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Software Increases Confidence in Decision Making

by Amy Davidson

The vast amount of diagnostic information available today about the condition of critical production assets – information that can be of real value to decision makers -- can be confusing and even overwhelming. However, when information from hundreds or even thousands of separate sources is consolidated and organized on a single platform, a more complete picture of the health and operation of critical assets, or an entire process, emerges.

As a result, users can literally see into the future to prevent process slowdowns or unplanned stoppages. The ability to view the health of critical production assets from anywhere in the world may be just what a manager needs to recognize a developing problem and predict what will happen well before a serious breakdown threatens productivity, whether in a production unit or an entire plant. Equipment not performing up to full capability can be identified well in advance, making it easier to decide when to deploy maintenance resources in the most efficient and cost-effective manner.

Look at the results from a multi-plant petrochemical company in southern Africa. When data from various sources was consolidated, a previously unattainable view of the production assets became the basis for predictive maintenance:

- Equipment reliability improved from 97% to 99.8%
- Saved 11 days of production by minimizing downtime
- Saved $200,000 to $300,000 by selectively overhauling control valves

Johan Claassen, previously mechanical and instrument maintenance manager for seven petrochemical plants, said officials were looking for a good maintenance management tool at a newly commissioned plant. This facility had all the latest automation technologies, including HART and FOUNDATION fieldbus instrumentation and was the site of a comparative asset management systems trial conducted in 2005. After the six-month trial, the company selected Emerson's AMS Suite as its basic predictive maintenance software. This included AMS Suite: Asset Portal, a web-based application designed to aggregate diagnostic information from data sources within the plant.

Since that data can be accessed via Internet Explorer, authorized personnel in the plant, or half-way around the world, can view vital information on critical production assets. The information can be organized in a way that is most helpful to the user – by location, asset type, description, health index, or significance to plant reliability. The configurable dashboard instantly presents the highest priority assets. Users can consult appropriate documentation from a manufacturer's website or view internal records on a specific asset directly from the dashboard.

The combined data gives managers a broader view of the current operating condition of mechanical and process equipment as well as field instruments and valves throughout a plant or across an entire enterprise. This can have a strong impact on decision-making.

"After six months of intensive scrutiny," Claassen said, "we decided to standardize on these technologies for their ease of use, the amount of diagnostic information we could obtain from the field, the high level of information received, and the ability to drill down for more detail if required. This was

Editors Note: We published this article with specific references to Emerson's AMS Suite and Asset Portal software in order to tell more people about potential solutions as maintenance and reliability information management evolves. We did not want to make it generic. There are other unique software products that we will also be presenting to you in Uptime. In order to bring you the full impact of the capabilities of some of these new technologies - we have decided to allow product specificity - not as an endorsement - but to create an enhanced understanding of the rapidly changing landscape of Information Technology. Uptime is comfortable stepping out of the limited and traditional etiquette of magazine publishing and we hope you see the value in our decision. We certainly invite your feedback as we continue to move forward.
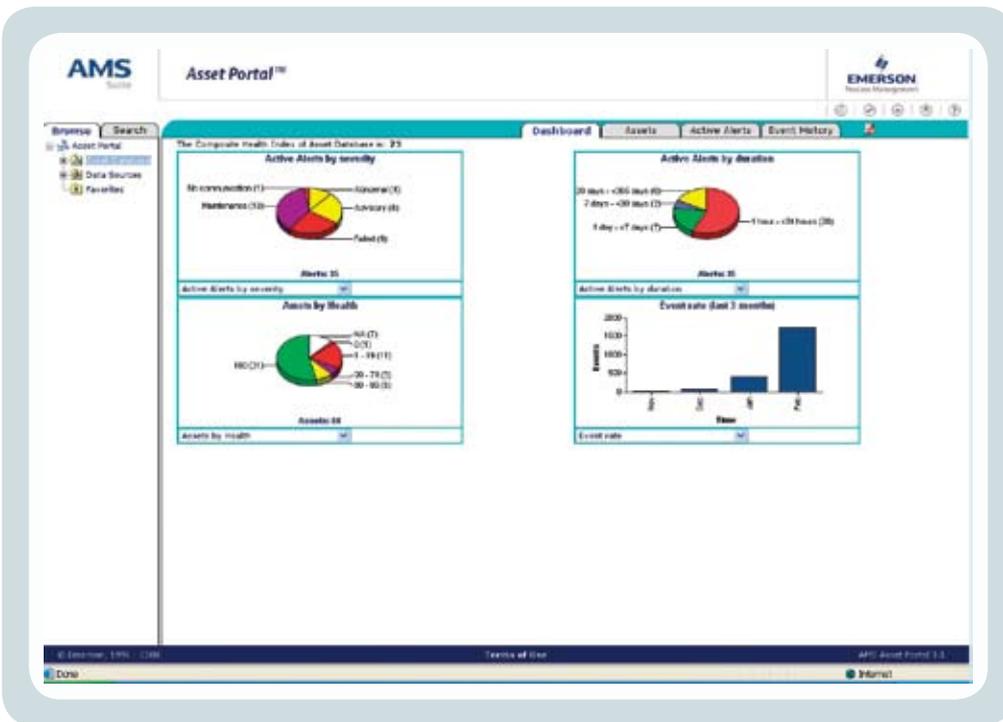
Figure 1 - A screen shot of the dashboard within Emerson's AMS Suite: Asset Portal, which gives you a view of Active Alerts by severity and by duration, a view of Assets by health and a score for the composite health index of you asset database.

a good choice; they proved their value in their first year of full operation in our plant."

The two major yardsticks used to evaluate the operational effectiveness of the AMS Suite products, Claassen said, were the impact on maintenance costs and plant reliability. In 2003, the first year of plant operation, instrument and valve reliability was 97 percent – not bad, he said, but of course everything was new. Following implementation of AMS Asset Portal, reliability increased to 99.8 percent.

There was also a direct financial benefit in the reduction of maintenance costs. Instrument and valve spending actually decreased in the years following start-up. This was largely due to a "big gain", Claassen said, on the control valve side where a program was implemented to use the predictive diagnostics produced by valves equipped with digital valve

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controllers (DVCs), which provided feedback on valve function and condition.

In the past, control valves were generally removed from service and overhauled every two years. The new valve diagnostics proved that that repair frequency was not necessary.

"We actually changed our valve maintenance philosophy based on the new technology," Claassen said. "When production and maintenance personnel met prior to a shutdown, we would determine which valves had to be removed based on a preventive maintenance philosophy calling for maximum removals just to be on the safe side. When we started basing decisions on each valve's actual performance, by comparing original and current valve signatures, we found that far fewer valves had to be scheduled for overhaul.

"This represented a significant savings," he said, "because removing a control valve requires a huge amount of planning and coordination. For example, the wiring must be detached, and the lines must be drained and removed and the valve placed in a good space where the guys can work on it. It also may be necessary to arrange for scaffolding or get a crane to lift the valve, depending on its size and location in the plant. We saved between $200,000 and $300,000 per shutdown by greatly reducing the number of valves serviced each time."

Claassen concluded, "Even with that impressive savings, the biggest financial impact resulted from increasing equipment reliability to 99.8 percent. The additional uptime was equal to about 11 full days of production per year." He cited still another benefit – faster plant startup following a shutdown. Claassen said, "The biggest concern an instrumentation and valve manager has after a shutdown is whether everything is physically connected in the same manner as it was before the shutdown. A lot of contaminants can get into the system during a shutdown, so we always try to make sure all the equipment is back to normal."

Claassen said, "AMS Asset Portal enabled me to actually see which devices were ready and which ones had problems. If it showed everything was connected and properly configured, it gave us the confidence to sign off on the startup."

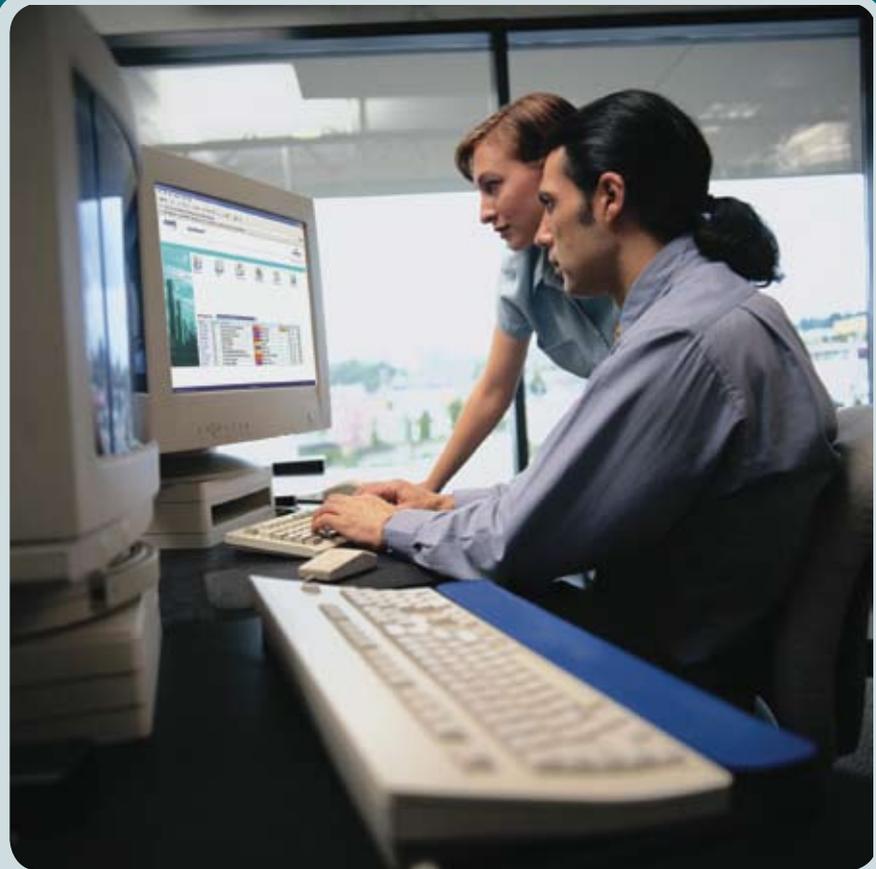Timely information provided by this software includes:

- Plant Health Home Page for a quick look at the health of all plants

- Asset Health Dashboard Report that organizes

Using AMS Suite

Each of the AMS Suite applications provides a unique window into a specific area of plant operations that can be observed in no other way. AMS Suite: Intelligent Device Manager gathers data generated by smart instruments and valves throughout a plant. This single application supports device configuration, documentation, calibration management, and diagnostics, making it possible for maintenance personnel to predict with great accuracy how long and how effectively a smart device or smart valve can be expected to continue performing reliably.

In much the same way, AMS Suite: Machinery Health Manager supports predictive maintenance of rotating mechanical equipment by analyzing vibration data from motors, pumps, fans, turbines, etc.

AMS Suite: Equipment Performance Monitor is another web-based service designed to increase the availability and throughput of turbo, rotating, and process equipment.

AMS Asset Portal aggregates data from all AMS Suite applications to provide a comprehensive picture of asset health across a plant.

and displays information on the condition of plant assets in a concise, yet understandable way (Figure 1)

- Enterprise-wide view of production assets, no matter where they are located

- Importing capabilities for data regarding production assets not connected to standard sources

- Exporting capabilities to send asset data to a third-party, such as an equipment vendor, for analysis and suggestions

Summary

By consolidating diagnostic information from many sources throughout a production unit, or an entire plant, on a single platform, the condition of all essential production assets can be observed. Plant personnel can quickly identify under-performing equipment long before it causes a slowdown or stoppage. They are essentially able to look into the future with the power to predict unexpected failures or off-spec product in time to take corrective action.

With these technologies in place, equipment reliability is raised to new levels, predictive maintenance can be practiced, and hundreds of thousands of dollars can be saved.

Amy Davidson is a Product Manager in the Asset Optimization Division of Emerson Process Management, located in Eden Prairie, Minnesota. An Emerson employee for the past five years focusing on asset management issues, Amy has more than 20 years of experience in project management and marketing in the automation industries. She is a graduate of South Dakota State University with a BS in Chemical Engineering.

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