

Case Study:
P&H Mining Equipment

Two Days to Two Hours: Matrikon Mobile Equipment Monitor powers P&H's Remote Health Monitor to a Reduction in Downtime and Increase in Safety

[featured quote]

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— Brian Raba, Regional Product Specialist, P&H MinePro Services

Situation:

A P&H 4100XPC shovel shuts down after a dipper drop at a large coal mine in Wyoming. A P&H MinePro Services Regional Product Specialist is contacted at home in the middle of the night to investigate the cause of the shutdown and determine whether the shovel is safe to operate.

Challenge:

Quickly and reliably diagnose the root cause of the dipper drop incident. At stake is the safety of mine employees and the reduction or elimination of costly shovel downtime required to investigate the incident.

Solution:

P&H MinePro staff analyze data captured by P&H's Remote Health Monitor (RHM), powered by Matrikon Mobile Equipment Monitor, to understand the actual conditions at the time of the dipper drop event. Remote access to the data allows them to quickly diagnose root cause and determine that the shovel is safe to operate without time-consuming travel to site or costly downtime.

Results:

- Faster, more reliable diagnosis of root cause
- Fast re-deployment of shovel
- Confidence in shovel safety
- Savings in downtime costs per incident
- Elimination of onsite visit

Anatomy of a Dipper Drop

In the surface mining industry, a dipper drop – an uncontrolled motion of the dipper due to gravity – is a significant event. In some cases, the shovel's control system is able to regain control and stop the motion before damage is done. In other cases, the dipper stops when it hits the ground or – in a worst-case scenario – comes into contact with another piece of equipment.

Dipper drops can occur for a variety of reasons:

- mechanical failures in the shovel
- electrical and control system disruption
- machine overloads
- operator error

The suspended loads in the dipper can range up to 200 tons for P&H's 4100 series equipment. As a result, understanding the root cause of a dipper drop is crucial to ensuring the safety of the employees and the equipment.

Investigating a Dipper Drop

Typically when a dipper drop occurs, a significant effort is required to investigate and determine the root cause of the event. Not only must P&H MinePro staff visit the mine, the shovel remains down for the duration of the investigation, which can take anywhere from one to three days to perform. Shovel downtime at current market rates costs the mine approximately \$50,000 every hour in lost production.

The investigation requires significant time and effort to recreate and understand the conditions at the time of the dipper drop. Physical inspection of the shovel looks for damage that may be a cause or result of the event. The shovel operator is interviewed in order to understand the events leading up to the dipper drop. P&H MinePro staff may sit on the shovel and either wait for another incident to occur or try to recreate the original incident. During this time, they connect a laptop to the shovel in an effort to collect the data points that they believe will help them to understand the incident. If their best guess is wrong, the data will be useless. It is often difficult or impossible to fully understand the root cause behind the event.

A Better Way to Investigate

Within 24 hours of its installation on a shovel in a Wyoming coal mine, Remote Health Monitor provided Brian Raba, Regional Product Specialist at P&H MinePro Services, with a more effective tool set to investigate a dipper drop incident. Raba was asleep at home when the mine called to report that a shovel had shut down after experiencing an uncontrolled dipper drop. With no prior training on RHM, Raba quickly logged on to the RHM system in Milwaukee from his home computer in Wyoming and was able to see real-time operating data on that specific shovel.

From experience, Raba knew to look at the hoist system. Because RHM was capturing and archiving hundreds of data points from the shovel, Raba was able to quickly find the fault associated with the shutdown and use RHM's analytical tools to analyze the data leading up to the fault. Within the hour, Raba was able to diagnose the problem. The data that RHM provided indicated that the shovel event was induced by operator action rather than a system failure. Equally important, the data indicated that it was safe to restart the shovel.

"Without Remote Health Monitor in place, I would have had to drive an hour to the mine and hope the operator that was running the shovel during the fault was on shift and find out what took place," Raba said. "I would then have to hook up a laptop and hope that everything was set up right to capture the correct data."

Saving Time and Producing Better Results

RHM saved the mine 24 to 72 hours of shovel downtime — time that would have been spent diagnosing and recreating the original event with often inconclusive results. RHM allowed Raba to quickly provide a more reliable diagnosis of the root cause of the dipper drop event without a trip to the mine or extensive downtime. Because of RHM's comprehensive data collection, Raba was able to investigate the original dipper drop incident itself instead of data collected from attempts to recreate the incident. He had immediate, remote access to the actual data from the actual event and was able to quickly and reliably diagnose the root cause.

Raba determined that the fault occurred due to operator error, allowing the mine to address a training issue. Even more importantly, he knew that the shovel was operating properly and recommended that it continue operating — avoiding the significant downtime and production losses usually involved in machine troubleshooting.

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About P&H Mining Equipment

P&H Mining Equipment is a global leader in the manufacture and service of pace-setting large excavating and drilling machines used to mine copper, coal, iron ore, silver, gold, diamonds, oilsands, phosphate, molybdenum, potash and other minerals and bedded materials. Ninety percent of the world's surface mines utilize P&H equipment. www.phmining.com

About Matrikon

Matrikon is a leading provider of industrial intelligence solutions that enable mines and manufacturing plants to achieve operational excellence in their equipment and plants by transforming operations data into actionable knowledge to predict and prevent problems and optimize operations. Matrikon's customers deliver consistent bottom line improvements through use of the combination of external and operations data to make informed, intelligent decisions in real-time. With offices in major cities throughout North America, Asia-Pacific, Europe and the Middle East and a global client base including industry leaders in mining, oil and gas, power and chemical industries, Matrikon's reach is global. www.matrikon.com.

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