

Dashboards Provide a Window into the Manufacturing Process

An easy-to-use control panel can help operators, plant supervisors and upper management analyse and improve operations.

Process manufacturers are very much like racing teams: they must have the right information at the right time to operate at peak performance.

Software tools known as “dashboards” put process manufacturers on the right track. The tools allow them to capture, organise and display pertinent production information; foster stronger communication among all levels of the enterprise; and ultimately speed ahead of the competition.

Dialing into Performance

An industrial dashboard is a software-based control panel for one or more applications, network devices or machines. Dashboards display simulated gauges and dials that look somewhat like an automobile dashboard, making it easier for users to understand and gather data.

Combined with reporting and analysis tools and operator interfaces, dashboards help put data into context. This allows users to make better decisions faster by providing localised, role-based information applicable to the machine, line, plant and enterprise levels.

According to Rockwell Automation® Product Manager Todd Smith, dashboards also can be a key driver of such performance-improvement initiatives as waste reduction and increased output. They do so by offering a simple and graphical way to make key performance indicators (KPIs) visible throughout the enterprise.

Several features distinguish dashboards. First, they are role-oriented. That is, they are designed specifically for each level and job.

Second, they are highly graphic. For example, dashboards that show



trending can be a key to establishing an early warning or predictive capability.

Third, they allow and initiate policy development. Dashboards permit executive and plant managers to consider the type of behaviour they’re striving to achieve. Done well, dashboards let manufacturers institutionalise goals and objectives up and down the organisation.

Driving Improvements

Although performance metrics tell the story of an operation’s progress, metrics alone don’t improve performance. Smith explains that whether by root cause analysis – alerts to those who can alter a situation – or by having the dashboard connected into the system guiding operations, the tool’s fullest advantage is leveraged when the user takes action on the information provided. The most effective dashboards allow

users to drill down into KPIs to find items or areas likely to cause problems. Some can even alert maintenance or support personnel when performance drops.

Traditionally, many manufacturers collect an array of data, then manipulate and display only the data that’s needed, so as to avoid information overload. This is where sophisticated reporting capabilities of dashboard software can play a vital role.

Smith also explains that with access to predefined, Web-based reports, users can monitor key factors that impact operational equipment effectiveness (OEE), performance efficiency and quality rate. The reports organise the data by time interval (shift, day, week, etc.), operator, part number, equipment/work cell or production line.

One driver for using dashboards is measuring and comparing different

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plants. For example, many of today's advanced software packages employ an OEE model to measure or compare the performance of plants, lines, machines and even production teams within a manufacturing enterprise.

The OEE model yields a single performance rating to help plant personnel determine how a particular manufacturing activity or asset is performing while providing detailed machine event history to document performance. This data is the basis for understanding the real causes of inefficiency, waste, lost capacity and equipment states.

Beyond the Plant

Some companies are implementing customer portal technology for all

order entry and tracking along with dashboards to improve interactions with suppliers and customers. Such integration enhances customer service by connecting manufacturing to customer relationship management (CRM) systems accessed by sales people and supplier networks. Real-time data sharing results in higher sales while offering customers expanded choices and improved responsiveness to market demands.

In addition, companies are using dashboards for more than establishing performance benchmarks. They are also using them to make performance data more widely available to their operations team. One company, for example, tracks machine uptime and downtime. Automatic event

logging saves each supervisor up to an hour per shift in data entry time, allowing both supervisors and operators more time to run the plant instead of doing paperwork.

The value of plant-floor visibility and enabling technologies is tied to how it's used. Working in concert with your internal team, your automation and information technology partners can lend incredible amounts of insight into the best strategies for implementing dashboard solutions. Companies that capitalise on this technology and expertise will be the ones that forge a sustainable competitive advantage in the years to come. **AT**

on the web

For more information on dashboard software tools, visit: www.rockwellautomation.com/rockwellsoftware/performance/

On the Right Track

Today's control systems generate incredible amounts of raw data that, when used properly, can dramatically improve manufacturing and business processes. Transforming that data into useful information can be challenging. Fortunately, today's manufacturers have access to software tools that gather data, incorporate the metrics that interpret the data, then format it into dashboards that are easy to read and customisable.

Line operators, for instance, need information about the health of their line or machine, so, their dashboards must be designed with easy-to-read gauges and displays. Operators must continuously track process variables including temperature and cycle time as well as confirm that machinery is effectively running. Paired with a human-machine interface (HMI), dashboards provide operators with the

real-time, granular data they need for quick machinery and line-specific decision-making.

Plant supervisors need different data. They are most concerned with strategic analysis of production information and need software that can aggregate data from one line or one machine as well as multiple machines or production lines. Optimal dashboard systems will pull information from many different areas including historical logging systems and downtime analysis programs.

The most valuable dashboards include tools that help supervisors access and analyse time-lapsed data and identify the key performance indicators (KPIs) associated with each process variable. A KPI analysis helps them best evaluate how teams and lines are performing against a given metric.

Plant managers are a different story. They are concerned with how long it

takes to perform maintenance on their machines. Armed with day-to-day production information, managers can provide the proper maintenance needed to improve plant-floor operations.

Upper management needs insight into how their teams are functioning – and that the enterprise is operating at maximum efficiency. It's critical to effectively link the KPIs used in the plant and the financial and business metrics executives rely on to gauge overall company success.

The executive team needs to see a large breadth of information relative to the entire plant or multiple plants across the enterprise. The data must be clearly presented so it can be read and interpreted as quickly and efficiently as possible. Delivering accurate data to senior management is critical, as they have the authority to make key process improvements based on a better understanding of all aspects of the entire enterprise.

Process Safety in Specialty Chemicals

Integrated platforms for safety and process help control lower lifecycle costs and improve information flow.

As global competition intensifies, the specialty chemicals industry is facing a number of business challenges including meeting increasingly stringent safety and compliance mandates, higher energy and feedstock prices, and aging

plants and equipment. In addition, chemical plants must manage margins closely due to rising costs, more

and viscosity. Since processes can create hazardous situations when they are out of control, critical devices – such as exhaust fans, pumps, valves and motors – must remain on if the basic process control system (BPCS) fails. Traditionally, the BPCS has been a distributed control system (DCS). A PAS also can serve as a BPCS.

In the event of a failure, a BPCS

Typically, manufacturers have implemented BPCS and SIS as separate systems, with separate operator interfaces, engineering workstations, configuration tools, data and event historians, and network communications. Lifecycle costs, such as spare parts, support, training, maintenance and services, usually are higher with this approach.

Nevertheless, many good reasons remain to put safety and control functions in different controllers. For instance, doing so minimises the risk of simultaneous failure of a BPCS and the SIS. Physical separation also prevents changes in a BPCS from causing any change or corruption in the associated SIS. In addition, there are different requirements between an SIS, which needs to have higher levels of security and typically doesn't change much once it's implemented, and the BPCS, which is usually designed for accommodating changes.



demanding customers and products that eventually go off-patent and face stiff competition.

One growing area of focus in recent years is the critical value of safety in protecting personnel, the process itself and the environment surrounding it.

Specialty chemical manufacturers employ different control system strategies to address the issue of safety. One strategy that has been gaining popularity is the trend to install process automation systems (PASs) that more tightly integrate safety and process control.

Keeping Processes Under Control

Specialty chemical manufacturers employ various control systems that continuously manage parameters such as temperature, flow, pressure, weight

and viscosity. Since processes can create hazardous situations when they are out of control, critical devices – such as exhaust fans, pumps, valves and motors – must remain on if the basic process control system (BPCS) fails. Traditionally, the BPCS has been a distributed control system (DCS). A PAS also can serve as a BPCS. In the event of a failure, a BPCS may not be able to keep the process under control. That is why a safety instrumented system (SIS) is used in conjunction with the BPCS to maintain control, and if necessary, shut down the process in an orderly way that protects the people, equipment and plant as well as helps minimise production losses. Common types of safety systems include emergency shutdown, fire and gas monitoring, critical process control, burner management and turbo machinery control.

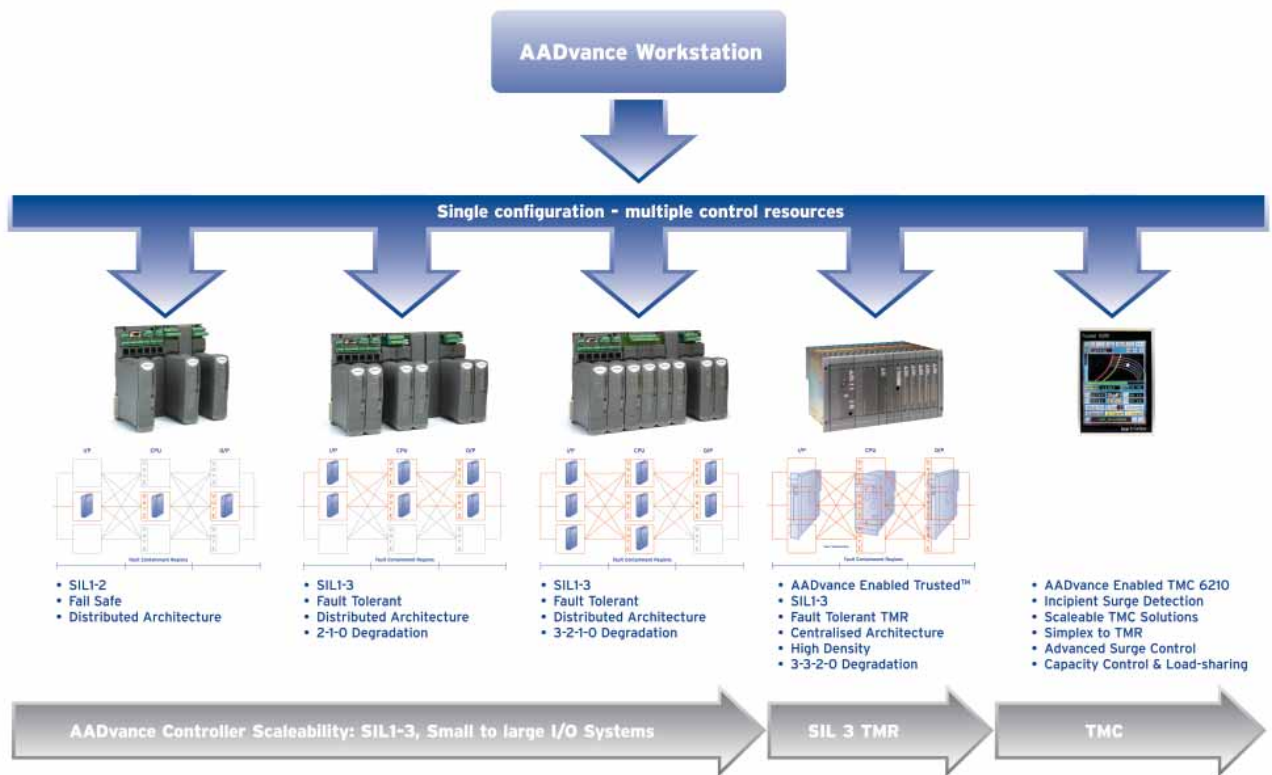
The primary function of a BPCS is to hold specific process variables and parameters to predetermined levels in a dynamic environment. An SIS, on the other hand, is static; it waits to take action, bringing a process to a safe state when the process is out of control and the BPCS is unable to do so.

An Alternate Control Strategy

Until recently, specialty chemical manufacturers and others had little choice other than to use separate, independent and diverse systems for control and safety. Some users even required the BPCS and SIS to be supplied from different vendors. Today, however, manufacturers are finding a number of business and financial reasons for using more-integrated platforms, such as PASs, for safety and process control in their plants.

PASs offer a more cost-effective solution because of their ability to provide a common infrastructure with common bases or tag bases, alarms and events, networks, software and development tools. These help to simplify asset management and reduce operation, maintenance and training costs.

What's more, specialty chemical manufacturers need improved information



flow across the enterprise, with the ultimate goal of controlling or reducing lifecycle costs. Perhaps the biggest advantage of integrating the process control platform is the potential for expanded information-sharing capabilities between the BPCS and SIS. The ability to leverage the data streaming from the plant floor is increasingly critical in today's competitive environment.

The Technology Forefront

Advances in control technology now allow companies to combine the reliability advantages of DCS technology and safety control without the historic limitations tied to each. Some BPCS and SIS suppliers offer common systems for both functions that incorporate the same configuration tools, programming software and components. The key is to help make sure the two systems are functionally separated but share common hardware, software and networks. This allows users to achieve the operational benefits of a common platform while meeting the functional safety requirement for separation.

However, not all control platforms are created equal. It's important that the BPCS and SIS offer the necessary attributes to contribute to a more cost-efficient, information-enabled environment.

Some manufacturers, like Rockwell Automation®, offer choices for the level of integration, diversity and performance required. Whether it's Safety Integrated

Level (SIL) 1, 2, 3; fail-safe; or fault-tolerant, Rockwell Automation has a solution to meet the safety and availability required and the level of integration desired. For those that require more integration and a common hardware platform, the company offers the fail-safe and fault-tolerant Logic Control Platform, which can be used for both BPCS and SIS up to SIL 2. All solutions are part of the Integrated Architecture™, which allows users to employ the same visualisation, information, networks and development tools to help with reduced training costs and easier maintenance.

With its acquisition of ICS Triplex, a leading global supplier of critical control and safety solutions to process industries, Rockwell Automation has expanded its process safety solution and consulting capabilities to help meet the most demanding high-availability requirements. ICS Triplex has over 40 years of experience in providing process safety solutions and services to heavy industries such as oil and gas (see Safety Solutions Expertise).

The proven track record of Rockwell Automation in the process industry gives it a keen insight into the issues facing specialty chemical manufacturers, as well as an in-depth understanding of the tools needed to address these needs. The company's resources, technologies and alliances are helping increase efficiency for companies and helping reduce operating costs while facilitating regulatory and environmental compliance.

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SAFETY SOLUTIONS EXPERTISE

The flagship ICS Triplex system, Trusted™ Controller, is based on Triple Modular Redundancy (TMR) technology. It is certified by TÜV and is NFPA 72, 85 and 86 as well as IEC 61508 compliant. This extends the Rockwell Automation® process safety offering to SIL 3 level. Additionally, the Trusted Safety Systems can provide for 3-3-2-0, an extra level of TMR fault tolerance that significantly enhances the safety system's availability and reliability.

The new AADvance solution supports a scalable, modular architecture that allows users to configure the level of safety and fault tolerance required for SIL 2 and SIL 3 applications. The system can be configured for simplex, duplex or triplex.

Both the Trusted TMR and AADvance systems have been integrated into the PlantPax™ solution. ICS Triplex and Rockwell Automation bring the combined expertise of both companies to customers worldwide, creating one of the most comprehensive automation solutions available today.