



Move to Zero Unplanned Downtime

“It’s estimated that the total cost of unscheduled downtime can be as much as 15 times that of a scheduled event.”

Caterpillar

What if...

...you could know what is wrong with your equipment before it fails?

...you could schedule downtime for your equipment with the least amount of production impact?

...you could know when your equipment was going to fail and isolate the critical problems?

...you could reduce the amount of time your experts spent in the field?

...you always had access to the experts you need?

...you could minimize the financial impact of unplanned outages?

...you could avoid putting personnel in harm’s way?

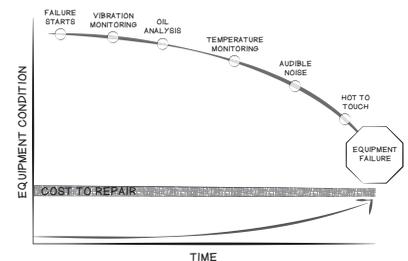
Your mine needs to run smoothly and economically if you are going to sustain a successful operation during tough economic times. Amid a volatile business landscape—from erratic commodity prices, rising government taxation, and lower quality ore—your job requires you to get every bit of productivity from all of your running assets. This means that you’ve got to prevent breakdowns whenever possible. After all, unplanned downtime can mean expensive last-minute repairs and replacements—alongside slowed production, personnel safety concerns, and reduced profitability.

Under these circumstances, maintaining the status quo is a sure way to fall behind. To sustain success in the future, you’ve got to do more with less—and you’ve got to do it quickly.

The cost of doing business is escalating for a variety of reasons, making it more challenging to sustain profitability over the long term.

UNPLANNED EQUIPMENT DOWNTIME

You contend with too much unplanned equipment downtime because your staff is unable to see mechanical problems as they develop—forcing them to react when equipment fails. Even during routine maintenance rounds, your workers may fail to see emerging equipment problems causing the cycle of unplanned downtime to continue. It’s a big challenge, but if you don’t do something to mitigate it, your mine’s profitability will suffer, particularly when commodity prices fall.



HIGHER MAINTENANCE COSTS

Your mining equipment is the lifeblood of your operation, so you make every effort to keep it running, regardless of expense. Your budget is impacted by maintaining surplus inventories, just in case you need an emergency replacement. Costs can further increase when equipment goes down unexpectedly, particularly as it may take days or weeks to receive parts in remote mining sites. Basically, by operating solely with a reactive or time-based maintenance strategy, costs add up and take a toll on your bottom line.

SAFETY CONCERNS

Protecting your personnel in the pit is a top priority. But when a critical asset fails, your staff concentrates on doing everything necessary to restore production. It’s not uncommon that they may overlook safety precautions during this time—creating a higher risk for accidents. This situation not only affects your employees, but impacts your insurance costs, production levels, and your public image. After all, a reliable mine is a safer mine.

SURFACE MINING SOLUTIONS

SUSTAIN PEAK PRODUCTION LEVELS BY PROACTIVELY MANAGING EQUIPMENT DOWNTIME

With Emerson solutions, you'll have the tools you need to meet your production goals. You will gain better insight and the decision-making knowledge you'll need to effectively plan equipment downtime.

- **Keep your equipment up and running** by using equipment health data to identify emerging mechanical problems.
- **Overcome inaccuracies due to manual or infrequent measurements** by employing online, continuous monitoring.
- **Equip your diagnostic experts with a holistic view of equipment health** using an integrated software view into early-warning issues such as increased vibration, rising temperatures, contaminated oil, and more.

CONTROL MAINTENANCE COSTS WITH GREATER EQUIPMENT INSIGHT

When your staff is equipped with Emerson condition-based monitoring tools, you'll reduce high maintenance costs associated with unexpected and inflated equipment repairs and back-up inventory. You'll also focus your maintenance team on fixing what needs repair versus having them monitor, inspect, measure, and test all critical assets on a scheduled basis.

- **Spot problems earlier** and curb repair costs using the earliest fault-detection technology available.
- **Avoid over-maintenance problems** with a condition-based strategy and eliminate costs associated with servicing healthy equipment on a time-based maintenance schedule.
- **Extend your expert skill set with the tools to analyze data remotely** and guide onsite staff, minimizing time and travel costs.

PROTECT YOUR PEOPLE WITH A PREDICTIVE MAINTENANCE PLAN

With Emerson's online monitoring capabilities, you can gather essential information about your critical assets without jeopardizing the safety of your workers. You'll have the ability to learn about equipment health without sending your operators into the pit to measure vibration, temperature, or to analyze oil quality.

- **Reduce the need for sending experts into the mine**, by relying on online, continuous monitoring and remote diagnostics to provide your crew with equipment and maintenance advice from any location.
- **Safeguard your workers** with online, continuous monitoring and remote diagnostics and mitigate the risks associated with manual measurements on or near moving equipment.

“Emerson’s method of processing vibration data preserves peak amplitudes of stress waves emitted by deteriorating equipment. Our analysts find this information very helpful in trending and evaluating fault development.”

Bob Hicks

Joy Global, a parent company of P&H Mining

SURFACE MINING SOLUTIONS

You can sustain peak production levels by keeping vital equipment running longer, while also decreasing costs and improving personnel safety. Start your condition-based maintenance strategy with the following Emerson's solutions.

MOBILE MINING EQUIPMENT

FIXED MINING EQUIPMENT

ELECTRIC ROPE SHOVELS AND DRAGLINES	CONVEYORS
<ul style="list-style-type: none"> • Online condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Crowd – Hoist – Swing – Propel • Wireless condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Cooling fans – Lube oil pumps • Infrared analysis • Oil analysis • Motor current testing 	<ul style="list-style-type: none"> • Online condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Motors – Gearboxes • Wireless condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Head and tail pulleys • Oil analysis
HAUL TRUCKS	CRUSHERS AND GRINDING MILLS (BALL AND SAG)
<ul style="list-style-type: none"> • Online condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Brakes – Cooling fans – Transmission – Differential – Alternator – Drive components • Wireless condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Cooling fans – Lube oil pumps • Load monitoring • Infrared analysis • Oil analysis 	<ul style="list-style-type: none"> • Online condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Motors – Gearboxes • Wireless condition monitoring (temperature) <ul style="list-style-type: none"> – Motor stator on gearless motors
RELATED SOLUTIONS	VIBRATING SCREENS
<ul style="list-style-type: none"> • Online condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Stackers/reclaimers – Excavators – Loaders – Mobile crushers – Drills 	<ul style="list-style-type: none"> • Online condition monitoring (vibration and temperature) <ul style="list-style-type: none"> – Screen bearings – Motors – Material flow

SURFACE MINING SOLUTIONS

ELIMINATE UNPLANNED DOWNTIME



Keep Production Running Optimally with Planned Repairs

Using Emerson online condition monitoring, a global mining company identified a problem on an operating SAG Mill ring gear. Because this defect only affected one direction, the company operated the mill in the “good” direction until it could be shut down on a planned basis.

REDUCE MAINTENANCE COSTS



Reduce Spending by Eliminating Maintenance

A South American mining company reengineered its processes by investing in Emerson’s condition monitoring and eliminating time-based preventive maintenance. By doing so, it kept its workers out of the field and lowered the number of field man-hours by 80%.

PROTECT YOUR STAFF



Keep Personnel Clear of Moving Equipment

Joy Global implements Emerson’s condition monitoring on all of its new electric rope shovels. Not only does this help miners keep their shovels online, it also eliminates the need for mine workers to crawl on shovels to collect vibration data by hand.



EmersonProcess.com/Mining

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