

robotics



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Per Vegard Nerseth
Managing Director,
Business Unit Robotics

Today is such an exciting time in robotics. There is a convergence of technology innovations, market changes and new ways of working that are making 'robot automation' the answer to many manufacturing questions. In this context we are pleased to share with you the newest issue of ABB's *Robotics Magazine* 1/16.

This year we had the privilege of witnessing the early stages of a new era in robotic co-workers. ABB is proud of the first year of our YuMi dual arm collaborative robot and the impact it is having in the marketplace. We were also recently honored to have YuMi voted 'Product of the Year 2016' by *Elektronik* magazine's readers.

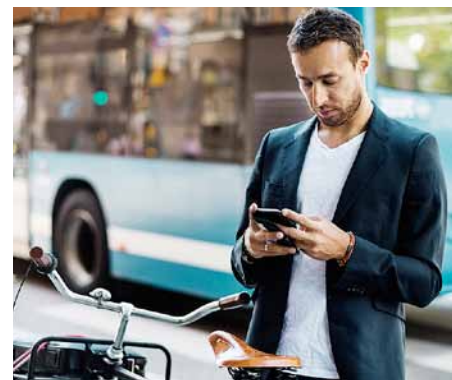
This issue also has a number of interesting articles on how robots are helping manufacturers improve their efficiency

and their ability to respond to increasingly diverse customer needs – from a local cookie bakery to one of the world's best known pencil brands, and from an automotive supplier to one of the world's leading pharmaceutical companies.

One of the biggest trends affecting large and small businesses alike is the increasing impact of digitalization. In this issue's Trends article, we also help demystify some of the complexities of digitalization and explain how it is helping companies to sharpen their competitive edge.

In that spirit I hope you find inspiration and thought-provoking ideas in the pages of *Robotics Magazine* 1/16.

Best regards
Per Vegard Nerseth



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Events calendar 2016

Come and see ABB's newest solutions at the following events:

> June 27–28
European Value
Provider Conference,
Stockholm

> June 29
European
Customer Day,
Stockholm

News

Connected Services boosts efficiency

ABB's robot systems exist in an interconnected ecosystem that ABB calls the Internet of Things, Services and People (IoTSP). As a key product in ABB's long term digitization strategy we are now introducing Connected Services, a suite of five products that can lead to up to 25 percent less incidents and 60 percent faster response time and issue resolution:

- **Condition Monitoring & Diagnostics** is a secure 24/7 monitoring and diagnostics service which helps keep robot systems running at optimal performance.

- **Backup Management** ensures there is always a full robot program backup available, with automatic backup scheduling anytime, from any server.

- **Remote Access** gives quick and secure access to robot controllers and

connected equipment so you can react to performance related or unexpected issues as if you were sitting right there at the controller. Access is given on customer request and supervision, protected by hardware and software security.

- **Fleet Assessment** benchmarks your robots to ABB's entire population of connected robots, allowing us to identify robots with the greatest service needs. By limiting the risk of critical failures in gearboxes and motors, Fleet Assessment extends the lifetime of your robot equipment.

- **Asset Optimization** can help identify underperforming robots and provide regular, proactive recommendations on how to avoid downtime and boost performance. Asset Optimization includes periodical analysis of a robot's general health and performance.



All ABB robots are delivered ready to be connected, wirelessly or wired, to the IoTSP. ABB's Connected Services can be tailored to your plant's individual needs through flexible Robot Care service agreements.



The IRB 1660ID

Great expectations

A new ID robot that could reduce arc welding cycle times by up to 10 percent and cut maintenance costs by up to 50 percent is being launched by ABB.

Just over a year in development, the IRB 1660ID upgrades the previous IRB 1600ID, created 10 years ago.

Crucially, the new robot's application cabling runs inside its upper arm in

a flexible conduit, so water and cutting fluids are not constantly affecting the cabling. This reduces both maintenance costs and delays to production.

And the robot's upgraded drive chain and machine control software make arc welding even faster and more accurate, avoiding collisions with other production machines.

> September 12–17
IMTS,
Chicago

> October 19–26
K fair,
Düsseldorf

> November 1–5
CIIF,
Shanghai



Get connected today to claim your Condition Monitoring & Diagnostics and ABB Basic Care service agreement package for free during the warranty period by registering your new robot at: www.abb.com/robotreg.

“It’s a great enhancement of the previous version, and customers can benefit from higher output and lower maintenance costs with this product,” says Per Löwgren, global products manager, medium robots, arc welding, continuous laser welding and cutting.

That’s great news for customers dealing with high demand for high quality, reliable products, such as Tier 1 automotive sector companies.

SafeMove2 enhances employee safety

Robots are capable of performing any number of applications, but their quick motions can pose a hazard to nearby people.

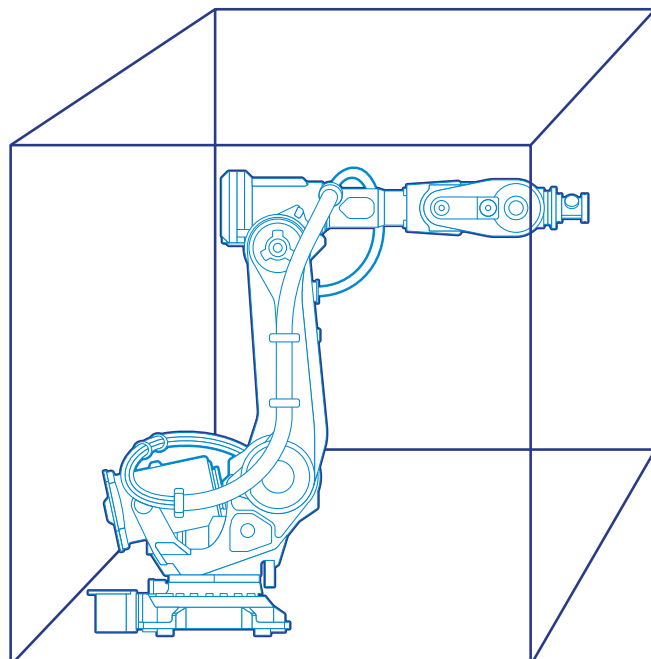
ABB launched SafeMove in 2008 to perform safety-certified monitoring of robot motion, tool and standstill supervision as well as speed limitation. Now, after working closely with customers, ABB has introduced SafeMove2, which ensures employee safety, revolutionizes safety commissioning times and reduces total investment by up to 30 percent.

By evolving to achieve an optimal balance between hardware and software,

SafeMove2 encourages the development of innovative robot applications by integrating safety features directly into the robot controller. This evolution has enabled the creation of features such as more zones, ranges and tools.

The IRC5 controller is now available with a Keyless Mode Selector option. This means that the controller’s physical mode switch can be replaced by a soft mode switch on the FlexPendant, which eliminates the need for external control panels.

SafeMove2 is able to support all robot mounting angles.



The sweet taste of success

Personalized confectionery manufacturer Boomf switched to the IRB 1200 and saw its business grow by 600 percent.

Text: ABB Photo: ABB



The machines originally cut cakes and sandwiches, but Boomf's IRB 1200 has been adapted to cut personalized marshmallows.

An ABB robot has been installed by system integrator Newtech Intelligent Automation Limited, at Boomf, a company that specializes in the production of personalized marshmallow confectionery. Founded in 2013 by founders James Middleton and Andy Bell, Boomf enables its customers to print their choice of photos, graphics and messages onto marshmallows, which they can then have sent to a chosen recipient as a quirky alternative to flowers, chocolates or greeting cards.

The idea proved so popular that within a year the company's manual production line at its factory in Reading, England, began to struggle to keep up with orders. Much of the delay was happening at the cutting stage. The expectation of high quality meant that each product needed to be carefully cut, causing a bottleneck in the production flow. Difficulties in achieving a consistent high-quality cut also meant that a lot of product was being wasted.

With the company specializing in such a niche product, the founders feared that solving this problem with automation would require custom-built equipment and machinery. As James Middleton put it, "There was no marshmallow printing shop around the corner."

Looking at various cutting machines for the food industry on YouTube, Middleton came across a video of a robot cutting application that used an ABB six-axis robot and an ultrasonic blade to cut cakes. The automated system was integrated by Newtech, an ABB Robotics UK Authorized Value Provider.

Located in Sharnbrook, North Bedfordshire, Newtech was the first company in the world to create a commercial robotic cutting solution combining a robot arm with an ultrasonic blade.

"As soon as I saw the video, I thought that's the solution we need," Middleton says. "We got on the phone, contacted Newtech, and then we went up to trial some solutions."



Boomf's James Middleton demonstrates the automated cutting process to Newtech's Jaz Gill.



Jaz Gill, Sales Manager at Newtech, the ABB authorized value provider that integrated the automated system.



With 600 percent growth since the system was installed, Boomf, ABB and Newtech make a sweet combination.

With any robot installation, trials are required to ensure the best results. Because the original machines were set up to cut cakes or cheese, they weren't suitable to cut marshmallows, which are an inherently sticky product. Through applying a mechanical Teflon-coated blade to the ABB IRB 1200, Newtech was able to come up with a solution. The Teflon-coated blade passes through an oil reservoir before the cut is made in order to ensure a suitable surface for cutting. Once the marshmallow is portioned, the blade passes through a cleaning tank before repeating the process.

A clean-cut design is of the utmost importance to Boomf. "We make sure we have a precise square, not just something that's almost a square, and we have very sharp angles and edges so that we have a good printing substrate," Middleton explains.

When the process was performed manually, Boomf employed 10 people to cut the trays of marshmallow into 40 by 40 mm squares. After every five or six cuts, the blade would need to be cleaned. In total this took five minutes. Due to miscuts, there was also a lot of wasted product. Now that the process has been automated, the procedure takes 17 seconds. Newtech also integrated intelligent vision software into the robot cell to ensure that Boomf would get a perfect cut each time. "There's next to no wastage now, and that's been a real benefit to the figures," Middleton says.

Jaz Gill, sales manager at Newtech, says the Authorized Value Provider uses vision technology in this and many other processes to accurately cut and track products as they come into the robot cell. "The vision technology scans images and

then uses 2D vision from the top of the cell to recognize the product," he says. "The data is then sent into the robot to follow it – be it a tart, cheesecake or a sandwich, the camera ignores any other elements to achieve a perfect and accurate cut."

In addition to improved product quality, the robot solution has raised productivity levels significantly. Now Boomf has the flexibility to respond to changes in demand. The confectionery company receives a large increase in orders during holiday periods such as Christmas and Valentine's Day, and it needs the resources in place to cope with fluctuations. Improving the process has also enabled Boomf to focus on other areas of the business, such as expanding delivery to more countries.



“The success that we’ve had with our robot speaks for itself. Any investment in robotics is a great decision for any company that wants to insure its future in an increasingly digital market.”

Boomf co-founder James Middleton.

“We develop a partnership with our customers and look at where we can add value across the whole of their production line,” Gill says. “In Boomf’s case, we can cut the product perfectly, but they still have a challenge in manually putting the product into boxes.” Over the coming months, Newtech will begin trials using another ABB robot.

Further, using an IRB 1200 within a machine cell allowed Boomf to improve health and safety at the site. James Middleton was a victim of the manual process before the automated system was installed. He severed a nerve in the end of his finger while cutting a batch with a knife. Removing the human interaction from the cutting process avoids the risk of such accidents, and employees can apply their skills to other areas of the business, such as operating the robot.

Overall, Newtech’s automated solution has been a real success for the company. Ease of use is ensured through the use of a human machine interface that enables staff to operate the cell following simple training. Gill says this means companies “won’t have to worry about having an engineer on site.”

In terms of finances, Boomf was well aware that as a start-up there would be a lot of cost. However, through investing in a robot the company has already experienced the benefits, and in its second year of business it has grown at an astounding rate of 600 percent. “It’s the benefits of having the robot that have allowed us to grow that much in one year,” Middleton says.

Jaz Gill says robotics and automation in general are completely underuti-



A worker using the IRB 1200.

lized in the food and beverage sector. “It’s a whole culture change that we need to bring to our customers and their partners for people to understand that the use of robotics, the use of automation, the intelligence, is not only far more economic than it’s ever been and yields a faster payback, but it’s incredibly easy to use,” he says.

Asked what he would say to UK manufacturers who were thinking of investing in robotic automation, Middleton is encouraging. “I’d say go for it,” he says. “The success that we’ve had with our robot speaks for itself. Any investment in robotics is a great decision for any company that wants to insure its future in an increasingly digital market.”



Boomf co-founder James Middleton.

Scan the QR code (right) to see the ABB IRB 1200 cutting marshmallows.



The perfect medicine

Unique ABB robot solution supports AstraZeneca Australia as it deals with rising export demand.

Text: ABB **Photo:** Kevin Manning

AstraZeneca, one of the world's largest pharmaceutical companies, now relies on ABB robot technology to pack and palletize asthma medication to meet rising export demand from China. The ABB robots are part of an A\$80 million investment in six new production lines at AstraZeneca's facility in North Ryde, New South Wales, Australia. Two further lines are currently being planned.

The pharmaceutical company, which has been manufacturing in the Sydney suburb for more than 50 years, recently completed the installation of the six new lines, each featuring blow-fill-seal technology with a purpose-built finishing and packaging system known as Respules 4010, culminating in a case packing and palletizing cell that uses an ABB IRB 4600 robot. Each of the six existing production lines has the capacity to produce 65 million units a year of AstraZeneca's asthma medication, called Pulmicort Respules. Once all eight lines are in operation, AstraZeneca will have the capacity to produce 520 million units a year of the Pulmicort medicine.

Plans to upgrade AstraZeneca's North Ryde facility began in 2011 after the company signed a supplier agreement with the Chinese government, naming North Ryde the sole global site for the supply of Pulmicort Respules, which are used to treat a portion of China's estimated 7 million asthma sufferers.

To meet its increased supply targets, AstraZeneca engaged ABB Authorized Value Provider Andrew Donald Design Engineering (ADDE) to develop a purpose-built packaging, verification and robotics palletizing solution.

Based in Bayswater, Victoria, ADDE specializes in the design of industrial automation solutions. ADDE worked closely with AstraZeneca to develop the Respules 4010 packaging system, from

the initial concept development and systems design through to integration into the production lines at the North Ryde facility.

A completely new configuration, Respules 4010 took 40 people nine months to perfect. At the heart of the world-first system is an ABB IRB 4600 robot, enclosed in a sterile glass cell and employing ABB's SafeMove technology to ensure the highest levels of operator and product safety.

Barry Hendy, ADDE's managing director, says each of the four production lines, or bays, features two key areas: the product is processed on a finishing line at the back of the bay, then fed to case packers and palletizers at the end of the line. "The robot cells do the security sealing, as well as the serialization for the track-and-trace system on each and every carton," Hendy says. "They then do the case packing and palletizing of each case, putting them onto the slip-sheets and feeding them out of the cells onto the trolleys."

ADDE has been an ABB Authorized Value Provider for several years, and it specifies ABB robots for the majority of its industrial automation projects. The ABB IRB 4600 robot at the core of AstraZeneca's new packaging system offers sharp path accuracy and motion control, an ultra-wide working range, short cycle times, flexible mounting possibilities and top-level protection for harsh environments.

"We looked at a number of the products in the ABB range and decided the IRB 4600 was the best fit in this configuration, with its long arm giving us the reach we needed while being able to fit within the required cell and perform all the tasks the customer demanded," Hendy says.

"One of the very unique and challenging things in this cell is that the safety guarding has been done with toughened glass, which is very good at keeping people out, but not so good at keeping ro-

bots in," he says. "So to achieve the safety standards that we needed, the robots are fitted with ABB's SafeMove technology, which provides the safety to ensure the robot stays within the cell and away from the glass, while the glass ensures that the operators stay out."

According to Paul Ives, AstraZeneca Australia's engineering and operational excellence manager, the ABB robot solution has allowed the manufacturer to increase throughput at its North Ryde facility while maintaining the pharmaceutical manufacturer's extremely high product quality requirements.

"Our manufacturing process utilizes blow-fill-seal technology that molds molten plastic containers, fills and seals them, all within a grade-A sterile environment," Ives says. "The containers are then printed, inspected and checked for leaks before final packing in the robot cell.

"Our case packing and palletizing robot cell is extremely compact and versatile," he says. "It applies a security seal and a unique serialized barcode before being packed, 18 at a time, into a shipper, which is also identified with a unique barcode. The pallet is then stacked within the same enclosure.

"We've currently got around nine ABB robots in the plant, and we anticipate this will increase in the future," Ives says. "We've seen many benefits from using these robots, including dependable operation, as well as reduced labor costs."



An IRB 4600 robot is at the heart of the unique packaging system.

Scan the QR code (right) to see the ABB IRB 4600 robot pack and palletise asthma medication.



Small company, big vision

Robots help to keep Dutch bakery profitable and flexible.

Text: ABB Photo: ABB

Over the decades, most of the food and beverage industry has seen competition increase, labor costs rise, margins drop to razor-thin levels and raw ingredient prices increase dramatically. It's enough to make you wonder just how a small business can stay afloat in this environment, but as the market for baked goods has shifted over time, Interbanket bakery has defied the odds by adapting and developing new ways of staying profitable.

Since the 1960s Interbanket has baked, packaged and delivered cookies of all types. The company doesn't have its own label, but you have likely seen some of its distinctive Dutch products under various labels on store shelves across Europe and the world. As a small family-owned company located close to Amsterdam, Interbanket has many strengths, including the ability to react quickly to the market, stay close to its customers and remain flexible in the face of modern production challenges.

"Before the early 1990s we were only exporting to Germany, but after that point we started exporting to more and more countries," says Wilco Roelse, who is



Seven IRB 140 six-axis robots are used in the production line.



**Interbanket bakery's
Dutch cookies
rolling off the
production line.**

aging lines,” says Ron Haaring, sales director for Tehama. “We’ve developed so many machines through the years that we can make a solution for the customer that takes the products from the cooling belt all the way to the pallet.”

At Interbanket’s facility, the major challenge was the large amount of cookies it needed to package. On the one line that was slated for robotic automation it makes 19 different kinds of products, packed 30 different ways into a tray, including flat, at an angle of 45 degrees and at an angle of 90 degrees. When you add up all the different kinds of toppings and labeling, Roelse says, the possibilities are endless.

“I first looked at it in the traditional way of making machines, but there were so many different packaging styles and cookie combinations it couldn’t be done,” Haaring says. “We needed incredible flexibility to transform the line quickly between batches of cookies, and the only way it could be built was with robots.”

Given that this was Tehama’s first foray into the world of robotic automation, it turned to ABB Robotics Benelux for some advice. In the end the project team decided to go with seven IRB 140 six-axis robots for the line instead of six four-axis delta robots.

“I got a call from Tehama saying they had a new project and needed to use robots,” says Haayo Terpstra, business development manager, ABB Robotics Benelux. “The first idea was to put in the IRB 360 delta robots, but during our discussions we realized that picking up the product flat from the conveyor and tilting it to put it into a package could only be done by six-axis robots. In addition, we were able to keep costs down due to the reduced mounting needs of the IRB 140.”



only the third owner of Interbanket in more than 50 years, after succeeding his father in the 1990s. “For companies like us, it is not possible to exist only on sales to the Dutch market anymore – there’s too much competition – but in other countries our Dutch cookies are a unique and exotic product, which makes it easier to differentiate them.”

These days Interbanket exports 85 to 90 percent of its products, which are made on two production lines. One line is built to handle cookies of all kinds, while the other produces *stroopwafels* – the famous traditional Dutch syrup wafers.

“For most of our history we packed cookies by hand,” Roelse says. “Labor and associated personnel costs are our biggest cost. Every year profit was going down due to thinning margins, so we had to find a way to increase profits to stay viable. There are some ways you can try to do this, including finding cheaper raw materials or increasing your selling price, but both of those are always difficult. It’s not nice to your customer to say ‘I have to increase the price,’ and keeping a very high quality is always the first order of business. So you try to find other solutions to keep the costs down, and

then you come to automation as an obvious conclusion – robotics in particular.”

When Roelse first started to think about robotics, he attended several trade shows, getting new ideas and making connections. His biggest concern was the risk of losing production during the shift from manual packaging to robotic packaging, so the company spent a lot of time identifying all the risks associated with each product group. It eventually asked machine builder Tehama B.V. to help implement the robots.

“It turned out to be very difficult to find the right solutions to pack our products automatically, and for that we needed a good supplier,” Roelse says. “Tehama is also a small family company. I’ve known their people for many years, and it’s nice to do business with another family company because you understand each other.”

Tehama, based in the Netherlands, only recently began to use robotics in its automation solutions. The combination of the small business mind-set and decades of experience in traditional bakery automation made moving into robotic automation a seamless process.

“We make complete sorting and pack-



“It didn’t matter that we were a small company working with another small company – ABB Robotics Benelux treated us like family.”

Wilco Roelse

Haaring says, “ABB is a very big company with many, many years of experience, and they gave me the right support to develop the right programming for this solution. It didn’t matter that we were a small company working with another small company – ABB Robotics Benelux treated us like family.”

Over several tests with the IRB 140 in the Interbanket facility, Terpstra and his team were able to convince Tehama that it was the right robot for the job. ABB also helped Tehama with some RobotStudio offline virtual computer trials to figure out the best positions for the robots, as well as gripper attachment configurations. Before starting, Roelse says he knew of ABB, but he put his trust in Haaring and Tehama to choose the right robot supplier.

“This robotic system is very flexible and was quite complicated to design,” Roelse says. “But one of the main goals was to keep the system easy to operate, so that the same people who packed the products by hand a few years ago can now run the line and reconfigure it themselves between product runs. In fact, the changeovers are very quick, taking between five and 10 minutes to complete the transition between two very different products. The production pressure on the people is less now, because the robots

are doing the hard labor and the people keep an eye on the robots.”

With the robots now running at full speed for several months, it’s clear that the line has delivered a bit better output, but the biggest benefit was the lowering of labor costs. “In the past it was six or seven people who did the job,” Haaring says. “Now there is one operator who looks at the line and keeps the line filled with empty trays and other jobs, but the robots do the work. It allows Interbanket to continue operating in the era of small margins and still turn a profit.”

In the early 1980s Interbanket had a daily production output of 1,500 kg of dough, and now it goes through more

than 3,500 kg of dough each day, using fewer people in the same amount of time.

“I always think about flexibility,” Roelse says. “Try to be flexible everywhere in your company – to the people, to your products, how to pack your products, to the customers, and try to solve their problems – and that’s a strong point for small companies, I think.”

Haaring adds, “Since this experience with ABB, I’m able to develop more machines with products that I couldn’t make machines for in the past, so Tehama’s business is growing bigger. We’re absolutely going to use more robots in the future. It opens the market for me to do more difficult products that conventional lines couldn’t do in the past.”

Scan the QR code (right) to see the IRB 140s that keeps the Dutch bakery profitable and flexible.



Interbanket worked with machine builder Tehama and ABB Robotics Benelux to implement the robots.

Going mobile

A mobile packaging system designed by an ABB Authorized Value Provider is reducing costs for one UK aggregates supplier.

Text: ABB Photo: ABB



An aerial view of one of the company's aggregates sites.



Malcolm Burton, Yard Manager at Day Group's South Cerney and Southampton depots.



British aggregates supplier Day Group handles more than 3 million metric tons of construction material each year. The company has been running for more than 70 years, and as a family-owned business it has a dependable history of providing high-quality products.

The company sources large quantities of both primary and recycled aggregate from a number of quarries across the UK,

all of which require bagging before customer deliveries are made. This poses a logistical problem, as transporting heavy loads of aggregate over hundreds of kilometers increases both handling and energy costs. The alternative – building on-site factories for the purposes of bagging – also requires capital expenditure.

Having recognized these challenges, Day Group approached ABB Authorized Value Provider RGroup. The two com-

panies had already worked together on other projects when Day Group rented RGroup's mobile packaging plant.

Comprising a trailer equipped with an IRB 460 ABB robot inside to palletize the bags, the mobile packaging plant provides a versatile, efficient and easily transportable solution for bagging products at source. Day Group realized the benefits immediately and ordered its own fleet of nine mobile pack-





In recognition of the company's track record as an experienced robot systems integrator, ABB awarded RMGroup the status of Authorized Value Provider in 2015.

aging plants, which have been deployed around its many quarries.

Llewelyn Rees, managing director at RMGroup, explains, "When companies like the Day Group buy a quarry, if they go for planning permission for buildings, it can take a couple of years. With the mobile system, it's literally there, and it's bringing the raw material out of the quarry immediately. As soon as they have an asset, they can remove the materials."

The efficiency of the bagging process is greatly assisted by the compact and lightweight design of the IRB 460. Capable of operating at up to 24 cycles a minute, the robot can perform the process quickly with less inertia on the trailer. In addition, its zero tail swing and small footprint mean it can fit within the confines of the trailer. The inherent flexibility of the mobile solution means it can be used anywhere to handle a wide variety of different products.

Malcolm Burton, yard manager at Day Group's South Cerney and Southampton depots, explains, "Our biggest challenge is meeting changes in customer demand. The adaptability that the IRB 460 offers means we can palletize a vast range of aggregates from naught to three millimeters through to 40 millimeters. It can even take track ballast if need be."

The IRB 460 also adds flexibility in terms of production capacity. "It can handle over 15 bags a minute, but it can go up to 22 bags if required," Burton says. This flexibility allows Day Group to respond quickly to changes in demand, which tends to vary according to the seasons.

The nature of the products in demand can also change with the seasons. Day Group experiences high demand for salt for gritting purposes during the colder months. Again, the mobile packaging system adds value to this application by allowing the packaging process to be transported directly to the docks.

Burton also notes that process mobility can significantly reduce downtime. "If we have a depot that has a breakdown, we can pack the lorry up and it can be at the other site tomorrow," he says. "Production is unaffected. The product can be stockpiled and fed straight onto the truck, packaged and delivered to the consumer."

Remote assistance is included so that in the event of a breakdown at Day Group, the issue can be resolved in the shortest time possible. RMGroup's eWON package allows users to dial into the system and view programmable logic controllers and human machine interfaces using cameras to identify the problem.

"Nine times out of 10 we can identify where the issue is," Rees says. "In the past, a supplier would send an engineer, but this could take anything up to a week. Remote access means we can be there instantly."

As a manager of two yards, Burton can log on to his laptop and diagnose the problem from wherever he is. "If I get a problem at one of the sites, I can help the lads resolve it over the phone," he says.

Since it began business, RMGroup's customer base has grown to include everything from sugar factories and animal feed suppliers to coal products and aggregates. With the help of ABB and the

range of robots on offer, RMGroup is expanding into the food industry this year.

Inventiveness is key to RMGroup's success. In recognition of the company's track record as an experienced robot systems integrator, ABB awarded RMGroup the status of Authorized Value Provider in 2015. "We've always had a philosophy of never standing still," Rees says. "You can't sit back and just sell machinery. Customers are always asking us, 'Could you do this differently, or could we make that?' Our strong point is that we've never said no."

It is this forward-thinking attitude that has made RMGroup's use of the IRB 460 in its mobile packaging lines such a success. Rees envisions that the Day Group installations and similar projects could be replicated across the UK. "The more mobile packaging plants that are taken up, the better it will be for the environment," he says. "More mobile plants will mean that companies could significantly reduce their fuel usage by eliminating the need to transport large quantities bulk materials over long distances. There are benefits to be had not only for the customer but for the UK as a whole."

For Day Group, the IRB 460s and the mobile packaging application are part of the aggregates supplier's plans to grow. Burton concludes, "If we get bigger, no doubt we'll be seeing another mobile packaging line in the not too distant future."

Scan the QR code (right) to see how IRB 460s are used for mobile packaging factories in the UK.



Keeping it running



ABB Robotics' Connected Services minimized a shutdown and paid dividends for car glass manufacturer Saint-Gobain Sekurit.

Text: ABB **Photo:** Matthieu Grandjean

When Saint-Gobain Sekurit experiences a plant standstill, every second counts. ABB Connected Services was able to proactively help the French automotive glass maker avoid a costly longer production stop.

In northeastern France, an hour by car from Paris, is the town of Noyon, where the French multinational automotive glass manufacturer Saint-Gobain Sekurit has a plant. The company develops and supplies major car manufacturers with windshields, sidelights, backlights and glass sunroofs. Saint-Gobain Sekurit is a part of the 350-year-old Saint-Gobain Group, with more than 170,000 employees in 66 countries.

Production at the Noyon plant focuses on encapsulation, extrusion and

premounting of car glass with the help of 39 ABB robots involved in handling, palletizing and gluing. ABB enjoys a long-standing relationship with Saint-Gobain, since an initial service contract was signed in 2005. The local service team recently won a new service contract, thanks to Connected Services as a differentiator and ABB's close relationship with Saint-Gobain.

ABB's patented and embedded Connected Services monitors the health of our customers' robots 24 hours a day, seven days a week, year-round through a wireless or wired connection to the Internet. This continuous monitoring generates an automatic alert if the robots' condition changes or if an issue occurs. Customers can access this actionable information from smartphones and tablets at any place

or time, and, importantly, ABB's central Service Intelligence Unit is always monitoring it as well. Ultimately this leads to reduced service costs, higher availability and extended equipment lifetime.

"We anticipated a failure in the IRB 6600 motor in axis six, via Remote Service and analysis of daily Mechanical Condition Change (MCC) data and alarms," says Robertino Cinelli, ABB Robotics LPG customer service manager, France. "ABB immediately informed the customer proactively that a failure might occur and asked if it could perform a few tests. Shortly thereafter we were able to validate that the motor in axis six was about to fail, and we recommended a replacement to the customer to avoid a production stop. We then planned a service intervention at the customer site for motor replacement."

The local service team performed the service intervention in one day to minimize the impact on production, thus avoiding a costly longer stop and effectively reducing Saint-Gobain's maintenance costs.

"MCC is an important tool in our current Connected Services toolbox, which is continuously being enhanced," says Jörg Rommelfanger, global product manager, ABB Robotics. "In a typical user case, MCC data can be used as the second step in predictive analytics after having identified critical or highly utilized robots with our fleet assessment tools. Then we provide customers with immediate actions which will help reduce our customers' maintenance costs even further, according to robot condition and usage."

Matthieu Grandjean, maintenance manager, Saint-Gobain Sekurit, France, is pleased with the service. "Connected Services, and more precisely the last case with the MCC tool, allowed us to minimize the shutdown, with time only spent on repair," he says. "The financial impact of a production stop is close to 4,000 euros per hour. Knowing that ABB monitors our robots remotely is a real benefit and gives us true peace of mind. We are therefore very satisfied with the service performed by ABB Robotics."

This shows the power and value of an attentive local service team and great customer intimacy to prevent a costly production stop. ABB has entered the age of the Internet of Things, Services and People with everything interconnected for the benefit of our worldwide customers.

Intricate welding

Heavy-duty vehicles can be hazardous to manufacture as well as to operate. A US maker of cabs and roll-over protective structures found that a robotic servo spot welding system was not only faster but could minimize the potential safety and repetitive motion risks.

Text: ABB **Foto:** Crenlo Inc.

The hazards encountered by construction, forestry and mining vehicles are easy to envision. The perception is not quite the same for the garbage trucks that ply America's alleyways, subdivisions and commercial parking lots. But Google "garbage truck rollover accidents" and you can be 15 pages in and still see references to incidents that have occurred in the past 12 months.

Crenlo Inc. of Rochester, Minnesota, specializes in the manufacture of heavy-duty cabs and roll-over protective structures (ROPS) for vehicles in these industries and several others. The design standards are understandably rigorous.

Since its first order to make tractor cabs for Caterpillar in 1951, Crenlo has continued to invest in advanced manufacturing technologies. It now has two facilities in Rochester, covering 55,000 square meters and 17 hectares. Working in those plants alongside 725 employees are 23 industrial robots, handling tasks such as press tending, machine tending and arc welding. 22 of these robots come from ABB and have been added over time, with

some on duty for as long as 24 years.

Despite the prevalence of robots and other hard automation systems, there are many processes that Crenlo handles manually – typically, those that require extensive handling, such as parts of a complex geometry.

The recent addition of a new refuse truck cab to the manufacturing schedule presented a challenge that didn't seem to be a perfect match for any of the processes Crenlo currently had in place.

"These new cabs require 2,000 spot welds," says Jeff Petersen, Crenlo's robotics and weld engineering manager. "We did some preliminary manual spot weld testing on some smaller cab components and we quickly saw that it would be a very manually intensive process.

Crenlo considered installing a standard robotic spot welding system, but with the complexity of the truck cab the project team did not think the system could access enough welds to get an effective payback. It was a foregone conclusion that no system could get to all 2,000 welds in one stage. Petersen and Brent Sharpman, the lead manufacturing



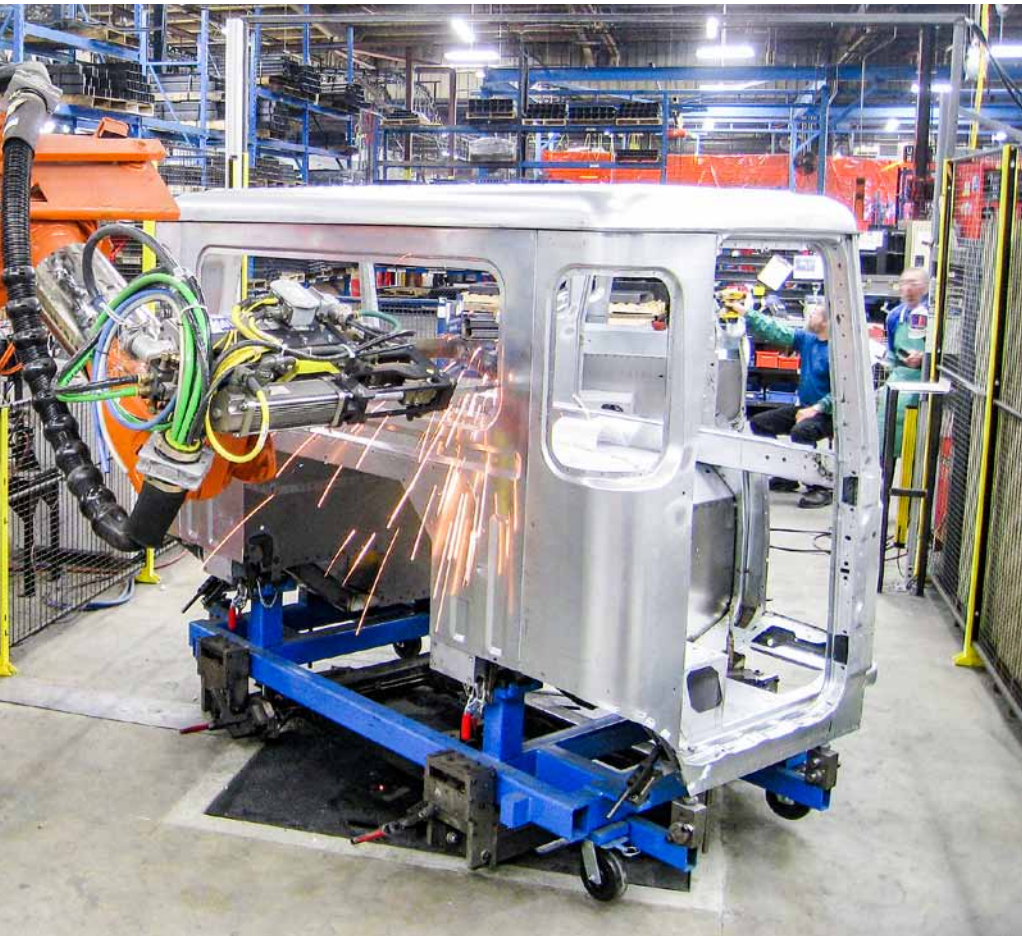
engineer, did some further analysis, ultimately determining that if the truck cab could be repositioned during the welding process, the robot could get to enough of the welds to be a viable option.

The challenge remained to design a system that repositioned the robot effectively but was not overly complicated or capital-intensive.

"After struggling with it for a while, a light came on and we thought a really clean idea would be to rotate the part with a fixture in the floor, sort of like a lazy Susan, turning the cab in a controlled way so the robot could sequentially get to as many welds as possible," Petersen says.

"We talked to ABB and the idea of servos and a robotic servo spot welding system first came up. After some further review, that is the route we decided to take."

A servo is basically a motor coupled to a sensor that provides feedback through a reduction gearbox, allowing for precise position control. Robotic servo welding uses the motor and an encoder as a seventh axis to control the opening and closing of the welding tip. The tip is closed as the torch moves from weld to weld, open-



ing up only as much as needed for each individual spot weld.

As the system was developed for Crenlo, two servos came into play – one servo to control the welding apparatus, and a full servo positioner in the floor to rotate the flat platform on which the truck cab is affixed. An ABB IRC5 controller controls the three primary system components: the movement of the IRB 6650 robot, the operation of the spot welding equipment and the movement of the positioner to present the truck cab to the robot in the optimum position for each weld.

“The system provides a very controlled, precise movement of all parts,” says Dave Minkebigge, the ABB manager who worked with Petersen and Crenlo on the project. “In addition to the coordinated movement of the cab on the floor positioner and the robot, there are a lot of other benefits of servo spot welding, like 30 percent faster cycle time than a pneumatic gun, improved weld process control, lower operational costs and a longer welding tip life.”

A typical pneumatic gun has a control of plus or minus 10 percent in tip pressure, which is a direct result of the plant

air supply. A servo gun properly tuned has a control of plus or minus 2 percent or better in tip pressure. As an example, given the 1,000-pound tip force required for a weld process, the pneumatic gun will deliver anywhere from 900 to 1,100 pounds, while a servo gun will deliver from 980 to 1,020 pounds.

Besides the cost benefits, the more consistent pressure allows the weld parameters to be more tightly tuned, improving the control of the welding process and the overall quality of the welds.

“There continued to be some push-back from our management team until it became clear that the fixture holding the cab wouldn’t need to be all that complex,” Petersen says. “In reality the cab is just pinned at the bottom of the rotating plate. Once the relative simplicity of the entire system took shape, it gradually gained the support of the entire team.”

The support was justified. When the system was initially installed it was able to do 488 of the 2,000 spot welds. The welds that the robot wasn’t able to do were smaller subassemblies, or joints that were covered up when affixed to the cab.

By gaining experience with the system and finding unique ways to move both the robot and the cab, the servo spot weld system is now able to do about 600 spot welds directly on the cab in one cycle. This method of processing is truly unique in the spot welding industry.

Many of the welds the robotic spot welder is not able to do directly on the cab are done in batch mode by a robot on another workstation.

“It takes 14.5 minutes to do the 600 spot welds on the cab,” Petersen says. “We don’t really know how long it would take to do that manually, but for comparison’s sake, the roof reinforcement piece we tested initially has 98 welds that took two people 90 minutes to weld. This takes the robot 3 minutes and 10 seconds and eliminated the ergonomic concern.”

There are many secondary benefits to the robotic spot welder, none more significant than minimizing the potential safety and repetitive motion hazards that could afflict any welders manually applying that many welds.

Carrying the welding equipment while climbing and bending in and around the cab to reach the welds would cause physical stress very difficult to withstand over the long term. Fortunately, the robot does the most difficult welds, while the ones left to manual welders are accessible in far better ergonomic positions.

“Crenlo has always been willing to introduce industrial robots to areas of their operation where the benefits made sense, and, though this was new technology to them, they were open-minded about introducing the robotic servo cell,” Minkebigge says. “We took an operation that would have been incredibly cumbersome to handle manually and significantly reduced the cycle time, vastly improved the quality and consistency of the welds, and provided the flexibility to handle different cab configurations in the future.”

Petersen concludes, “We feel 600 welds per cycle is a great use of our resources, especially since typical automotive spot welding systems do 10 or 12 welds per cycle. We weld between eight and nine cabs per day, plus a handful of subassemblies. The quality is excellent, and none of our welders have to climb all over the cab.”

YuMi for you and me

The world's first truly collaborative robot has had an exciting first year.

Text: ABB
Photo: ABB

Charge it anywhere

A pocket-sized fuel cell charger from the Swedish company myFC uses water and salt to charge a cellphone, without the need to plug into an electric outlet. ABB's dual-armed YuMi robots will produce the power cards starting in spring 2016.

The charger, called JAQ, uses environmentally friendly fuel cell technology to generate electricity instantly for smartphones and tablets. The slim Power-Card introduces a completely new way to charge, since the card and charger can easily fit in a pocket or a purse and can be used anywhere. The electricity is instantly generated when the charger activates the card.

The robots from ABB will initially make production tests and conduct the assembly for JAQ's charging cards, which contain water and salt to generate green energy together with the fuel cell.

Björn Westerholm, CEO of myFC, says ABB's YuMi robots allow the company to control production and also be location-independent. "We are placing the first production facility in Sweden so that we can make sure that the whole assembly and production is 100 percent green using only renewable energy," Westerholm says. "With YuMi, we can be extremely flexible with a variable volume and produce closer to our customers in Europe, the USA, and Asia – or anywhere where we can have a completely green, controllable and high quality-environment for production. The automation also means that we bring down the production cost for the card."



YuMi named "Product of the Year 2016"

The readers of *Elektronik magazine* and the elektroniknet.de website have decided: ABB's collaborative two-armed robot YuMi is number one in the automation category in the competition to select the "Product of the Year 2016."

Collaborative, safe and absolutely precise – these are the qualities that won over the readers who voted in the competition, which featured 111 different products in 11 categories.

"We developed YuMi for customers in the electronics industry who are looking for flexible automation solutions for small parts assembly," says Rainer Benz, local business unit manager for robotics. "The award for 'Product of the Year 2016' is proof that YuMi meets the demands of customers ideally."

As the first truly collaborative robot, YuMi is equipped to work alongside humans in a completely normal production environment. "With its two robot arms, YuMi carries out the movements necessary during small parts assembly in the smallest space," Benz says. "This reduces space requirements to a minimum, and existing work environments can be maintained."

Sony the first UK order for ABB YuMi

Sony UK Technology, a leading maker of broadcast and professional cameras, is the first UK company to order ABB's YuMi dual-armed robot, with more orders coming in. YuMi is ideal for use in small parts assembly, and Sony will use it to pick and place circuit board parts.

"The innovative design and forward-thinking capabilities of YuMi will complement our culture of doing something better today than yesterday," says Kevin Edwards, general manager and head of engineering at the Sony UK Technology Centre.

Colin Dullaghan, product manager at ABB Robotics, says YuMi will open up more opportunities for UK businesses to improve their productivity. "Task sharing between humans and robots is a great way to accelerate production with lead through programming, making the programming stage achievable for staff at all levels in a minimal amount of time," he says.

Continental innovation

YuMi is helping Continental explore collaborative automation opportunities at its plant in Karben, Germany.

See a new video that shows how Continental is pursuing innovative new automation solutions as part of its vision

"The Future in Motion." YuMi is helping Continental explore flexible solutions for adapting to increasingly diverse products and changing automation requirements without the need for safety barriers.

Scan the QR code (right) to see the Yumi robot unlocking new possibilities in Continental's Karben plant.





Quick on the draw

Staedtler, one of the world's best-known pencil makers, relies on ABB FlexPicker robots for agile and precise packaging.

Text: ABB **Photos:** Matthias Merz

Staedtler, established in 1835, is one of Germany's oldest industrial companies. The manufacturer of writing, painting, drawing and other creative materials is especially proud of the long manufacturing tradition "Made in Germany." About 80 percent of the products manufactured

by Staedtler are produced in Germany, and automation has always played a major role. Shortly after the company was established in 1835, the first production steps were already automated. Today, 98 percent of production is partially or fully automated.

"I was impressed by the incred-

ible speed of the FlexPicker," says Martin Paul, head of the packaging department at Staedtler. "I realized immediately that we could make the packaging of our products significantly more efficient using this robot." Paul saw the robot for the first time at the Automatica 2004 trade show. A year later, the first FlexPicker system was up and running at Staedtler. Now that the installation of a second system with similar properties is planned, Staedtler is once again turning to ABB. "The products and services from ABB find our fullest approval," Paul says. "Therefore, our choice once again fell on the FlexPicker." >>



The new system, which was put into operation in September 2015, is equipped with a FlexPicker with a handling capacity of 1 kg and an operating distance of 1,130 mm. The system was implemented by N.K.G. Sondermaschinenbau, and Eule Industrial Robotics, an experienced ABB partner, took on the simulation and programming tasks.

The FlexPicker system allows packaging of various pens and erasers in so-called blister packs – visibility packaging with a printed carton back and a transparent plastic front. The products that require packaging reach the system via a conveyor belt. An integrated camera system detects their position and orientation and reports this data to the robot control. By means of a suction gripper, the FlexPicker then picks up the pens and eras-

ers with precision and places them in the blister pack as it passes by. All this takes place at a very high speed: The robot can perform up to 120 pick-and-place cycles per minute.

Of particular advantage for Staedtler are the short changeover times. The operator needs just five minutes to set up a new job, and there is no need for elaborate training. All products running on the system are already stored in the robot control and only need to be selected during changeovers. “Especially during the peak season, the time when school starts, we require extreme flexibility to be able to respond quickly to possible shortages,” Paul says. “Thanks to the short changeover times of the FlexPicker system, this is no issue at all.”



Currently, 145 different products are packaged on the system. Since the grippers of the FlexPicker can also be replaced during the changeover process, it is possible to grip individual products as well as presorted sets consisting of several products.

Staedtler has entered into a maintenance agreement with ABB covering one comprehensive maintenance a year for the FlexPicker that is in operation. “The ABB robots in our production run reliably and without downtime,” says Andreas Martin, head of production in Nuremberg. “That adds up to 10 years for the older robot by now. We are more than happy about that.” Staedtler intends to collaborate with ABB on future automation projects as well.”

About Staedtler

Staedtler was established by Johann Sebastian Staedtler in 1835, and it is one of Germany's oldest industrial companies. The headquarters of the group of companies are in Nuremberg. More than 1,200 people work there and at three other production sites in Germany. Staedtler products are distributed in more than 150 countries. The company generated revenues of 285 million euros in 2014.

Innovative new products from ABB

SCARA offers big package in a small footprint

The Selective Compliance Articulated Robot Arm (SCARA), or IRB 910SC, is a single arm robot capable of operating in a confined footprint. SCARA is ideal for small parts assembly, material handling and parts inspection. It is available in three configurations, with individual reaches of 450, 550 and 650 millimeters, so customers can choose the best arm for the job.

While small in size, the IRB 910SC incor-

porates the same high performance and design concepts as other ABB small robots, such as superior path control and accuracy in a small footprint. Robots in the SCARA family are designed for a variety of general-purpose applications requiring fast, repeatable and articulate point-to-point movements, rapid cycle times, high precision and high reliability.

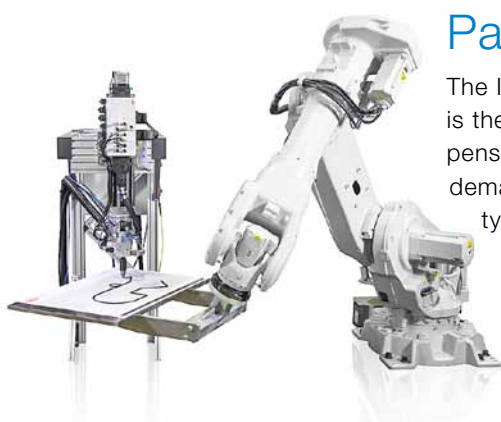


Integrated Dispensing Function Package saves time and money

The Integrated Dispensing Function Package is the world's first fully integrated robotic dispensing system. Designed to meet a growing demand for quality, flexibility and productivity, it delivers up to three times the speed of conventional gluing and sealing systems. As the only solution on the market to fully integrate the dispensing control process into the robot controller to increase performance and mini-

mize risks, it can do wonders for productivity.

Because the function package is integrated into the internal motion control system of the IRC5 industrial robot controller, it automatically knows the robot's next move, allowing it to dispense materials with greater precision and accuracy than traditional solutions. The package is a headache-free solution that combines speed and quality to reduce cycle times as well as costs.



IRB 8700 – fast and cost-efficient

The IRB 8700 industrial robot is designed to be highly reliable with a low total cost of ownership. It also delivers speeds that are 25 percent faster than any other robot in its class size. It comes in two configurations, one with a reach of 4.2 meters and a payload of 550 kilograms, and another with a reach of 3.5 meters and a payload of 800 kilograms.

The IRB 8700 will run with very high uptime – a key feature in production lines that operate around the clock. It has fewer components to fail while it delivers shorter cycle times and higher accuracy. In addition, thanks to superior motion control at high moments of inertia, the robot can adapt or slow its speed to accommodate heavy and wide parts.



ABB Robotics is expanding its LeanID portfolio to include IRB 7600 and IRB 6650S.

ABB Robotics' semi-integrated LeanID Dress-Pack cabling solution offers customers a number of advantages. These include safer simulations and enhanced availability and flexibility in production.

The option, which was previously available on the IRB 6640, IRB 6700 and IRB 8700, has now also been introduced on the IRB 7600 and IRB 6650S in order to harmonize the product portfolio and simplify the market offering. Its introduction has maximized synergies on the IRB 6700, resulting in the reuse of more than 90 percent of the IRB 6700's DressPack.

This major harmonization not only provides optimum coordination of spare parts for customers, but it also provides an opportunity to improve delivery lead times for complete robots and spare parts, as fewer parts need to be handled.

The introduction also means that LeanID can be retrofitted onto the IRB 6650S and IRB 7600 in the future.

LeanID has been available on the market since 2012, and more than 2,000 robots equipped with LeanID have been delivered to satisfied customers throughout the world.



Demystifying digitalization

Automation complexity today is greater than it has ever been. So is the importance of mastering this complexity.

Text: Philip Lewin, ABB **Photos:** Nest Labs & Getty images

The consumer Internet of Things (IoT) is already familiar, from wearable technology and personal fitness devices to connected homes. But in the industrial arena, IoT remains a disruptive and daunting topic for many. This is not likely to last long, with the number of B2B IoT connections projected to grow from 1.5 billion today to more than 5 billion by 2020, and with several consecutive years now of record-breaking R&D investments and acquisitions.

Many manufacturers naturally have concerns about the shift toward digitalization, from cyber security and data privacy to the risk of integrating digital technologies into efficient “analog” production lines. Loss of connectivity or data integrity for personal electronic devices is often nothing more than an irritating inconvenience, but in an industrial setting it can raise serious business continuity risks.

Lack of a clear digitalization strategy is especially common in small and medium-sized enterprises that do not have the in-

house expertise to bridge IT and manufacturing, or the free capacity to experiment.

At the same time, it cannot be assumed that “business as usual” automation is enough to maintain competitiveness. Companies that under-invest in productivity improvements risk losing their edge against peers that are taking advantage of more efficient automation technologies to reduce costs or serve customers better.

Robotics Tomorrow offers the interesting observation that many of today’s factories are like personal computers before the Internet. They worked well for their intended, standard tasks such as word processing or spreadsheets, but upgrading their performance or reacting to new information required manual human intervention. In the same vein, many factories today lack the ability to capitalize on data without manual intervention – adapting production to real-time demand changes, or optimizing the response to unplanned stoppages.



The shift toward digitization is more than simply connecting additional devices to the Internet. ABB views this change as part of an interconnected ecosystem it calls the Internet of Things, Services and People (IoTSP). The focus is not IoTSP itself, but rather on the gains in productivity, flexibility and reliability it provides. According to SparkLabs, B2B companies that use such technologies in their operations are expected to be 10 percent more profitable.

The IoTSP can be demystified into a few basic benefits that all contribute to greater manufacturing competitiveness:

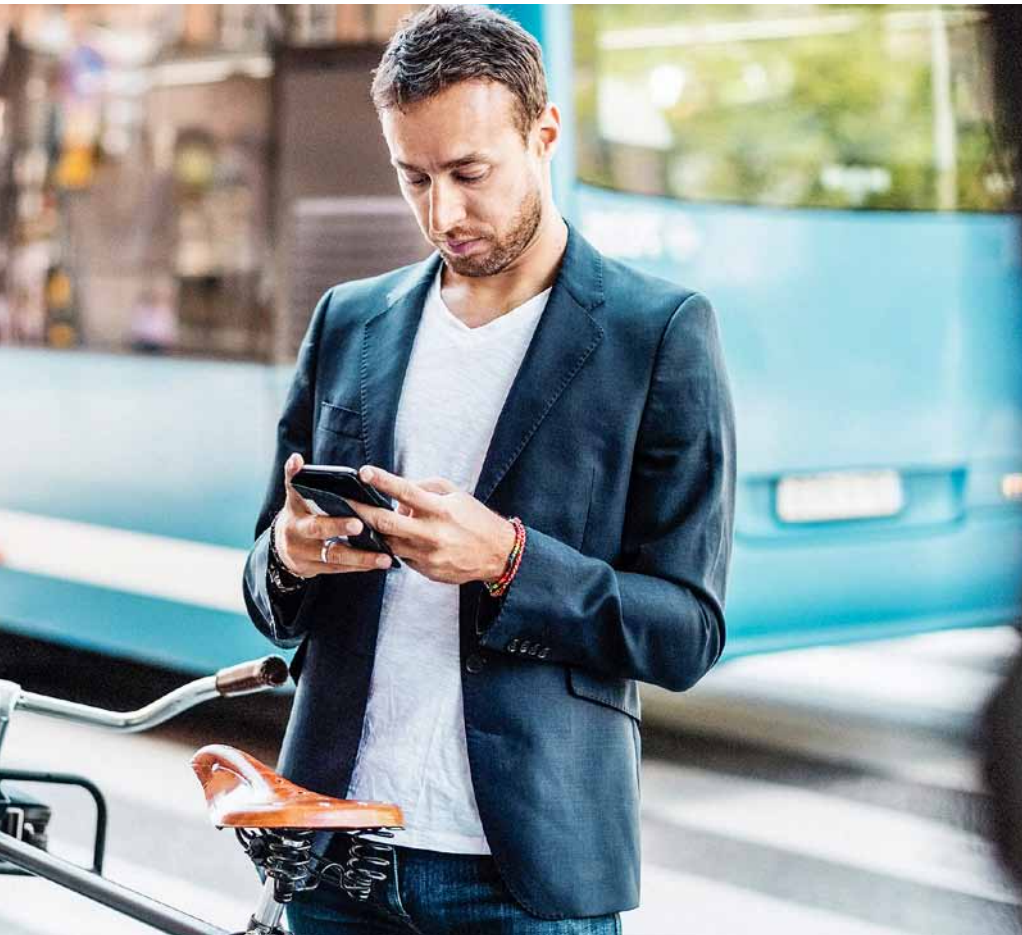
More efficient engineering

Engineering and commissioning often make up the bulk of new production costs, while machines and equipment are typically less than a third of total costs. Yet a large number of firms focus on hardware costs when evaluating line extensions.

Combining virtual and physical devices is a hallmark of IoTSP. Control systems can be built using virtual models that share engineering libraries and interoperable functions with virtual robots, drives, programmable logic controllers and safety systems through software such as ABB’s RobotStudio. Tools and fixtures can be verified, bottlenecks can be identified, and



The Internet of Things is a growing part of our everyday lives.



lines can be modified without disrupting a precious minute of production.

The rise of collaborative robots

Connectivity, easier programming and safe designs are allowing people and robots to work side by side on shared tasks for the first time. Previously robots had to operate behind safety barriers, which required the automation system and cells to be designed around the robots.

Collaborative robots can be deployed quickly in workplaces designed for people, and their flexibility for productivity in an unstructured environment will help unlock many new applications.

This flexibility is important for supporting the shift from high-volume, low-mix production to the “new normal” of low-volume, high-mix production in consumer segments such as food and beverages. In addition to assembly, collaborative robots offer the possibility of integrating separate islands of automation, such as moving fragile electronics from clean production environments to logistics centers for shipping.

Devices become more intelligent

Robots do not only need to collaborate with people. To achieve their full potential

they also need to interact with production systems to understand their operating context and share information back to the overall plant. IoTSP-enabled robots such as ABB’s YuMi will be able to upload “learned” manufacturing skills into the cloud, where they can be shared with other robots and people.

As the need for centralized intelligence and control gets smaller, there will be a new wave of smarter devices that use a type of artificial intelligence called machine learning. This is largely based on pattern recognition, where a robot “learns” and becomes better by recording and analyzing the results of its actions to avoid repeating mistakes and to increase successful actions.

Advanced, connected robots can also make better decisions for more complex tasks: trimming irregularly shaped pieces of meat for the greatest yield and quality, or installing small electronics at unusual angles in a car dashboard while accommodating many different customer-selected options.

Simplicity

As automation processes and needs become increasingly complex, it is important that the user experience remains intuitive

and actionable. Today very few people read the manual when they get a new mobile phone. They upload their applications and contacts from an old device and then spend a few minutes exploring the menus. In the future robots will need this level of simplicity, especially to remove entry barriers for a wider range of new users.

Today many robots can be programmed by demonstration – for example, “lead-through programming,” in which an operator positions the robot for required process moves and records the movements on a tablet. This can reduce programming time from hours to minutes.

At the same time, IoTSP can help to make sure users are not overwhelmed with needlessly complex interfaces or too much data. This includes virtual and augmented reality devices for interaction with virtual robots, intuitive operator panels and actionable alarms sent to mobile phones when service intervention is required.

Reliability

One of IoTSP’s most compelling benefits is the use of predictive insights from past performance under real operating conditions to keep equipment from breaking down. Instead of maintenance schedules based on arbitrary operating hours, service can be planned based on the actual condition of the equipment, and robots can be monitored remotely from anywhere in the world.

Behind IoTSP’s connectivity and processing power are millions of sensors that can fill the data pipeline with information such as robot proximity, motion and acceleration. AIG reports that the cost of an accelerometer has fallen from \$7 in 2007 to around 50 cents today. Smart companies are mining this data for backup, reporting, diagnostics, benchmarking and analytics. According to the ARC Advisory Group, the cost of corrective maintenance is twice the cost of preventive maintenance and 10 times more than the cost of predictive maintenance.

At an enterprise level, this enhanced transparency allows fleet analysis, where historical information for a manufacturer’s and ABB’s entire installed base of robots improves performance. This analysis can help prioritize maintenance activities and uncover hidden relationships between production events and equipment errors.



A collaborative future starts with You and Me.

Today's relentless markets demand automation solutions that are more flexible and agile than ever before. YuMi®, the world's first truly collaborative robot, is part of ABB's vision for a future where people and robots work safely and productively side-by-side to unlock entirely new assembly possibilities. It's part of the exciting new reality we call the Internet of Things, Services and People. Is your plant ready?
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