Inside

Korean OEM Builds Smarter Machines

Design Smart Machines with Smarter Tools

Why OEMs Should Care about The Connected Enterprise

How OEMs Can Leverage Technology to Help Meet Customers' Needs

March 2017

Automation TODAY

SOUTHEAST ASIA

Key Ingredients for Designing Smart Machines and Equipment

See page 4

Rockwell Automation

EDITORIAL

Delivering on the Promise of "The Connected Enterprise"

In my 28 years with Rockwell Automation, I have witnessed a significant evolution of technology, processes and tools. The journey continues with "The Connected Enterprise," which creates a world of new opportunities for Rockwell Automation and our customers through greater connectivity and information sharing.

Today's End Users strive for faster time to market, improved asset utilization, a lower total cost of ownership and the ability to manage enterprise risk. Advances in communications and computing technology are transforming our customers' businesses, and forward-thinking companies are adopting "Smart Manufacturing" strategies with The Connected Enterprise from Rockwell Automation. These technologies are enabling our customers to drive the convergence of the information and operational environments to optimization in productivity, safety, security and sustainability.

Original equipment manufacturers (OEMs) are also adopting The Connected Enterprise technologies to produce "Smart Machines" to better serve their customers. These technologies enable OEMs to provide "Smart" solutions to differentiate themselves from the competition while improving their total cost to design, develop and deliver equipment. The machines become integrated into the manufacturing environment, allowing End Users to gain access to information and enable agile reaction to changing market demands.

Through its technology, processes and people, Rockwell Automation can help OEMs and End Users become more connected, compliant and competitive. Here's how:

Technology: Rockwell Automation makes Smart Machines and equipment featuring integrated safety. Our single-system platforms are designed for safety and standard control. They are information-enabled, offering embedded machine diagnostics from more intelligent devices and performance dashboards that provide access to machine information and advanced diagnostics.

Our machines are simple to integrate into facilities because they are based on a scalable control platform with one common design environment; also, we leverage a single, open EtherNet/IP™ network. In addition, our machines provide real-time diagnostics – accessible locally or remotely – to help reduce mean time to repair and mean time between failures. We also provide tools to optimize machine design, reduce operating costs and improve efficiency.

Processes: Rockwell Automation understands what it takes to create a Connected Enterprise that leverages Smart Manufacturing. We restructured our own business, unifying information technology (IT) and operations technology (OT) systems. As a result, we lowered total cost of ownership, reduced inventory, accelerated time to market and improved productivity.

To help OEMs and End Users make the technology and cultural changes essential to reach The Connected Enterprise goals, we developed a process that helps put the elements of The Connected Enterprise into perspective, offering a roadmap to operational excellence, regardless of the implementation stage (see page 7, *Stages of The Connected Enterprise*).

People: Rockwell Automation supports your needs through technical consultants, safety audits and assessments, workforce training solutions, project management and global support centers.

We invite you to review this issue of *Automation Today Asia Pacific* to learn more about the technology, processes and people of Rockwell Automation – and how we can help you move into the Smart Manufacturing era and effectively compete globally.

Joseph Sousa, *President* | *Rockwell Automation, Asia Pacific Region*

CONTENTS

3 News & Events
Rockwell Automation developments from around the world.

4 Cover Story – Key Ingredients for Designing Smart Machines and Equipment
Meeting end users' expectations takes the right mix of processes, technology and people.

7 OEM Innovations
Korean OEM builds smarter machines.

8 Technology Watch
Design smart machines with smarter tools.

9 Technology Watch
Why OEMs should care about The Connected Enterprise.

11 Technology Watch
How OEMs can leverage technology to help meet customers' needs.

12 Value Proposition
Compac Sorting Equipment uses leading-edge technology to remain competitive.

13 Application Story
MESNAC builds better machines to meet global safety standards.

14 Product Focus
Recent additions to the Rockwell Automation product portfolio.

Rockwell Automation

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China CEOs Discuss Smart Manufacturing

Recently, CEOs and experts from China's leading companies gathered in Shanghai and Beijing for The Connected Enterprise CEO Forum to explore how smart manufacturing will deliver value to the manufacturing industry and support government initiatives, including China Manufacturing 2025. Rockwell Automation new president and CEO Blake Moret led the forum.

The Connected Enterprise connects information from the plant floor to the rest of the enterprise, bringing together people, processes and technology to achieve enhanced productivity, sustainability and economic performance. It is enabled by an integrated control and information architecture that delivers a smarter, more productive and more secure environment.

Moret says, "The Connected Enterprise is a future-proof vision available today that is perfectly aligned with the Chinese government's China Manufacturing 2025 and Internet Plus initiatives, to help China transition to smart manufacturing."

China's traditional industries, facing the problem of overcapacity, are considering moving abroad for further development. Last year, China's Overseas Direct Investment surpassed its Foreign Direct Investment for the first time.

Rockwell Automation boasts extensive experience in helping Chinese companies expand globally. For example, the company signed a strategic agreement with SGMW to implement an automation control system for the SGMW plant in Jakarta, Indonesia. It also has collaborated with a Chinese tyre manufacturer to meet local safety standards for a plant it was building in the United States. Rockwell Automation serves a range of industries in China including automotive, tyre, oil and gas, chemical, food and beverage, life sciences, mining, subway, and water and wastewater treatment.

Rockwell Automation Recognises Safety Excellence

MESNAC, a supplier of rubber and tyre machinery in China, was one of three recipients of the Rockwell Automation Manufacturing Safety Excellence Awards. The awards honor companies that have a holistic safety program based on three key pillars: a strong safety culture, well-executed compliance procedures, and effective use of contemporary safeguarding and automation technology through capital investments.

MESNAC received an enterprise-level award for its company-wide focus on safety. It holds all employees accountable for safety, and it is the first topic covered during daily operations meetings. The environmental health and safety team works closely with its management and company leadership to carry out the safety program.

The company also designs productivity-enhancing safety features into its machinery. Mingjin Yu, vice president, MESNAC, says, "We help our customers realise that safety doesn't have to come at the expense of productivity." He adds, "Focusing on safety has enabled us to expand into new markets around the world. We build machines using the most stringent global safety standards while also continuously improving our own safety culture." (See the article entitled *MESNAC Builds Better Machines to Meet Global Safety Standards.*)

BRIEFS

Rockwell Automation Acquires MAVERICK Technologies

Rockwell Automation has acquired leading systems integrator MAVERICK Technologies to expand domain knowledge and help deliver innovative control and information solutions to customers in industries such as chemical, food and beverage, and oil and gas. The acquisition strengthens Rockwell Automation expertise in key process and batch applications to help its customers realise greater productivity and improved competitiveness through process control and information management solutions. Founded in 1999, MAVERICK has completed more than 15,000 projects in 40 countries across six continents.

Delivering Simple and Secure Centralised Visualisation and Mobility Solutions

Rockwell Automation has acquired Automation Control Products (ACP), a leading provider in centralised thin client, remote desktop and server management software.

ACP's two core products, ThinManager® and Relevance®, provide manufacturing and industrial leaders with visual display and software solutions to manage information and streamline workflows for a more connected manufacturing environment.

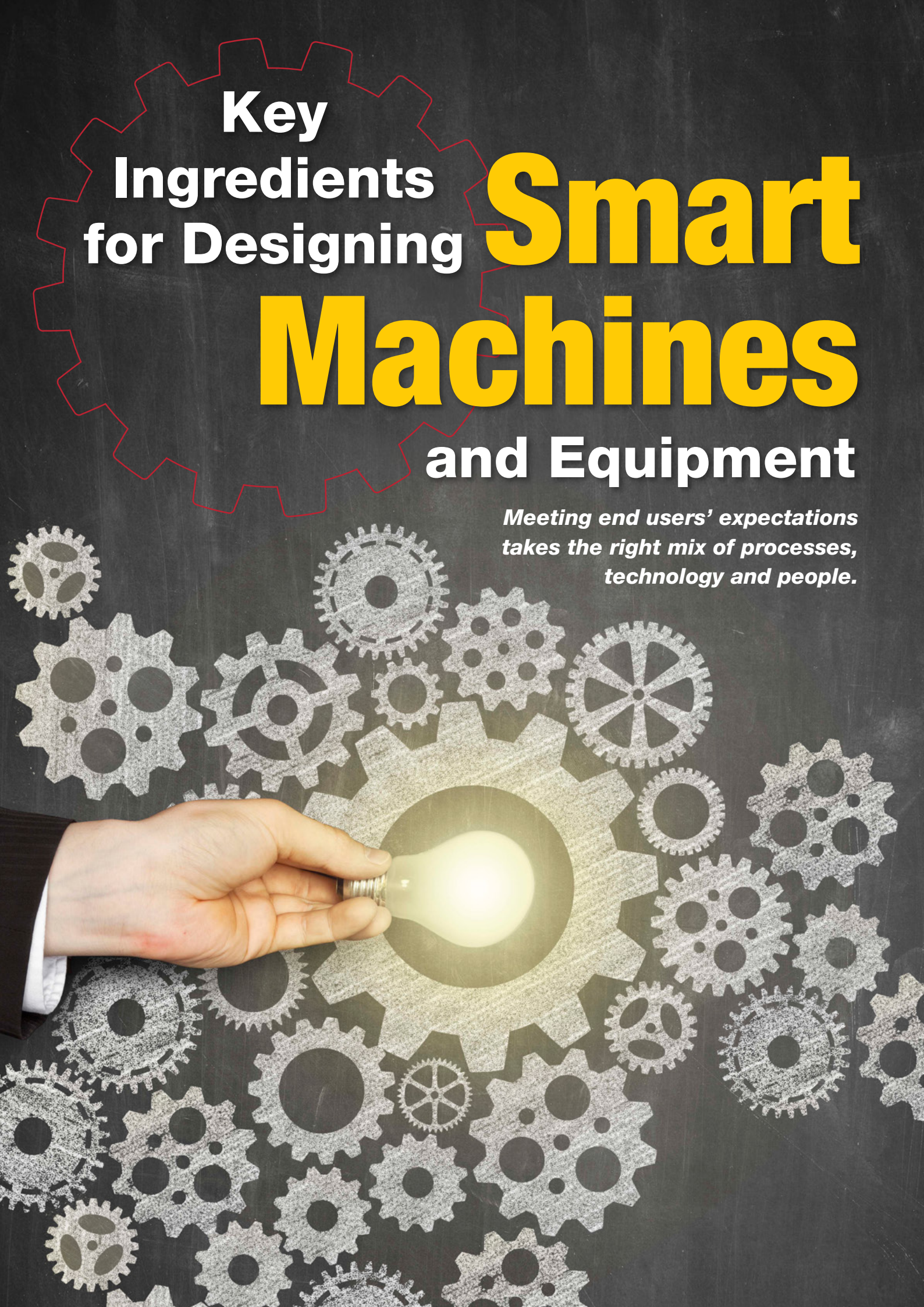
Earning Top Ratings for Environmental Performance

Newsweek magazine ranked Rockwell Automation seventh in the 2016 Newsweek Green Rankings, one of the world's most recognised assessments of corporate environmental performance.

The magazine specifically recognised Rockwell Automation internal environmental and safety performance assessments as well as its goal to reduce greenhouse gas emissions.

Key Ingredients for Designing Smart Machines and Equipment

Meeting end users' expectations takes the right mix of processes, technology and people.



OEMs have always been expected to innovate and keep pace with end users' requirements. Yet, today in the era of smart manufacturing, end users want to optimise their production and supply chain by bringing together islands of information — and they want OEMs to help. Delivering on the promise of smart manufacturing is paramount.

At the heart of a smart operation is The Connected Enterprise. It consists of converged information technology (IT) and operations technology (OT) systems functioning in a single network architecture. It also uses smart machines and Internet of Things (IoT) technologies for seamless connectivity and information sharing across people, plants and supply chains.

As a result, end users need smart machines and equipment that are designed to thrive in The Connected Enterprise and provide nearly endless opportunities to improve their operations. The Connected Enterprise also can help them address their most pressing needs, such as:

- Remaining globally competitive by keeping business models relevant and moving from mass production to mass customisation.
- Addressing workforce issues, including retaining the skills of retiring workers and preparing IT and OT workers for the influx of new smart technologies.
- Addressing risks, including security threats and increasingly complex regulations.
- Making the most of Internet- and Ethernet-enabled technologies.

This all may be daunting for industrial OEMs. However, they can meet customers' needs and simplify the design of smart systems by focusing on three key elements: processes, technology and people.

Processes: Meet End Users on Their Journey

Dan Seger, principal application engineer, Rockwell Automation, explains that an end user's journey to The Connected Enterprise generally follows four stages (see sidebar). Still, every journey will be distinct. Factors, such as operational needs, available resources and workforce availability will be unique to each organisation and influence their Connected Enterprise roadmap.

OEMs will encounter end users at different points in their journey. Some will be in the early planning stages. Others may be in the midst of IT/OT convergence. And others may be ready to integrate smart machines or equipment.

It's important that OEMs communicate with end users to understand their needs and stage in the journey. Those conversations also can help OEMs identify opportunities to innovate with their customers, such as using remote monitoring to monitor assets and maximise uptime.

Ultimately, OEMs must always be ready to equip end users with smart machines or equipment, regardless of where they are in their journey.

Technology: Deliver Systems That Match Needs

OEMs that want to enable or support smart manufacturing and industrial operations should rethink traditional, machinery-design approaches. Seger explains that as they consider different design aspects to change and update, five key technology areas are paramount:

1. **Integrated Safety:** Combining standard and safety control into a single platform enables the use of intelligent, machine-safety-system designs. This can improve productivity while still achieving compliance. Safety-system data also can be collected to alert operators where safety-related issues are occurring for faster downtime resolutions and long-term improvements.
2. **Accessible and Secure Information:** End users develop goals for securely accessing and capitalising on their operational, business and transactional data. OEMs can support and fulfill those goals by connecting control systems and using performance dashboards that make information available and actionable.
3. **Simplified Integration:** Replacing a multi-tiered networking strategy with a single, open EtherNet/IP™ network can simplify the network infrastructure and reduce integration risks. Likewise, a single, Logix-based control and information platform can ease the collection, transfer and analysis of real-time operations data.
4. **Real-Time Diagnostics and Analysis:** Embedded-intelligence devices can deliver real-time data for predictive maintenance to help end users more quickly troubleshoot and repair problems. Remote monitoring

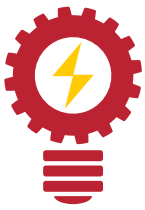
While every end user's journey to The Connected Enterprise is different, they generally can be expected to follow these four primary stages:

1. **Assess and Plan:** Conduct assessments to understand the culture and to evaluate the IT/OT infrastructure in place, including controls, networks, information and policies

2. **Secure and Upgrade Network Controls:** Securely upgrade the network and controls to prepare for future configurations and technologies, such as mobility, big-data analytics and cloud computing

3. **Leverage Data and Analytics:** Define data, identify how to turn it into actionable information to support better business decisions, and use it to drive continuous improvements

4. **Optimise and Collaborate:** Optimise operations, and engage with internal teams, suppliers and customers to better respond to internal and external events



also can be used to monitor critical parameters and address issues before they reach a point of failure.

5. **Operational Efficiency:** Design tools and scalable automation technology help OEMs deliver equipment that is flexible for multiple purposes to improve operating efficiency. For example, modular programming and re-usable code can help reduce system complexity and support faster design, commissioning and installation times. Motion-sizing tools also can help make mechatronic designs faster and easier to analyse, as well as help to optimise, simulate and select motion-control systems.

People: Secure the Right Skills

Today, engineers and programmers must understand the blend of IT/OT technologies used in connected plants and enterprises. They also must know how to configure, operate and sustain their customers' networked industrial control systems.

Providing training for existing workers can be critical to achieving this, especially because skilled workers are increasingly hard to find. OEMs should strongly consider using training and certification courses that have been specifically developed to help bridge the IT/OT gap in smart operations.

At the same time, OEMs don't need to go it alone. They should look to use vendors' consultative, design, integration and support services to help fill areas of need.

This could include using a vendor's network and security services to help design a more secure control system in a connected operation. Safety services also can help smart machines and equipment comply with the latest standards, while virtual support engineers can analyse trends and recommend actions to help prevent downtime.

Keeping Up with Expectations

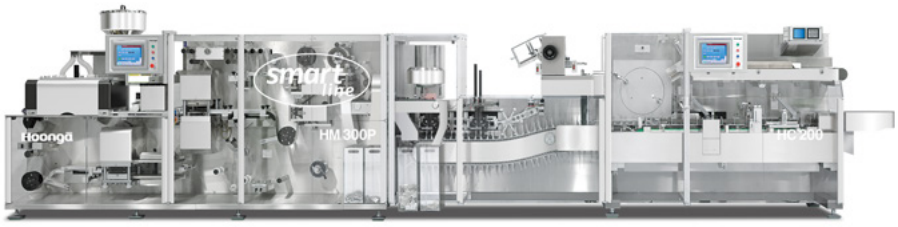
End users still expect machines and equipment to help them optimise processes, achieve compliance, maximise quality and protect workers. But they also now expect those same systems to integrate easily into their operations, offer production intelligence and to improve their responsiveness to changing market demands.

With the right mix of processes, technology and people, OEMs can develop smart machines and equipment that meet these higher expectations. AT

For more information on designing Smart Machines, visit: *http://www.rockwellautomation.com/global/capabilities/machine-equipment-builders/overview.page?pagetitle=Smart-Machines-and-Equipment&docid=2e1287530bd202b79b53ac89870ba233*

Korean OEM Builds Smarter Machines

Through innovative design, Hoong-A is providing end users more access into production lines — to make information available and actionable.



Since 1970, Hoong-A Corporation has become one of the most recognisable and innovative businesses in South Korea. The company specialises in manufacturing packaging machinery for a variety of industries.

For example, Hoong-A makes tablet and capsule blister and cartoning machines for the pharmaceutical industry. The company also provides a variety of feeding and automated packaging machines for products used in healthcare, confectionary, food and household.

The company has used Rockwell Automation solutions for the past three years and has developed a machine with a single, secure network — EtherNet/IP™. The network integrates with systems including the human machine interface (HMI), CompactLogix™ programmable automation controllers (PACs), I/O and motion.

By implementing the Rockwell Automation solutions, Hoong-A can easily access and collect real-time operation data. The solutions improve operational efficiency by reducing installation and start-up time through the use of smart design tools and re-usable code. In addition, time to market is reduced through a single cable of Kinetix® 5500 servo drives.

Building Smarter Machines

The Hoong-A smartline is an optimised packaging line designed for small- and medium-sized batch production.

The line, comprised of the HM 300P machine and the HC 200 cartoner, has an output of 300 blisters and 200 cartons per minute. Its efficiency is achieved through superior design, which provides quick tooling changes and reliable performance at low cost. In addition, it is designed and constructed to comply with the pharmaceutical industry's Good Manufacturing Practice (GMP) standards, which allow complete visibility and capacity for inspection.

The HM 300P blister machine uses an Allen-Bradley® midrange system, including CompactLogix 5370 L36ERM PAC, Kinetix 5500 servo drive for optimised motion control, and a Stratix® 2000 unmanaged network switch for Device Level Ring (DLR).

The PanelView™ Plus 6.0 HMI graphic terminal is used for smarter machine control and effective operation. By using a changeable CAM profile for programming, the operator can change all CAM profiles without connecting any programmable device, such as a laptop computer. Also, CAM profiles can be regenerated and modified through parameters on PanelView Plus 6.0 HMI.

Along with the HMI, a mobile device or tablet PC can be used for remote monitoring. The servo drive connects to and operates with the CompactLogix controller, supporting Integrated Motion on EtherNet/IP. With its innovative, compact design, the Kinetix drive helps minimise the machine footprint and simplifies system wiring.

For the HC 200 cartoner, the control system is comprised of the CompactLogix 5370 L33ERM PAC and Kinetix 5500 servo drive for 2-axis motion control. Leveraging a single network, EtherNet/IP simplifies the integration of the entire system including HMI, PAC, I/O and motion.

Fully adapted to the 21 CFR Part 11 regulation, both the HC 300P blister machine and the HC 200 cartoner are activated with an Audit Trail function, which allows the HMI to store and visualise 100 time-stamped activity logs.

Furthermore, Hoong-A has adopted integrated safety based on the Rockwell Automation Integrated Architecture® platform. Migrating the safety relay to Compact GuardLogix® safety controllers has enhanced performance and increased productivity by approximately 20 percent. The machines can collect safety-system data to alert operators to where safety-related issues are occurring.

The Connected Enterprise

The proliferation of mobility and visualisation is reshaping the future of industrial automation, and forward-thinking OEMs like Hoong-A recognise the potential. The integration of information technology (IT) and operations technology (OT) enables Hoong-A to use the power of real-time data to make better decisions — and to provide the same advantage to users.

Kang Sun Lee, Hoong-A chief engineer, says, "Smart manufacturing is a big wave in Korea and all over the world. We welcome innovative solutions such as manufacturing intelligence, mobility and the Internet of Things that can enhance innovation and our footprint with end users. We appreciate the future-proof vision of the Rockwell Automation Connected Enterprise. The Rockwell Automation vision and smart machine solutions have helped Hoong-A to become more competitive in the global marketplace." AT

Design Smart Machines with Smarter Tools

OEMs can leverage standard, scalable building blocks to more efficiently modify existing designs to build customised machines.

Industrial manufacturers and producers across industries are implementing smart manufacturing initiatives in their enterprises. To succeed, they require smart machines that can easily integrate into a facility, provide access to information and be flexible to quickly react to changing market demands. As a result, end-user companies are challenging machine and equipment builders to deliver custom, smart and innovative machines that meet their specific needs — and can help them compete and supply globally.

However, building customised, modular machines requires more time and resources — both of which are being stretched thin for many OEMs. Since this is not an optional task for those who want to stay competitive, machine and equipment builders need to find the right balance between designing standard machines for efficiency and customising machines to meet specific needs. They also need to select a solution that meets customer requirements and stays within budget.

Free Online Tools for OEMs

A smart solution for OEMs involves leveraging standard, scalable building blocks when designing machines. By organising how they build with a small upfront investment of time and resources, OEMs can more efficiently modify existing designs to build customised machines. This will help them save time and resources over the long term.

OEMs don't have to start this process from scratch. Free, online tools available from companies like Rockwell Automation help them create scalable building blocks; select the right, "just-enough" products; and more efficiently develop customised machines based on the standard blocks.

The tools cover the four-system, life-cycle phases of a machine and address the following:

- **Selecting the Right Equipment:** When OEMs start designing a machine, they can use performance and capacity tools to assist with product selection and configuring the architecture. These tools can help OEMs choose which controller will work within the defined parameters of the machine's architecture; get a jump start on CAD documentation; choose the right architecture to meet standards requirements; identify the best motor-drive combination; and more.
- **Developing Smarter:** To kick off machine development, OEMs can leverage design, conversion and sample code guides that can help accelerate time-to-market. For example, OEMs can use a software sample-code library to organise and store code by library function. The library provides OEMs an easy way to find and reuse existing code. This leads to generating less new code and producing machines more efficiently while still meeting customer requirements.

  In addition, a wide array of accelerator toolkits include pre-configured components, such as sample machine and application code, to significantly reduce development time. By implementing the preprogrammed, pretested faceplate/Add-On-Instruction sets for devices, such as drives, networks and I/O modules, OEMs can configure devices without writing a single line of code.
- **Commissioning More Efficiently:** Commissioning time can be a significant concern for OEMs, and configuration and diagnostic tools can help OEMs to set up their machines more efficiently.

  For example, system quick start guides walk OEMs through setting up a machine, from specific drives to the whole network. Accelerator toolkits also provide guides on starting up and troubleshooting machines.
- **Maintaining for Best Performance:** Once a machine is installed and running, OEMs can use status, diagnostic and troubleshooting tools to continuously improve operational efficiency. For instance, the System Ferret is an inventory software tool that seeks out and logs all devices communicating on DeviceNet™, ControlNet™ and EtherNet/IP™ in a control system; it also provides a report with catalog numbers, serial numbers, revisions and CIP™ paths. In addition, the EtherNet/IP toolkit provides easy-to-use resources for all phases of EtherNet/IP implementation, including design, configuration, commissioning and troubleshooting.

Reduce Time to Design

Design, selection, commissioning and maintenance tools are part of the commitment from Rockwell Automation to help OEMs reduce their time to design, develop and deliver their machines and speed time-to-market. OEMs can work with Rockwell Automation to determine which tools fit their needs best — and will have the biggest impact on their business and will help them to stay competitive. AT

For more information on tools available to OEMs, visit *http://www.rockwellautomation.com/global/capabilities/machine-equipment-builders/overview.page?pagetitle=Design-Machines-and-Equipment&docid=988fa526fad2f5f9829afc5c152a63bf*

Why OEMs Should Care about The Connected Enterprise

OEMs need to build smart machines that allow better use of data so that end users can make intelligent decisions based on that data.

Rockwell Automation is seeing more and more end users pursue The Connected Enterprise in response to the need for Smart Manufacturing. That directly impacts OEMs, according to Christopher Zei, vice president, Global Industry Group, Rockwell Automation.

As end users look to optimise their production and supply chain by bringing together islands of information, they need OEM partners to provide smart machines that easily integrate into their facility, provide access to production information and enable agile reaction to changing markets and demands.

OEMs need to understand these end-user goals and react to them. Their machines must be smarter — able to complement their customers' Connected Enterprise efforts to access and capitalise on operational, business and transactional data for improved enterprise, plant and supply-chain performance. That requires building smart machines using technologies that allow better use of data and enable end users to make intelligent decisions based on that data.

Who is Driving This Change?

Ultimately, end users' desire for Smart Manufacturing is driving this change. To effectively build smart machines and compete in a new world of manufacturing, OEMs need to navigate unfamiliar regulations and end-user requirements; take advantage of enabling information-sharing technologies; and anticipate and respond to customer needs.

Zei explains that Rockwell Automation underwent its own Connected Enterprise journey and understands the end-user challenges, as well as the opportunities for OEMs serving them. Through its industry expertise, technology and business allies, Rockwell Automation is helping OEMs design smart machines — equipment that is connected, compliant and competitive.

What Is a Connected Machine?

In a word, connected machinery means information. End users are increasingly realising the benefits that more information, insights and data offer them — to help improve production, perform proactive maintenance and better diagnose any issues. OEMs can respond by building smart machines that can connect the plant floor with the enterprise.

Rockwell Automation and its collaborators help OEMs create smart, EtherNet/IP™-connected machinery that more easily integrates with end-user facilities and supports their Connected Enterprises. The connected machinery shares production data with the end user's automation and information systems. As a result, end users gain access to data about what's happening in throughput, quality, asset health, energy efficiency, operational efficiency, etc. — in immediate updates and production trends.

What Is a Compliant Machine?

As OEMs look to deliver more connected machinery to end users around the world, they encounter a variety of unfamiliar global standards and regulations across industries. Rockwell Automation provides information software and solutions, network and security expertise, and deep knowledge of industry-specific standards and regulations to help OEMs be sure that their Connected Enterprise machinery meets the appropriate standards.

Recently, Rockwell Automation customer Harmony Enterprises received an order for a new baler from a large, multinational beverage company and worked with Rockwell Automation to design the new machine to meet international safety standards, including ISO 13849 and IEC 62061. By fulfilling the end user's time-to-market request and meeting these standards, Harmony opened the door for additional orders from other global customers.

What Is a Competitive Machine?

The Connected Enterprise isn't just an opportunity for end users. It's also a significant business opportunity for OEMs. Helping end users to turn production data into working information capital helps OEMs become more valuable to end users and in the marketplace. Instead of reacting to end user needs, OEMs become more like collaborators by thinking about potential future needs and proactively meeting them.

To remain competitive, OEMs will have to go outside their comfort zone and look at more innovative, strategic ways to reduce costs and time to market — and stay ahead of their competitors, according to Zei. AT

How OEMs Can Leverage Technology to Help Meet Customers' Needs

Incorporating the right technologies and capabilities into their smart machines or equipment enables OEMs to help manufacturers make progress on their journey towards The Connected Enterprise.

Implementing a Connected Enterprise — the integration of information technology (IT) with operations technology (OT) to improve business performance and minimise risks — calls for organisations to balance people, processes and technologies.

They must keep business models relevant and move from mass production to mass customisation to compete globally. They must manage the talent and skills shortages resulting from retiring workers and an influx of new, more connected technologies. Organisations must also manage security threats and achieve compliance with increasingly complex regulations. What's more, they must merge physical and digital worlds to capitalise on the value at stake in the Internet of Things (IoT).

Original equipment manufacturers (OEMs) must stand ready to equip these organisations with the smart machines or equipment that will help facilitate The Connected Enterprise. Being able to deliver on the promise of smart manufacturing and industrial operations requires OEMs to think differently about how they design their machines and equipment.

While there are many considerations to keep in mind, five guiding technological principles will help confirm that OEM solutions are best aligned to meet customers' needs. They include mitigating safety and security risks; designing for information availability; supporting simplified integration; delivering real-time diagnostics and analytics; and optimising operational efficiencies.

Mitigating Safety and Security Risks

Smart machines and equipment make it easier than ever to support safety compliance while optimising operations.

Safety-system diagnostics can quickly alert operators to where a safety-related issue is occurring for faster downtime resolutions. Safety data also can be collected over time to identify long-term trends and compare safety performance across multiple sites.

Integrated safety solutions can be used in place of lockout/tagout for certain routine, repetitive and integral job tasks to improve productivity. Safe-speed and zone control can enhance how operators interact with a machine, allowing minor adjustments and servicing activities to take place while it is in motion.

By using contemporary safety technology and a rigorous Functional Safety Life Cycle approach, OEMs can harness the inherent value of integrated, safety system designs.

In addition, security needs to be a continuous, evolving component of a company's overall safety strategy. This means proactive safety management beyond worker safety and into consumer safety.

More connection points on a machine also mean more entry points for security threats, whether those threats are physical or electronic, malicious or unintentional, on-site or remote. As a result, a comprehensive security approach is paramount.

The goal is to secure not only the OEM's machine but also to help protect the customer's intellectual property, physical and human assets, and the environment.

Every manufacturer or industrial operator's Connected Enterprise journey should include a defense-in-depth (DiD) security approach. This approach assumes any one point of protection can and likely will be defeated — and employs layers of security through physical, electronic and procedural safeguards.

At the machine level, important safeguards include role-based access to the control system and authentication, authorisation and accounting software to track application access and changes. Control panels and cabling should also be protected against intrusions, tampering and accidents.

Strong security requires strong collaboration. OEMs should work with their customers to incorporate the appropriate security measures that support their unique security approaches.

Designing for Information Availability

Organisations have their own Connected Enterprise goals for accessing and capitalising on their operational, business and transactional data. It is the OEM's job to design information-enabled smart machines and equipment that support and help fulfill these goals.

OEMs can do so by first identifying their customers' key performance indicators to be measured, such as operational efficiency, quality, asset health or energy efficiency. They can then work with customers to determine exactly what data needs to be captured and how it should be handled, backed up and transferred to their manufacturing execution system.

Supporting Simplified Integration

In an era where SKU counts are up yet production operations are being consolidated, manufacturers are eager for new opportunities to simplify their automation systems and minimise downtime. Likewise, oil and gas, mining and other industrial operators are seeking less complex systems to keep operations running continuously and at peak efficiency.

Smart machines and equipment can support simplified integration but first require that OEMs make some key design decisions. It is important that OEMs choose the following:

- **The right network architecture:** EtherNet/IP™ can simplify network infrastructure and reduce integration risks. It offers the real-time performance, resiliency and security of a standard fieldbus solution and the bandwidth, open connectivity and global acceptance of standard Ethernet.
- **The right control platform:** A Logix-based platform uses a common design environment, one control engine and one network technology, enabling OEMs to integrate all forms of control into one platform. It also supports reusable code to help reduce system complexity and support faster design, commissioning and installation times.
- **The right technologies:** Line-control technologies, such as RAPID Line Integration™ from Rockwell Automation, provide a common equipment interface that allows OEMs to install and verify functionality prior to shipping the equipment.
- **On-Machine™ solutions:** These Rockwell Automation solutions move industrial controls and hardware closer to the application or onto the machine, minimising the number of components in the cabinet. This reduces wiring time and results in increased uptime and lower costs.

Delivering Real-Time Diagnostics and Analytics

After OEMs have identified which data needs to be captured, they can determine how it will be captured and delivered to help optimise operations. Key solutions that can help make this happen include the following:

- **Embedded intelligence devices** offer new ways for customers to increase machinery life cycles and decrease downtime. These devices can use built-in functions, such as vibration monitoring, condition monitoring and torque signatures, to identify issues before they become problems, and to help quickly troubleshoot and repair problems that do arise.
- **HMI faceplates with system-wide diagnostics and easy-to-understand display screens** keep operators informed of system performance and provide early detection of system errors, which can help ease maintenance and troubleshooting.
- **Mobile technology** expands traditional HMI system access to let operators be more productive. It can empower manufacturing operators, managers and supervisors to make timely decisions no matter where they are.
- **Remote access** can give plant managers and other stakeholders convenient access to machine information. It also allows OEMs to remotely monitor critical parameters and instantly connect with on-site personnel via video to swiftly remedy problems.

Optimising Operational Effectiveness

Using more innovative designs and scalable automation technology enables OEMs to deliver more flexible smart machines and equipment that help improve operating efficiencies and reduce installation and startup cycle times, changeover times and energy costs. The equipment can also help meet electrical, mechanical and environmental requirements as well as enhance worker safety and equipment protection.

The use of modular and reusable code is one way of doing this. It enables code structuring, tag-naming conventions, state model implementation, HMI practices and more. OEMs benefit from a building-block design approach that can improve their time to market. Customers benefit from a more consistent programming approach that makes systems easier to operate and maintain.

Mechatronic design tools, such as Motion Analyzer software, also can help OEMs realise the full benefits of a mechatronic design. This includes making it faster and easier to analyse, optimise, simulate and select control systems.

A scalable control platform provides one common framework that is easier to design, install, manage and maintain. It also allows OEMs to right-size the control system for their customers' applications.

By keeping the above technology considerations in mind when designing their smart machines or equipment, OEMs can help position themselves — and their customers — for greater success. They can help meet customers' demands for optimising asset performance, maximising product quality and safety, and protecting workers and the environment. AT

For more information on developing smart machines and equipment, visit: *http://www.rockwellautomation.com/global/capabilities/machine-equipment-builders/overview.page?pagetitle=Develop-Machines-and-Equipment&docid=04438912cf57ddefe2d48ad0715de517*

Compac Sorting Equipment Uses Leading-Edge Technology to Remain Competitive

Rockwell Automation helps Compac Sorting Equipment improve productivity and reduce engineering costs.

Fruit and vegetable equipment manufacturer Compac Sorting Equipment, established in 1984, has a track record in the development of leading-edge technology and software.

As a market leader in the development, manufacture and supply of smart produce-handling solutions and equipment to packing operations around the world, Compac's software and technology are continually under development and improvement to meet and exceed customer requirements.

However, the global market for fruit and vegetable manufacturing has become increasingly competitive. To hold its position in the market, Compac needed to improve productivity. The company engaged Rockwell Automation and New Zealand-based NHP Electrical Engineering Products Ltd. to help streamline its machine engineering and design capabilities.

Established Working Relationship

Compac Sorting Equipment was already using some programmable logic controllers (PLCs) from Rockwell Automation and was familiar with the company and its technology. To improve productivity and maintain its competitive edge, Compac decided to call on the expertise of Rockwell Automation together with NHP to design a solution that would help to reduce time and costs associated with engineering disparate machine components.

"Together, we worked with Compac Sorting to understand its challenges, which included implementing new technology and the need for local service and support," says Prasad Nory, industry manager at Rockwell Automation. "We then worked together with NHP to design a solution for Compac centred on how we could streamline its machine engineering and design capabilities for equipment destined for New Zealand, Canada and the United States."

The solution comprised Micro850® programmable logic controllers (PLCs), PowerFlex® 4M and 40 drives and industrial control gear. According to Nory, the team demonstrated the value of the solution using Rockwell Automation and NHP technical resources, including Connected Components Accelerator Toolkit and One-stop Sample Shop.

The Connected Components Accelerator Toolkit helps OEMs reduce design overheads so they can instead concentrate on making their machines the best in the market. One-stop Sample Shop is a Rockwell Automation commercial program; through it, customers receive free product samples to try in their applications.

According to Baden Crabb, senior electrical engineer at Compac Sorting Equipment, "It's been really good working with Rockwell Automation. They support their product by providing plenty of training and support. In addition, being able to 'try before we buy' was very beneficial, allowing us to see firsthand how the products work and could add value to our solutions."

Simpler and Faster Machine Building

The Connected Components Accelerator Toolkit helps companies reduce machine design time by providing guidance for the entire machine control application development. It allows OEMs to concentrate on the intellectual property that produces compelling and differentiating machine features.

"The Connected Components Workbench™ Software is one of the reasons we decided to use the Micro800® series of PLCs; it's powerful, and code can be written in ladder, function block diagram or structured text," says Crabb. "The Micro 820™ controllers are great for applications with low I/O requirements and one of the very few PLCs on the market that provide great value, delivering Ethernet capabilities and serial Modbus control of variable speed drives. The scan time is about three milliseconds in our application, which is very fast," he explains.

The Connected Components Workbench Software offers controller programming, device configuration and integration. In addition to the many existing function blocks that are available, the software also has advanced encapsulation abilities with function blocks that are simple to create and then use in the graphical function block diagram programming environment.

Widespread Benefits

Reduced engineering times together with the flexibility to handle different requirements are the key benefits of the solution. In addition, Compac Sorting has seen the benefits of having a single software package for configuring the drives, PLCs and safety components.

Now entirely commissioned and installed at various Compac sites, the equipment manufacturer is winning more business as a result of the cost-effective solution.

"We've used this gear on about 50 projects so far, and it has allowed us to reduce our engineering time by as much as 80 percent. Having non-licensed software is a real advantage for us, allowing us to distribute it to all our service technicians around the world. We're now able to produce control systems much more quickly with the same amount of staff," says Crabb. AT

MESNAC Builds Better Machines to Meet Global Safety Standards

MESNAC enhances quality, reduces costs and improves time to market by collaborating with Rockwell Automation.

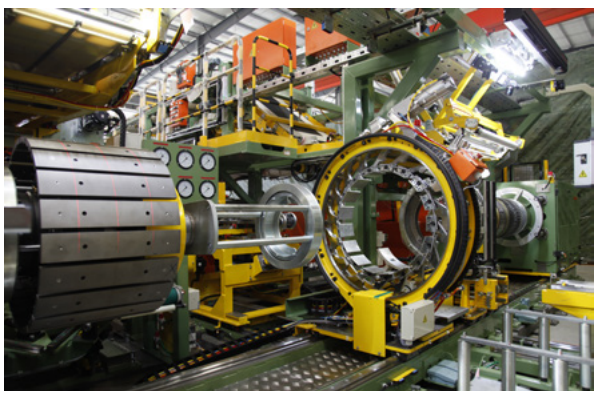
MESNAC

Sixteen years ago, MESNAC originated from the Qingdao University of Science and Technology. Since then, it has grown into an international original equipment manufacturer (OEM) supplying world-class tyre building machines to some of the biggest names in the industry. In 2015, the company became the first tyre OEM to promote the smart factory in the rubber machinery industry.

Following the principle of "Global Technology for Local Solutions," MESNAC's goal is to globalise operations. The company has established a global R&D, manufacturing and service network that integrates advanced resources to provide localised service to over 300 customers in more than 60 countries.

Safety Standardisation

With weakening demand in the tyre industry and tough price competition, MESNAC needed to collaborate with a company that could help them enhance quality, reduce costs and improve time to market. That company needed the right technical acumen to develop new machines, and support them, while confirming that the machines would easily integrate with existing plant systems. What's more, that company needed to have expertise in complex global safety standards.



According to Zhang Jian, safety engineering manager, MESNAC, "We could lose market share in Europe and North America if our safety standardisation did not meet global requirements."

MESNAC found such a collaborator in Rockwell Automation. It had a safety engineering team that understood machine safety and could make sure the MESNAC machines met safety standards, no matter the location of the machines and the end users.

On Target

"Rockwell Automation provided domain specialists to help us understand global safety standards," says Zhang. "While we were able to satisfy customer requirements around machine speed and quality, we were not experienced in machine safety. Rockwell Automation is helping us to understand what our customers require – and how our machines can meet those requirements while still maintaining the speed and quality those customers have come to expect."

The Rockwell Automation team, including members of the Global OEM Technical Consultants (GOTC), used a multi-phased approach to deliver a solution for MESNAC. It provided in-depth training about safety products, solutions and standards from the perspective of end users. It also performed a machine audit to discuss safety solutions, including safe speed control, safety motion realisation, safe zones specification and system structure setup. In addition, Rockwell Automation worked together with MESNAC to design the new machines.

The solution included several Rockwell Automation products in various areas, including:

- **Safety products** – 445L light curtain, 440K safety switch, 440G safety lock, 442L safety scanner and 440F safety net;
- **Motion** – Kinetix® 6500 Ethernet/IP™-enabled servo drives with safe speed control and Kinetix 5500 servo drives supporting integrated motion on EtherNet/IP;
- **Drives** – PowerFlex® 70 and PowerFlex 525 compact AC drives;
- **Control system and safety solutions** – L735 safety programmable logic controllers; and
- **Support** – Safety business unit and GOTC.

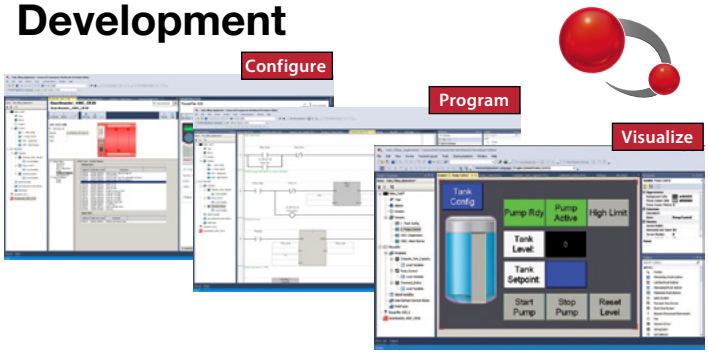
Maximising Production

MESNAC reports that the Rockwell Automation solution reduced design time by 5 percent. In addition, using module code reduced engineering time by 10 percent. Furthermore, the solution reduced learning time when designing the control system by 10 percent, with Power Programming streamlining overall design time. Enhancements reduced the space required by the machine by 10 percent.

With this solution, MESNAC has maximised production, reduced training costs by 10 percent and eased testing and validation. To maintain these improvements, Rockwell Automation provides two dedicated GOTCs, and the company's safety team is ready to support the tyre machines following installation.

Zhang says, "We value Rockwell Automation as an ally able to provide the most advanced automation technology in the world, and a professional team to support our tyre machine development and installation. We plan to develop new machines with the support of Rockwell Automation." AT

Simplify Stand-Alone Machine Development



Connected Components Workbench™ design and device configuration software offers device configuration, controller programming and integration with the human machine interface (HMI) editor.

Based on proven Rockwell Automation® and Microsoft Visual Studio® technology, Connected Components Workbench software can help to minimise machine development time and cost. The latest release offers support for Windows® 10 and embedded ControlFLASH™ capabilities that allow easier device-specific firmware updates from inside the workbench.

Several enhancements have been made to the Micro800 programming experience. Build, download and upload times are up to 50 percent faster; ladder programming is more intuitive with improved Drag/Drop and keyboard navigation; and variables are now automatically renamed throughout the project to save time.

In addition, the latest PanelView™ 800 Graphic Terminals are optimised for compatibility with Micro800 and MicroLogix™ controllers. PanelView 800 Version 4.011 enables operators and supervisors to monitor terminal applications remotely using their PCs, tablets, or mobile phones. Also, they can upload applications from terminals using Connected Components Workbench over EtherNet/IP™; copy and paste from Excel spreadsheets to enter tags into the Tag Editor; rename recipes on the terminal without using Connected Components Workbench software; and edit controller address settings of applications from the terminal.

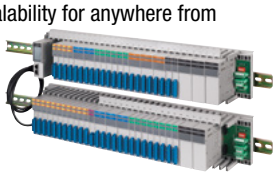
For more information, visit: *http://www.rockwellautomation.com/global/support/connected-components/workbench.page?#tab2*

I/O Platform Improves Connectivity in Hazardous Areas

The new Allen-Bradley® Bulletin 1719 Ex I/O platform enables users to access data from field devices and more easily control process operations in hazardous areas.

As part of the PlantPAx® distributed control system (DCS) from Rockwell Automation, it allows users to monitor operations via a common platform that communicates with the DCS or other automation system. The new I/O platform is integrated into the Rockwell Software Studio 5000® design environment, which simplifies the user experience and can help reduce configuration time.

Three chassis models are available, providing scalability for anywhere from eight to 45 I/O modules on a single adapter. They are certified for mounting in Class1, Division 2 (North America) and Zone 2 (global) hazardous areas. As intrinsically safe I/O, they connect to field devices in Class 1, Division 1 (North America) and Zone 1 (global) hazardous areas.



For more information, visit: *http://ab.rockwellautomation.com/IO/In-Cabinet-Modular/1719-Ex-IO*

New AC Drives Help Increase Productivity, Reduce Energy

A suite of Allen-Bradley® PowerFlex® 755T drive solutions helps users reduce energy costs and increase machine uptime for assets running in high-demand applications. The drives provide harmonic mitigation, regeneration and common bus system configurations.

PowerFlex 755TL drive: Uses active, front-end technology and an internal harmonic filter to reduce harmonic distortion. It is available from 250 to 1,800 hp (160 to 1,250 kW).

PowerFlex 755TR drive: Delivering power from 250 to 3,000 hp (150 to 2,300 kW), the drive includes both regenerative and harmonic migration solutions. It helps reduce energy consumption and costs by delivering energy back to the incoming supply.

PowerFlex 755TM drive system: Allows users to build the system that best fits their needs for regeneration and coordination of multiple motors in common bus configurations. Predesigned modules support a power range from 250 to 3,000 hp (150 to 2,300 kW).

The three drive solutions have advanced, predictive diagnostics to estimate and provide notification of the remaining life span of drive components. In addition, their design allows complete removal of a module from the cabinet, creating ample space for wire installation.

For more information, visit: *http://ab.rockwellautomation.com/Drives/PowerFlex-755T-Overview*

Toolkit Eases Safety Compliance Process

The Safety Lifecycle Toolkit gives engineers one environment to complete the entire machine safety lifecycle, as defined in standards ISO 12100, ISO 13849 and ANSI B11:0.

The toolkit includes a new version of the Safety Automation Builder software tool, which is integrated with the RASWin risk-assessment software from SolidSafe and the Connected Components Accelerator Toolkit (CCAT) product selection software from Rockwell Automation. These tools guide users through steps of the machine safety lifecycle within one environment, providing documentation to show compliance with international standards.

The integration of RASWin software allows users with a Rockwell Automation subscription to conduct risk assessments, define functional specifications and complete safety-system validation within the toolkit. This helps ease the compliance process.

The integration of the CCAT tool allows users to import bills of material from CCAT into the Safety Automation Builder tool to verify that their safety-system concept is compliant to SISTEMA. This helps evaluate the system in accordance with ISO 13849.

For more information, visit: *http://www.marketing.rockwellautomation.com/safety-solutions/en/MachineSafety/ToolsAndDownloads/Safety_Automation_Builder*

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Analytics Solutions Provide Insight into Automation Technology

FactoryTalk® Analytics for Machines is a new Microsoft Azure® cloud-enabled capability that empowers equipment builders with information. The application provides access to performance analytics from deployed systems in order to gain valuable insight to support customers.

Equipment builders can embed a FactoryTalk cloud gateway device onto the machines they provide. Once commissioned, the machine collects data from selected controllers. This data is sent to the FactoryTalk cloud application securely with minimal configuration by the OEM or end user. The OEM then has access to real-time analytics and actionable information via prebuilt dashboards.

Another offering, a predictive maintenance solution, helps inform operators how and why a machine is degrading, then prescribes the best corrective course of action. In addition, the new FactoryTalk Analytics for Devices appliance crawls industrial networks, discovers assets and provides analytics by transforming the data generated into preconfigured health and diagnostic dashboards. To further enterprise analytics services, the SaaS-based FactoryTalk cloud offering will use Microsoft Azure IoT technology to allow for remote monitoring of assets, historisation and dashboarding capabilities.

For more information, visit: *http://rockwell.lookbookhq.com/factorytalk-analytics-for-machines/asset*

Stratix Line Expands to Handle Security, Harsh Environments

Rockwell Automation recently introduced two additions to its Stratix® product line: the Allen-Bradley® Stratix 5950 security appliance and the Stratix 5410™ Industrial Distribution Switch.

Stratix security appliance. The device incorporates new security technologies to help protect plant-floor systems. It uses Adaptive Security Appliance (ASA) firewall and FirePOWER™ technology to create a security boundary between cell/area zones or to help protect a single machine, line or skid. It also uses deep-packet-inspection (DPI) technology, developed in collaboration with Cisco, which enables inspection of the Common Industrial Protocol™.

Stratix 5410 Industrial Distribution Switch. With a rugged exterior, rear-mounting capabilities and multiple fiber port options, this switch is used for a centralised point of network distribution. It offers an all-Gigabit Ethernet (GE) platform with optional 10 GE ports, providing high-performance capabilities for networks where high-bandwidth support is needed. The switch can be used as a layer 2 access switch or a layer 3 routing switch.

For more information, visit: *http://ab.rockwellautomation.com/networks-and-communications/ethernet-ip-network*

Design and Execute Process Step Tests More Accurately

Rockwell Automation Pavilion8® Model Predictive Control software empowers engineers to design and execute step tests faster, safer and more accurately.

The Step Test Assistant in Pavilion8 version 5.12 independently makes adjustments in a test environment to more quickly identify models that drive operations to the maximum level of performance. The tool slashes testing time by up to 30 percent, avoids constraints for safer testing and helps reduce the need for repeat tests by adapting to and identifying good tests.

Key features include:

- **Windows-based configuration and support –** help improve workflow by enabling users to create a customised working environment. The software also supports modern browsers and operating systems.
- **Multivariable run-time controller –** allows users to quickly add predictive disturbance rejection, add new process limits and easily compare differences in advanced process control application versions.
- **Continuous controller monitoring –** enables users to configure process models with specific metrics for production, quality, energy usage and other factors.

For more information, visit: *http://www.rockwellautomation.com/global/products/advanced-process-control/overview.page?pagetitle=Pavilion8&docid=d4330344a44bde3c403a792832253c1f*

Streamline the Design and Configuration of Automation Systems

The Rockwell Software Studio 5000® integrated development environment now includes expanded integration with engineering tools, predeveloped application content to replace custom code and new features to help enhance security.

The Studio 5000 Architect™ application can now collaboratively exchange data with popular engineering tools, such as EPLAN and AutoCAD. This bidirectional data transfer helps improve startup time by reducing the need for engineers to manually re-enter control data from engineering tools into the Studio 5000 software.

Engineers can use predeveloped application content in the Studio 5000 Application Code Manager instead of creating custom code. This saves time and helps facilitate system standardisation.

To help enhance security, Rockwell Automation has added license-based content protection to the Studio 5000 Logix Designer application, which helps manufacturers protect the design and execution of their Logix content by limiting who can view or edit object source code; it also restricts code duplication in unauthorised machines.

For more information, visit: *http://www.rockwellautomation.com/rockwellsoftware/products/studio-5000.page*

App Speeds Plant Diagnostics and Collaboration

The FactoryTalk® TeamONE™ for iOS and Android smartphones boosts team productivity by enabling users to collaborate and share knowledge, view live production diagnostics, interact with machine alarms and troubleshoot devices.

The app is a smart node. Rather than act as a client that connects to a server, the app's device modules communicate directly to devices on the network for live data viewing. When secure cloud access is available, the modules sync with other trusted team members. The initial release includes eight modules. The app can be downloaded from the Google Play or Apple app stores and is offered on a yearly, user-based subscription basis.

For more information, visit: *http://www.rockwellautomation.com/rockwellsoftware/applications/factorytalk-teamone.page?*

Connect Third-Party Devices Over EtherNet/IP

The Bulletin 2198 Encoder Output Module synchronises third-party devices to Rockwell Automation integrated motion systems on EtherNet/IP™. Reduced wiring increases reliability by eliminating the need to split encoder signals between the motor and drive. The module also increases machine design flexibility. It can sync to any axis of motion within Kinetix® and PowerFlex® drives. Users configure and program it with Studio 5000 Logix Designer® software. In-cabinet installation eliminates the need to mount encoders on the machine and reduces wiring.

For more information, visit: *http://literature.rockwellautomation.com/idc/groups/literature/documents/pp/2198-pp003_-en-p.pdf*

Bring Smart Diagnostics to Control Systems

The machine-mountable, IP67-rated, Allen-Bradley® IO-Link Master module provides event and process timestamping capabilities for on-machine applications. The new IO-Link master, ruggedised for use in harsh applications, supports up to eight IO-Link devices and is based on the IO-Link specification V1.1. It can store up to 40 timestamps of sensor events on each channel, helping users track changes and more easily diagnose issues. Input timestamps of all sensor data also can be sent to a controller upon a change of state. These and other diagnostics can improve preventive maintenance and optimise overall system performance.

For more information, visit: *http://ab.rockwellautomation.com/allenbradley/networks/io-link.page?*

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Safety Automation Builder

Streamline machinery safety design and validation

Now with Risk Assessment functionality

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