

# Machines get health checks online

*Condition monitoring is a proven valuable tool for optimising maintenance strategies. Ian Liebler, Rockwell Automation integrated conditioning monitoring solutions architect, explains how integrated condition monitoring can provide even greater production and maintenance efficiencies through streamlining real-time information flow.*



**Integrated Condition Monitoring will provide a more accurate picture of the health of key machines, such as This SAG Mill.**

**T**o ensure the ongoing efficiency and operation of plant, machines must be maintained and serviced. Yet while too little maintenance will result in breakdowns; too much will cause needless machine downtime and reduced productivity. The optimum maintenance schedule lies somewhere between, demanding methods of predicting when servicing might be required, so that maintenance can be carried-out more strategically.

Regular monitoring of machine health—or condition monitoring—has proven a valuable tool for providing operational continuity, regulatory compliance, safety and reliability of plant operations. Fundamentally involving the collection of key machine data, condition

monitoring techniques can be used to identify changes in machine operations and instigate strategic condition-based maintenance (CbM) as required.

Conventional condition monitoring is intermittent, often using handheld devices, and is by nature isolated from other plant control-systems—including machinery protection systems. However, the emergence of integrated control technologies is promoting a shift towards ‘integrated condition monitoring’ (ICM), where control, protection and condition monitoring are merged into a single integrated architecture.

ICM aims to leverage existing infrastructure to incorporate CbM strategies and improve the flow, accessibility, and ‘actionability’ of

information. Ideally, ICM will provide full connectivity between the condition monitoring system and the plant enterprise—including computerised maintenance and monitoring systems (CMMS)—plus supports multiple types of data and data-collection strategies. However, the level of integration will ultimately depend on the infrastructure present.

In many plants, maintenance personnel collect and analyse condition monitoring data; concurrently, control data is collected for operational requirements. The two distinct and separate types of monitoring are then integrated into the same system.

## ‘Online’ integrated intelligence

It is possible to take the integration one step further. ‘Online’ ICM removes the need for separate data collection. Here, all field sensors—maintenance and operations—feed signals to the controller to allow it to perform auto-diagnostics. Current information can be accessed in real-time, and viewed on any SCADA or HMI. Real-time data can alternatively be routed to personnel as required, or passed back to a database or software interface for functions such as maintenance scheduling, data analysis or historian trending.

The ability of online ICM systems to handle machine vibration data is fundamental. Vibration magnitude at key narrow-band frequencies can be used to diagnose issues such as imbalance, misalignment, blade pass and blade pass harmonics. The vibration frequency associated with each potential issue can be monitored; if measured above the designated threshold—indicative of a specific fault—a real-time message specifying the fault can be sent to the

machine operator, to facilitate corrective action.

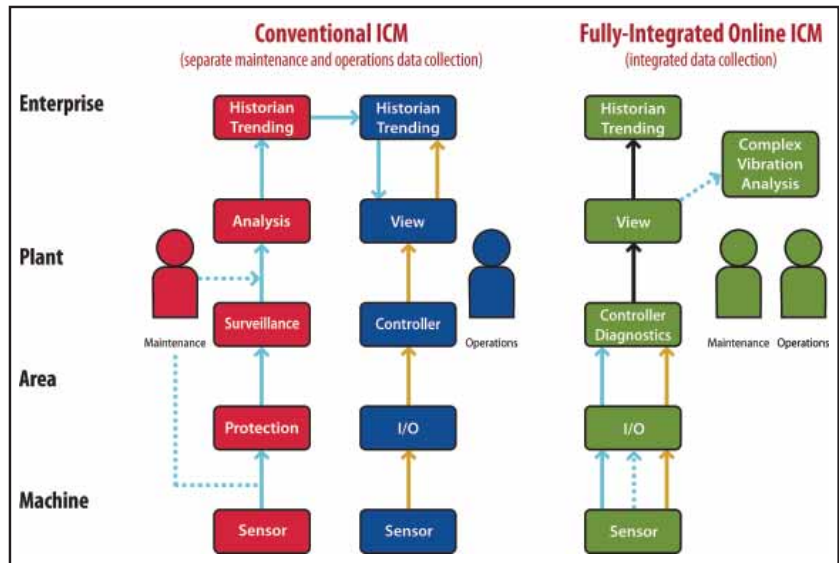
ICM systems can also leverage the intrinsic intelligence of the controller. The controller can be programmed to provide not only real-time operator alerts, but also protection or remedial control action.

For excessive vibration on a conveyor, for example, the controller could be programmed to reduce belt speed, thus minimising vibrations while allowing the unloading of material already on the conveyor. Similarly, vibration alerts from a bearing shaft caused by excessive friction can be used to task an auto-lube function through the controller. Control actions that minimise or rectify machine faults are especially valuable where—due to process or safety considerations—machines cannot simply be shut-down.

The provision of real-time data will provide a more accurate picture of the health of key machines—those that are critical to production or safety, difficult or expensive to repair, have a history of inherent faults, or are

prone to catastrophic failure. This will enable targeted maintenance-activities to be provided only when required. Furthermore, ICM functionality can provide increased levels of protection

and control to machines and processes, elongating the working-life and ensuring maximum productivity for minimised downtime. AT



Traditional ICM compared with Online ICM. 'Online' ICM removes the need for separate data collection.

## Industry Event - Automation Fair

**N**ovember 8-12: Thousands of customers, distributors, partners and media from around the world gathered to take the 'once-in-a-year' opportunity to visit Automation Fair, the largest event of its kind in the industry. The Anaheim Convention Center, Anaheim, California, started to bustle over the weekend with pre-show events, and remained busy through the week, hosting over 9,000 attendees.

Automation Fair is designed to offer visitors an excellent opportunity to keep up with the best automation technology available from Rockwell Automation and its Partners. The floor showcased over 100 exhibitors demonstrating their advance automation products, integrated control, information architecture and value-added services, emphasising time and money saving solutions through integration and cooperation with Rockwell Automation products and services.

Keeping with Rockwell Automation's tradition to host this annual event as an educational forum, company executives focused on three themes which are at the top-of-mind for manufacturing leaders today:

**Plant-Wide Optimization** – Manufacturers continue to converge factory controls and information technology, driven by productivity, globalization, innovation and sustainability. Rockwell Automation

addressed how information-driven, plant-wide optimization will change manufacturing and production processes in the short and long term, and position companies for an economic recovery.

**Machine Builder Performance** – A scalable architecture is a key differentiator that helps machine builders improve productivity while reducing their total cost to design, develop and deliver innovative machines for optimal performance. Company executives demonstrated how the Rockwell Automation Integrated Architecture system can change the way OEMs design a machine solution and the impact it could have on their business.

**Sustainable Production** – Strategic energy management is becoming an increasingly important element of sustainable production. Rockwell Automation executives, customers, the U.S. Department of Energy and other experts shared innovative approaches to better manage and reduce industrial energy costs while supporting their environmental and safety objectives as well.

Special customer focused events held earlier in the week included Process Solutions Users Group, a



forum for sharing best practices and finding solutions to process issues; Safety Automation Forum, focused on safety's importance in manufacturing, its business impact, and how to leverage changing standards; and Quality Forum, promoting interaction with our Quality leadership team.

"While this year has been extremely challenging, we can help our customers prepare for the economic recovery by showing them how to capitalize on their automation investments through innovative solutions," said Keith Nosbusch, chairman and CEO, Rockwell Automation.

Automation Fair included free workshops, technical sessions, industry forums, hands-on labs and exhibits that provided attendees with opportunities to learn about the latest trends, issues and solutions for manufacturers worldwide... Already in the planning, Automation Fair 2010 will be held on 3-4 November, Orlando, Florida – a worthy note for your new year's plans. AT