

Squeezing out more efficiencies with your process control system

by Don Mewes

It's been said that information is power — and many mining operations are missing out on ways they could apply the information available through their process control systems (PCS).

It seems that while over the years mining operations have become effective at acquiring data through the process control systems, they have not made optimal use of the data.

To quote one mining executive: "We're the masters of collecting data and of doing nothing with it."

To understand why this might be the case — and how mining operations can gain further operational advantages from their process control systems — some background is necessary.

Computerized human-machine interface (HMI) systems have been around since the 1980s, allowing staff working from a central control room to see pressures, speeds and machine status, as well as take actions such as starting or stopping motors, adjusting valves and activating alarms.

Data collection has been commonly used in the industry since the 1990s, as systems were configured to collect real-time data and make it available. In the past decade, a more progressive view of this data, providing trend data that can help correlate the various factors that influence production outcomes started to become available.

At the same time, there has been progress in the standardization of operations and management systems. Now, widely accepted process control system software such as Wonderware and Rockwell Automation offer the ability to manage a range of inputs, and the ability to not just generate data, but to use that data for process improvements.

Widespread use of these systems helps ensure that increasing numbers of mine personnel have at



least some familiarity with them, making their implementation easier. However, there are still gaps in how these systems are applied, creating opportunities for companies that learn to maximize the possible benefits of process control systems.

Condition-based maintenance

To understand one of the 'missing benefits' from process control systems, one must have connectivity to multiple data sources such as computerized maintenance management systems (CMMS).

Consider the case of a slurry pump. An earlier generation of operations software might be set to produce a maintenance ticket for this pump every three months, based on the average number of hours that the pump operates. However, this will almost certainly either not be often enough (risking a breakdown or damage to the pump) or too frequent (wasting supplies such as replacement gaskets and seals, as well as the time of maintenance staff).

It is much better to use data from the process

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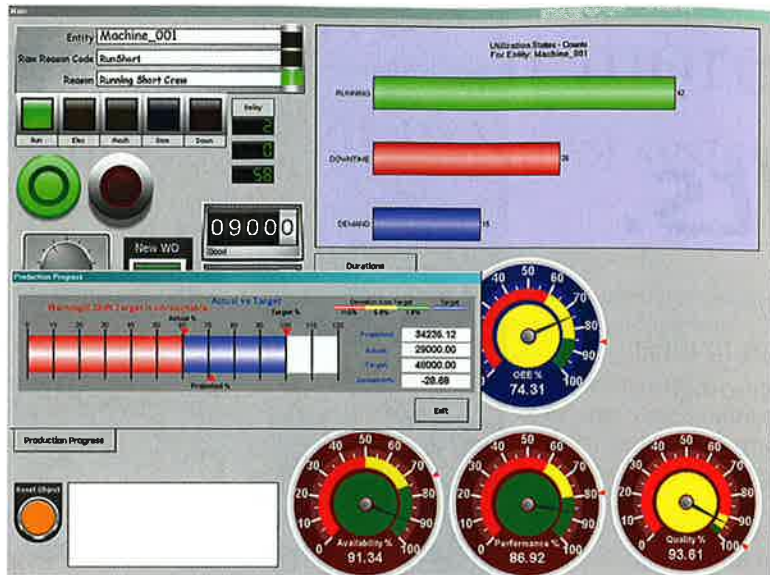
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Interfaces from current Process Control Systems, can give facilities managers a real-time view of production status. Screen images courtesy of Wonderware.

control system to determine, through real-time operational experience, how long it will be until perhaps 80 percent of the hours have elapsed until the next required maintenance. At that point, a maintenance ticket for the slurry pump would automatically be issued from the CMMS — leaving maintenance staff adequate time in which to do the work.

As the pump nears the end of its operational life, maintenance checks might be scheduled more

often, to reduce the risk that a breakdown in the pump will interrupt operations.

While one pump might not make or break a mining operation, if this predictive maintenance model is applied to all the hundreds or thousands of elements at the mine, mill, paste plant or backfill operation, the difference starts to show in operational improvements. Maintenance staff no longer spend as much of their time on unnecessary tasks, and can devote it to solving critical issues.

Overall equipment effectiveness

With the exponential growth of affordable computing power, it is now possible to build a detailed, real-time picture of a mining or milling operation to help boost overall equipment effectiveness (OEE).

Each element in the operation can have its own tag number, so that monitoring can be done at a micro level — such as the motor powering a single cylinder in a ball mill — or at a more macro level, which might be the entire ball mill operation.

Process engineers can then evaluate the data. In the case of a pump, they might ask whether the pump really needs to be operated at that speed in order to maintain a head of



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Process control systems can add efficiency to any mining operation.

pressure that meets operational needs. Reducing the speed could reduce energy costs, as well as wear-and-tear on the pump, plus maintenance costs, all without having a negative impact on the operation.

Maintenance teams can work directly with the control system, keeping its information current.

While information for operational purposes can be as detailed as required, it is also possible to prepare simplified dashboard-type interfaces so that senior management and the company's C-level can stay up-to-date on the plant's throughput levels.

call for human intervention if those parameters are exceeded.

The possible benefits extend into other areas as well. For example, a kiln operation might be set to use natural gas as a fuel whenever the price of gas is below a certain level, switching to another fuel source such as diesel if that price is exceeded.

Implementation suggestions

One of the keys to gaining these benefits from a process control system is to make sure qualified personnel carry out the work, whether these personnel are on staff or external professional advisors. This needs to include designing the historian — the repository of historical data that can then be mined for trends and correlations that help guide future decisions, ranging from maintenance schedules to capital purchases.

One way to access qualified staff is through the Control System Integrators Association (www.controls.org), which provides a certification and best practices for its members, and operates an online referral service that can help locate qualified professionals in many different parts of the country. ■

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