

Newcrest Mining Crushes their Goals with the PI System™

INDUSTRY MINING

CHALLENGE

80+ hours of mine downtime due to crushed ore bin sensor failure, and no ability to run models continuously.

SOLUTION

Real-time data available 24/7 thanks to PI System architecture enabling the use of virtual sensors running ML models to overcome sensor failure.

BENEFIT

Increased throughput by 650 thousand tons in the first six months, and decreased crushing circuit downtime by 50%.

Newcrest Mining is one of world's largest gold producers. With mines across three countries, Newcrest produced 2.49 million ounces of gold just last year, with growth and exploratory projects in the pipeline. But producing more gold isn't just a matter of working harder—the company has to delve deeper underground and explore increasingly remote parts of the world to meet their goals. For Newcrest, the answer was “a scalable modern platform for collection and mobilization of data to produce digital outcomes for our company, as well as advanced analytics, such as AI and data science,” said Nevena Andric, IT Solutions Lead at Newcrest Mining.

Big Data Means Big Results

To succeed, Newcrest needed reliable, accessible data. Newcrest had models built primarily to inform operator decisions and predict what might happen in various parts of the system. To improve, “we needed real-time data, which we didn't have in our existing platform... and we also needed to scale our platform in terms of how many models we can run,” said Andric.

To meet these needs, Newcrest built a “more modular, maintainable, and easy to troubleshoot” data architecture. “When we started to develop this architecture... we had a single PI server on each site. We had to often take that down for windows patching, which meant our models were down for that time as well,” said Andric. Now they have two PI System servers running side by side, which creates a fully redundant PI System architecture at each of their sites and allows their models to run all the time. “We picked this method together with help from architects at OSIsoft because of its scalability and its cross-platform utilization,” said Andric. “We also roll up all our PI data nightly and

send it to the cloud, and this is the data we use for retraining our models when we need to do so.”

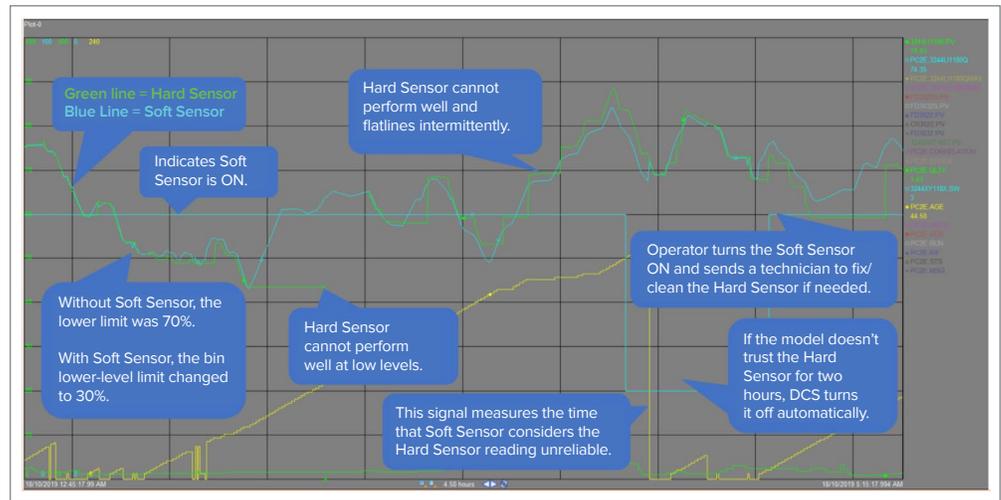
The Crushed Ore Bin Use-Case

Nowhere is the benefit of this restructuring more evident than in dealing with the crushed ore bin at their mine in Cadia. Machinery feeds newly crushed ore into the crushed ore bin, which then feeds that ore onward to be further processed. “The levels of this crushed ore bin are monitored by a microwave sensor that's located near the bottom of the bin. Over the years, we knew one of the major causes of downtime in the crushing circuit is that this sensor is highly unreliable.” Due to its location at the bottom of the bin, the sensor is frequently hit by falling rocks or covered by dust, causing it to be damaged. When the sensor malfunctions, it either causes the bin to be overfilled, requiring maintenance crews to go in and empty it out (causing 7–8 hours of downtime), or underfilled, halting the crushing process completely until the sensor can be recalibrated. Cadia's mine is completely underground, meaning it's difficult to get

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We can now continuously operate the COB, run of mine (ROM) and loaders, even in the event of a COB level sensor failure. This helps ensure the conveyors are at full capacity and don't stop operating unnecessarily, leading to increased production.”

— Peter Sharpe,
General Manager,
Cadia



A few hours of sensor data demonstrates that Newcrest's soft sensors, run on the PI System, are a game-changer.

technicians safely in and out to maintain this sensor, which meant Newcrest was dealing with over 80 hours of downtime in their crushing cycle.

Newcrest developed a model that would function as a virtual or “soft” sensor to predict the bin level without relying solely on the physical sensor. Running in their new PI System architecture, this soft sensor lowered the lower operating limit from 70% to 30%, allowing the crushing cycle to run uninterrupted until the microwave sensor could be replaced in a normal maintenance cycle. With the PI System, automations were also set up to notify support when the virtual sensor's

confidence in the readings became too low, and to let operators know when it was ready to run again. Using the PI System as a framework, this data is also used to decide when to retrain and recalibrate the models, so they can constantly improve. Newcrest was able to increase their throughput by 650 thousand tons in the first six months of use (a new record), decrease crushing circuit downtime by 50%, and enable faster delivery by fostering trust between the Site and IT teams, thanks to this responsive and reliable process.

For more information about Newcrest Mining and the PI System, watch the full presentation [here](#).

Andric, Nevena. “PI System as the Foundation of Data Science Platform for Optimising Mining Processes.”