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First published 06.04, page 38

Visualized key performance indicators spark communications and actions to maximize revenues

C. Kenna Amos, Contributing Editor

Is a picture truly worth a thousand words? Is seeing really believing? If so, then real-time or near-real-time analyses of integrated performance data and their digital visualization throughout the enterprise are two of the most notable behavior-changing and profit-enhancing business and management technologies ever conceived.

But, given other leading- or bleeding-edge technologies touted as remedies to businesses' problems, how can that be? It's simple. Data visualizations resolve a burden manufacturers have confronted seemingly forever—that is, translating and then publicizing corporate productivity and financial goals. With these tools, maintenance, operations and business staff, as well as executives, can understand what needs to be done, and then fulfill their respective contributions to produce positive returns on investments.

What holds the most promise as the fiscal and operations vocabulary of this ceaseless though changeable, challenge are key performance indicators (KPIs). At the core of KPIs is usually overall equipment efficiency (OEE). It comprises the multiplication of components, with each expressed as a percentage.

Availability is the percent of time a machine is available. Performance measures operation and output. Quality is a measure of acceptable product. OEE and other KPIs connect and initiate better-informed decisions and actions by quantifying organizational goals and describing success.

Now, employees at every level of the enterprise can see a cohesive view of the enterprise expressed in graphs, tables or charts. And they can see that view at any time from any location—based on security restrictions and users' need-to-know status—through Web-based out-of-the-box technologies that use customized digital dashboards.

Information from various enterprise and manufacturing systems can be integrated and then displayed as actionable data for decision makers, says Michael Saucier, vice president of marketing for OSIssoft Inc., San Leandro, Calif. One real-world example is how Prasantia LLC, a San Diego-based systems integrator, provides tools to manage engineering and economics of wind-powered generation. Prasantia incorporates OSIssoft's RtPM platform (for Realtime Performance Management) into its own Real-time Windpower Portfolio Manager to monitor 600 wind turbines. Information is distributed to operations managers, technicians, performance engineers, asset managers, utilities, power-marketing schedulers, turbine manufacturing and warranty providers, owners, lenders and even insurance providers.

"We are online and accessing the data in real-time, and then providing the ability for the users to analyze and understand their wind farms at that very moment," explains Prasantia President Dave Roberts. The technology's architecture allows secure access

DIN-rail mount modem



The new PSI-Data/Fax-Modem/RS232 DIN-rail mount modem provides worldwide access to machines and remote installations via the public phone network.

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and customized data, he says. Performance engineers can look at the pitch of turbine blades, while financial managers can drill down into budget details.

But technology produces success only if users' behaviors and interactions change. Islands of the organization, not islands of automation, are the problem, believes Peter Martin, vice president and general manager of real-time-performance management for Invensys Process Systems, in Foxboro, Mass. Enterprises must measure financial and strategic indicators down to the factory-floor level, he thinks. Once that occurs, every person can learn what their function is, says Martin. "The result is that the right information gets to the right person in the right priority order."

A case of behaviors changing occurs now at OCI Chemicals Corp.'s soda-ash facility in Green River, Wyo. The company uses Invensys' DPM (dynamic performance measures) dashboard for operators at one of five process units. Additionally, "we have couple of plant-wide initiatives on which we'd like to use the technology," observes Ric Lissa, OCI Chemicals' Shelton, Conn.-based corporate director of procurement and logistics. "But you don't want to overwhelm people with data because you may wind up getting paralysis by analysis," he adds.

Having the right data is an ongoing challenge that is solved by defining key metrics that are business-critical, Lissa says. "Then we make sure the dashboard reflects that." Some metrics include energy and material usage in production. "And in logistics, since we run a fleet of rail cars, it's cycle time." He says that OCI at Green River is now working to define the appropriate measurement frequency of data. Soon, a planned management dashboard will be implemented vertically through the plant and into the corporation, he adds.

This automated visualization of data unlocks new and useful information. There may be 100 to 200 small downtime events daily, says Jim Frider, Wonderware's product manager for plant intelligence products, in Lake Forest, Calif. These events may range from a few seconds to a few minutes. With Wonderware's Web delivered-and-configurable downtime-tracking technology, DT Analyst, users characterize events by type or operator input and can view the analysis. But what quantity of data is useful and how frequently should it be collected? Though average and instantaneous OEEs are available, many users like 15-minute averages. "That and half-hour intervals both give good data," Frider adds.

Also uniting and displaying multiple-sources data through a customized Web-based application is Rockwell Software's role-based, RSBizWare thin-client application. "You can walk up to any machine and log in. It recognizes you," says Jeff Biskowitz, West Allis, Wis.-based product manager of RSProduction Portal. He indicates that in an end user's lunchroom, he's seen OEE presented by shift on a liquid-crystal display. Also, "I've seen OEE for the last two hours or current shift displayed on operator workstation. Some companies do it on daily reports."

But regardless of what's displayed and where, users' KPI needs and preferences vary. Users need customization functionality to set displays based on their own demand, set frequency or natural-frequency basis, says OSIsoft's Saucier. Available on his company's RtPM platform is also a prescriptive template that includes configuration instructions and OEE. However, when independent variables change, users should run new KPI, he suggests.

Going beyond company-wide issues, dashboard technologies can also bring customer relationship management into an enterprise's operations. Two Austin, Texas-based companies—Indusoft and Protia Inc.—provide an example. The companies have aligned their respective Web-based technologies—Indusoft Web Studio (IWS) and Protia's Strategic Line of Sight (SLS) business-performance management software—to leverage factory-floor experience with data analysis and management to generate visualized KPI information.

Focusing on strategic planning as well as digital dashboard reporting and analysis through the vertical enterprise, Protia gathers internal plant data and allows end-users customize key performance indicators at the management level, while also integrating other information such as supply chain and financial data, says Beth Lillie, Protia's managing director.

Also, operator input can be collected, says Fabio Terezinho, InduSoft IWS product manager. For example, when a machine is turned off, the technology automatically takes information from the process and writes that to the database.

A beta test of these connected technologies is occurring now at Johnson Controls Inc. in Ossian, Ind., states Marcia Gadbois, InduSoft's vice president of business development. Johnson Controls manufactures seats for General Motors' Fort Wayne, Ind., truck plant. Prior to the IWS-SLS installation, GM's products specifications were not available digitally on the factory floor. The GM purchasing department now enters orders directly into the Johnson Controls database with information such as specifications of seats, delivery data and number of seats.

Providing agility to respond to market opportunities is yet another way dashboards find use today. A pre-configured-to-multiple-industries technology that provides such nimbleness is GE Fanuc's Proficy. This OEE-out-of-the-box system is used in 20 different industries from discrete manufacturing through hybrid (discrete-process mix) into intense process industries, says Kevin Roach, vice president of global solutions for GE Fanuc Automation, in Charlottesville, Va. "We have 70 different reporting metrics for OEE that allow end-users to view OEE and compare downtime metrics by machine, factory, reason, crew, day, supplier of raw materials and other indicators. They are delivered through this fully Web-based technology that uses click-and-drag objects to let users create customized dashboards."

End-dimensional analysis of all attributes around OEE can also be made with the technology. "It has connections to (enterprise resource planning systems from) SAP, J.D. Edwards and others as standard functionality. We have consumer-packaged-goods customers who are seeing 90 percent-plus reductions in waste of packaging materials," Roach says. But the goal of KPIs and dashboards is not just to inform, Roach emphasizes, "but to present knowledge so that personnel change their daily behavior; they can make better, faster decisions."

[See sidebar to this article: Digital dashboards drive automotive parts](#)

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