or speed. When these conditions occur within a specific range, data is acquired and stored. Trending of the data, analysis and alert levels are all based on similar conditions. With adaptive monitoring, you'll also identify those faults that occur under abnormal operating conditions.

The AMS 6500 uses a unique processing methodology called PeakVue technology, which recognizes increasing stress waves during the monitoring process. This provides earlier identification of fault development in mechanical equipment compared to standard vibration analysis techniques. PeakVue technology detects – even at very low RPMs – anomalies that may go unnoticed with traditional methods.

The combination of adaptive monitoring and PeakVue technology enables the CSI 6500 to capture data during stage testing and normal shovel operation. This flexibility delivers unprecedented insight into the operating condition of your most critical pit asset. Analytical data is available both on board the shovel and can be integrated with other systems for remote analysis. From both in the field and further away, you can easily identify and monitor developing faults and schedule for repairs during planned maintenance.



Emerson's PeakVue technology delivers early indication of developing faults in bearings and gearboxes.

Monitoring of hoist and swing drive as shown in AMS Asset Graphics.



Apply diagnostic solutions to both new and existing shovels.

An electric rope shovel is purchased with the expectation that it will remain in operation for 30+ years. Including a monitoring system on a newly built shovel is ideal, but the system is even more critical to those workhorses already in the field.

Whether pre-installed on a new shovel or retro-fitted to an existing shovel, the AMS 6500 delivers the same diagnostic capabilities with the same proven results.

Emerson co-develops new applications with leading global suppliers, so systems are field-proven before reaching end users. The AMS 6500 has monitored shovel operations for hundreds of thousands of hours with the industry's largest supplier of mobile mining equipment.



Condition monitoring creates a comprehensive picture of machinery health.

Data from the AMS 6500 is sent to Emerson's AMS Machinery Manager for trending, diagnosing and reporting of the developing faults in the shovel. AMS Machinery Manager integrates data from the online monitoring system alongside other predictive technologies – periodic monitoring, thermographic and oil analysis – to give you a comprehensive picture of the shovel's machinery health. AMS Machinery Manager can integrate data from other production assets for a comprehensive look across the entire site – from pit to processing.

AMS 2140 Machinery Health Analyzer



The AMS 2140 is Emerson's solution for periodic monitoring of the rotating equipment in the processing facility. It features many of the same advanced analysis capabilities as the online system, including PeakVue technology, but delivers testing and analysis to the field.

AMS 9420 Wireless Vibration Transmitter



When rotating assets are far from the control room, such as those driving your critical conveyors, the AMS 9420 offers data collection and wireless transmission of that data back to the facility quickly and safely.

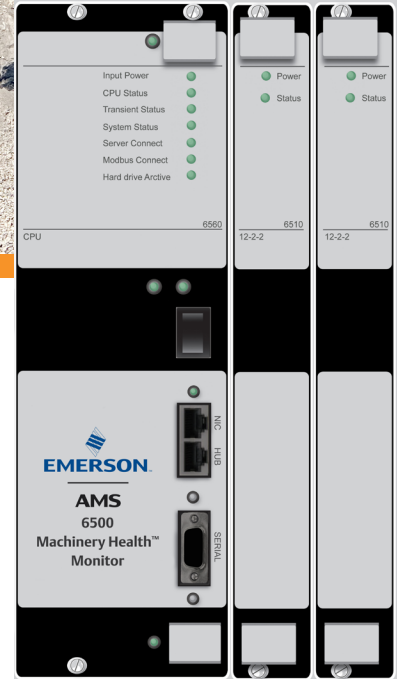
AMS Machinery Manager and Plantweb Optics



AMS Machinery Manager integrates data from the various data collection methods into a single database, alongside information from your thermographic and lubrication programs. This comprehensive approach to trending and viewing data along with the ability to focus on assets with developing faults provides the best opportunity for improved reliability of your rotating equipment.

When interfaced with Emerson's new Plantweb Optics asset performance platform, users can receive persona-specific alerts on developing faults and site-wide visibility to asset health.

Apply the benefits of vibration monitoring to the most expensive production asset you own.



AMS

**Emerson – Reliability Solutions
North America**
835 Innovation Drive
Knoxville, TN 37932 USA
☎ +1 865 675 2400

**Emerson – Reliability Solutions
South America**
Av. del Valle 601, 4to piso,
Ciudad Empresarial,
Santiago Chile
☎ +56 2 4310 7432

**Emerson – Reliability Solutions
Europe**
Katzbergstr. 1
40764 Langenfeld (Rhld.)
☎ +49 0 2173 3348 0
☎ +49 0 2173 3348 100

**Emerson – Reliability Solutions
Asia/Australia**
1 Pandan Crescent
Singapore 128461
☎ +65 6777 8211
☎ +65 6777 0947

**Emerson – Reliability Solutions
Middle East/Africa**
PO Box 17033
Dubai - United Arab Emirates
☎ +971 4 811 8100
☎ +971 4 886 5465

🌐 www.emerson.com/AMS

© 2018, Emerson. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co. The AMS logo is a mark of one of the Emerson family of companies. All other marks are the property of their respective owners.

The contents of this publication are presented for information purposes only, and while diligent efforts were made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.



EMERSON. CONSIDER IT SOLVED.™