

PLASTICS

A MAGAZINE FROM ABB ROBOTICS

SEPTEMBER 2007

PUT YOUR TRUST IN TOUGH ROBOTS

Says TI Automotive > 14-16



Break-the-mould
toilet seats are
made the high-tech
way at MKW

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Letter perfect
plastic containers
for the Swiss Post

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Switched on
at Kabeldon's
new disconnecter
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ABB

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Editorial

User friendlier

> The use of six axis robots in the plastics industry continues to increase with new solutions arising every day. For example, a new constellation that has caught the interest of the industry is the use of one robot for two injection moulding machines. This is an excellent way to make use of the flexibility of the 6-axis to perform different downstream applications while reducing investment costs and increasing future flexibility.

There is a growing interest in how to add value to products produced by improving downstream applications. Now extensively used in smaller companies, 6-axis robots are also increasingly used in those countries with the fastest growing economies. In these situations, ease of use is crucial, and this is a reason ABB focuses on this issue, providing user-friendly platforms such as RobotWare Plastics which enables easy programming and operation of the robots on the shop floor.

The Machine Tending PowerPac, based on ABB's simulation software RobotStudio, is another easy-to-use solution that has long been requested from the industry. With the PowerPac, you can create your first simulation ever in less than 30 minutes.

ABB is committed to serving the plastics industry globally and you will see more and more dedicated products being launched that will not just help make using robots easier, but will help you stay competitive in your market.

Tore Lindström

Segment Manager Plastics
ABB Robotics

Calendar

2007 & 2008

24–31 October

K 2007
Düsseldorf, Germany

21–23 November

SF China
Shanghai, China

6–10 December

Plastivision
Mumbai, India

16–17 April, 2008

Plasttechnik
Malmö, Sweden

10–13 June, 2008

Automatica
München, Germany

7–10 October, 2008

Ausplas
Melbourne, Australia



Robot shakes hands at K 2007

> The K 2007 in Dusseldorf, Germany on Oct. 24-31, 2007, gives visitors a chance to inspect firsthand the multitasking capabilities of robotic automation in the plastics industry. Visitors can lead an IRB 140 robot by the hand to demonstrate how easy it is to program the machine. The ABB stand will be at C39 in Hall 11. Read more at www.k-online.de



Robots speak Korean

> Schefenacker Poong Jeong in Korea has invested in an automated solution for extracting car side mirrors, employing an ABB IRB 2400 robot. This is the first robotized solution for this application in Korea. The robot has been easy to use, according to Schefenacker Poong Jeong, since Korean language is available in the controller. Due to the success of the solution, Schefenacker Poong Jeong are planning for further automation of their facilities.

Schefenacker supplies automobile parts to Hyundai Motors, Kia Motors, GM Daewoo and SangYon Motors. Read more at www.schefenacker.com

Easy unloading in Taiwan

> Last year Taiwanese TYG installed an IRB 6650S robot with the software RobotWare Plastics for unloading bumpers from an injection moulding machine. This was the first installation with RobotWare Plastics both in Taiwan and Asia.

TYG has since purchased an additional two ABB robots, one for the TYG Tainan factory and another one for the TYG Chang Chun factory. Says TYG R&D Director Guann Chen: "After installing the ABB robot we save 10 seconds on cycle time and 0.5 labor. The result is beyond our original expectation. As to RobotWare Plastics, we do not need to write any instructions anymore. The work is easily done by setting up some paths. Further more it is quite simple and convenient to use the touch screen. In a very short time a new model of bumper programming can be finished. It is truly handy."

Read more at www.tyg.com.tw

Boom in waterjet cutting in Japan

> ABB Japan has sold 38 robots to Rosecc and 15 to Hayashi Telempu for water jet cutting. The speed and path accuracy of the ABB robots make them very suitable for complicated cutting applications. Rosecc delivers not only to Toyota Group but also to Nissan affiliates. Rosecc also has seen an increase in delivery to overseas. Hayashi has adopted ABB robots for nearly 100 percent of its water jet cutting.



Paint robots for better quality

> In 2003, injection moulding specialist Wuhan Liaoyuan spent over one hundred million Yuan building the first automatic painting line for auto plastic parts in Central China with six IRB 5400 paint robots from ABB. Liaoyuan recently added to its painting line with six more IRB 5400 paint robots to increase capacity and productivity.

"Robots are capable of handling complicated profiles," says Zhou Yu, Equipment Manager of Liaoyuan. "It was difficult to improve quality and capacity with manual labor. Now, with these agile robots, our coating film thickness is ensured with better quality and doubled capacity, and the cost for a single part is reduced by 20 percent."

Read more at www.whlymp.com

Robot-Technology celebrates 100 robots



> German ABB partner Robot-Technology has sold 100 robots since its start in 2001. Robot-Technology specializes in laser cutting and has customers all over the world. "Laser-cutting robots for plastics are now our core product," says Stefan Maier, CEO for Robot-Technology, "but we also make robots that load and unload injection moulding machines, and robot units that assemble and glue clips."

Read more at www.robottechnology.de



Finnish Fiskars has carved itself a great niche in scissors, axes and other metal cutters. It's one of Finland's oldest companies, and it truly is where past meets present, and even the future.

Running with s

> The Fiskars village where the company was founded as ironworks in 1649 is an idyllic little village about an hour's drive from Helsinki. The old school and the mill are still there, as in a time capsule.

There's no Fiskars ironworks anymore, not there, not anywhere. In 1832, Fiskars founded Finland's first cutlery mill and the production range increased from knives to include forks and scissors.

Forty years ago, Fiskars launched the world's first plastic-handled scissors, and it's been running with them ever since.

These days, there are two production units about a kilometer away from the old cutlery mill, where



scissors, gardening tools, knife sharpeners, and axes are assembled. The older one of them was built as a scissors plant in 1973. When the demand was at its best – and when not every household in the Western world had a pair of them – over seven million pairs of scissors were manufactured there, says Carl-Olof Holm, technical director at Fiskars.

“Today, we manufacture about a half a million pairs of scissors here, but also 850,000 axes, and hundreds of thousands of gardening tools, to name a few of our products. A knife sharpener has the biggest production, measured in units produced,” he says.

Fiskars is a global player in its niche – 91 percent

By Risto Pakarinen
Photos Jaakko Jaskari



cissors

of its 535 million euro net sales come from outside of Finland – and high quality is its weapon against the cheaper manufacturing. High quality in everything: products, processes, R&D, marketing.

Good and practical design and innovative solutions have been one of the cornerstones of Fiskars products, and the company's products have claimed

dozens of awards at design fairs around the world.

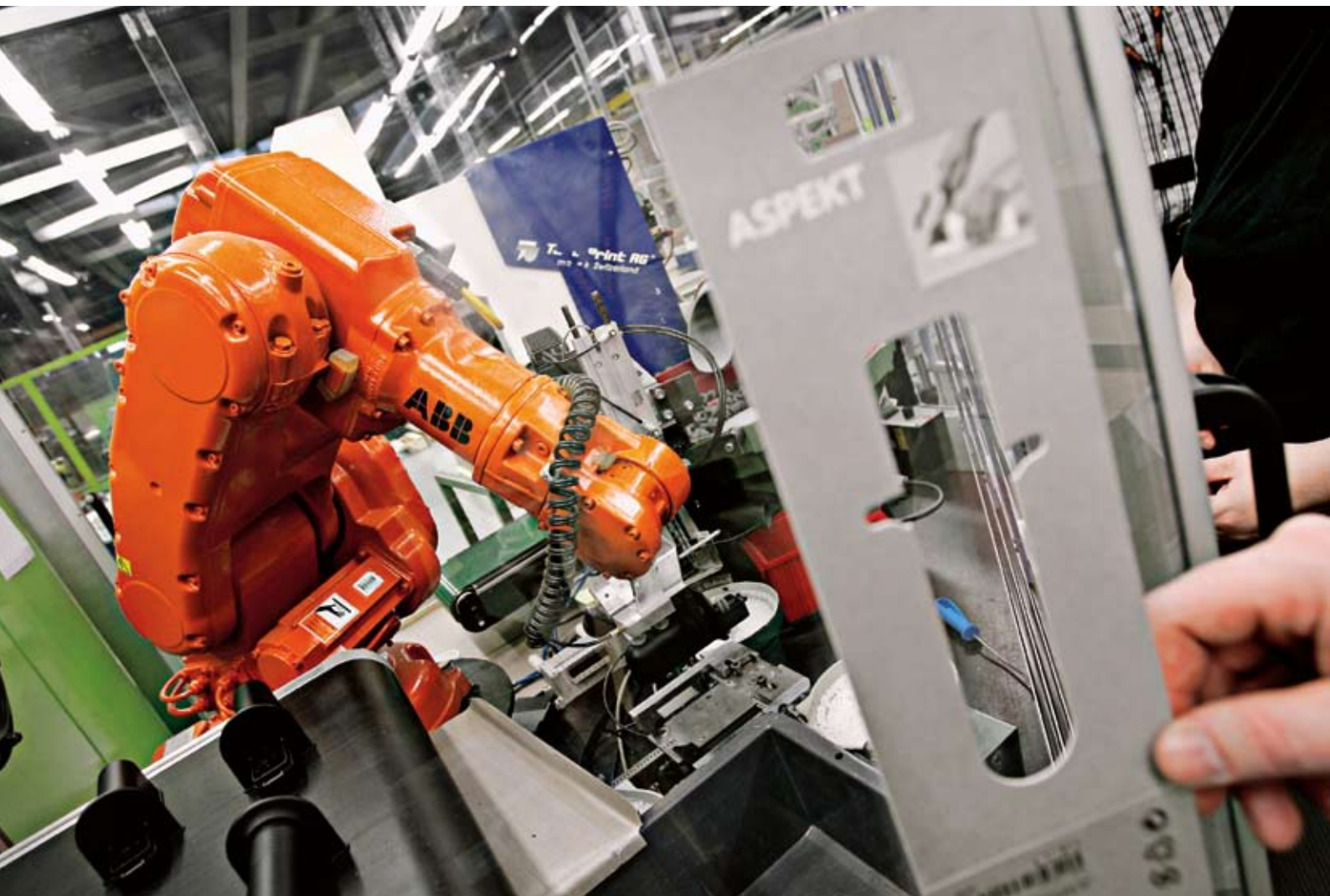
"Our success is built on our ability to innovate. Our products are unique, not quite in the mainstream, and simply the best cutters in the world," says Holm, and gives an example.

"When you're trimming a tree, you need most power when you're about 60 percent through, and

"We like to build the robot cells as flexible as possible..."

Carl-Olof Holm, Fiskars





our trimmers work in a way that helps you get that power where you need it," he says.

The success story, or at least the modern part of it, started with a successful marriage of plastics and steel, and that's still in the core of it.

There are eight robots in the injection moulding section of the production. They typically lift the handles of the gardening tools, feed them to the assembly, print the company logo on them.

The biggest, and newest robot cell, has two robots working in harmony, putting together garden cutters. The IRB 2400L feeds the handles onto the line and again onto packaging while the IRB 140 adds

Some eight robots work in injection moulding, producing handles for gardening tools, for example.

the blades and bolts into the mix. And then the IRB 2400L takes over again and sends the finished product onwards to be packed.

With close to a dozen different phases, the speed and accuracy is impressive.

Making scissors may sound simple. A pair of scissors is a pair of scissors, right? Wrong. Fiskars makes close to thirty different kind of scissors, in different sizes, and blade shapes.

They are loaded on a conveyor belt to be examined by an IRB 140 with 3D "vision" that enables it to pick the blades up from a pile and then sort and turn them so that they enter the heat treatment correctly. The blades then enter a gigantic oven with a temperature up to 950 degrees for a heat treatment that guarantees the perfect curve for the pair of scissors.

They can't be just two straight blades, because then the paper, or whatever you're cutting, gets stuck between them, explain Johan Holmberg and Harri Engström who make sure that the production robots stay in shape.

Before the two blades meet the plastic and become a pair of two-handed garden cutters, they go through another IRB series robot that sharpens the edges.

"It does an edge that's only about some fractions of a millimeter in a tiny degree angle," says Holm-



>FACTS

Advantages of the robots include:

- Flexibility of producing nearly 30 different scissors models with quick changeovers
- Better production saves money
- Precision that allows for fractions of a millimeter differences
- Safer for employees and environment
- Uses 30 percent less Teflon than the previous set-up when coating ax blades

Old company, new products

Fiskars is one of Finland's oldest companies, established in 1649. Fiskars Corporation includes the subsidiaries Fiskars Brands, Inha Works, and the Real Estate Group, and it also owns a major share of Wärsilä Corporation, an engine manufacturer.

Fiskars employs around 3,000 people around the world. In 2006, its net sales were 535 million euros.

Fiskars Brands has four consumer product divisions: Craft; Garden; Housewares; and Outdoor Recreation. Inha Works manufactures Buster aluminum boats, hinges, and forged products mainly for the Nordic markets.

The Real Estate Group administers the company's holdings of land and buildings, for example, the Fiskars Village.

Web site: www.fiskars.com



Fiskars makes close to thirty different models of scissors, along with other products such as axes.

berg about the robot, also known at the plant as “Little Johnny” – the identical twin next to it is called “Little Daisy.”

Even though the products are fairly similar, they're not the same, and that poses challenges for the manufacturing.

“We like to build the robot cells as flexible as pos-

sible so that we could switch the lines fast or assemble several products at the same time,” says Holm.

“The latest one has two different shaft lengths, and three different blades, so we can manufacture six different products quite easily,” he adds.

At Fiskars, past and present meet and enjoy each other's company. The axe is one of the first tools man has ever made, but the seven different axe models that Fiskars manufactures are state of the art.

“The latest development is the Teflon coating that makes it easier and lighter to use,” says Engström.

The axe blades come to the coating station attached to large hangers. The robot, an IRB 540, sprays the Teflon, the hangers turn, another coat on the other side, and so on, until all twenty blades have got their coating.

“This robot is so accurate that it uses 30 percent less Teflon than the one we had before,” says Engström. “Not only is it great for us financially, it's also made the process safer for the employees and it's more friendly to the environment.”

A truck stands at the shipping area waiting to be loaded. The newly built warehouse is only half full, but in this case it's a good thing.

The old lady of Finland manufacturers still has it. Cutting edge. 🍷





There are three functions for robot No. 3: labelling, checking and stacking.

Boxes made ugly but smart

When the Swiss Post decided to further automate its letter handling and needed 2.4 million plastic containers as part of the process, it turned to materials handling specialist Georg Utz AG. The containers are not just strong, easy to stack and track, they are also ugly – the better to discourage thieves.

By Karin Ghitti
Photos Karin Ghitti

> FACTS

About Georg Utz AG

The Georg Utz AG company in Bremgarten is one of eight subsidiaries of the company grouping contained under the umbrella of the Georg Utz Holding AG. One of the leading manufacturers of storage and transport containers and plastic pallets, Utz employs 750 staff worldwide, including 190 in Bremgarten, and had a turnover of 180 million Swiss francs in 2006. Web site: www.georgutz.ch

> Since its founding in 1849, the Swiss Post has undergone a range of radical changes – everything from the first letters sent by train and airplane, to partial privatization in the late 1990s. The latest change, which started in 2006 and will continue to 2008, is the opening of three new postal centers as well as six sub-centers, where the processing of the letters will be mostly automated. The Swiss Post is investing around a billion Swiss francs in the re-design of its postal centers, and this major strategic project has become urgent due to the demands of the deruglation of postal mail.

As part of the new plans, the Post has ordered 2.4 million letter containers from the plastics technology company Georg Utz AG, to be delivered within three years. In the future, the containers will replace the bags in which letters have traditionally been transported. “This is the largest order in our company’s history, which by now spans 60 years,” says Chris-



The postal containers are stacked seven meters high in the storage hall.

troph Zimmermann, production manager at Georg Utz AG, which is based in Bremgarten, Switzerland.

The 11-million-franc (EUR 6.7 million) project will be quite a challenge for Utz. Along with the huge volumes ordered, several demands that pose special challenges for the company such as being to nest the empty containers to save space. They must also be capable of supporting loads of more than 15 kilograms for a long period without the plastic bottom sagging. In addition, every container must be equipped with a yellow marking that will serve as an orientation guide for stacking and with two barcode labels for unique identification.

Last but not least, the Post made a highly unusual request: "The containers should be ugly, if possible," Zimmermann says, smiling. There's a very good reason for this, he says: "Dozens of containers are stolen every day, because they're so useful in everyday life. In future, the Post would like to nip this in the bud."

Meeting very specific customer requirements are a speciality for Utz. And so the Utz experts set out to design a "grey mouse" to join its other plastic container designs, albeit one with a sophisticated interior and stack and nest function. The post-processing of the production of the mail containers posed a new challenge for the team, however: The containers need to be fitted with the special requirements of the Post, i.e. double plastic bottoms, divider, yellow markings and barcodes in just a few seconds of cycle time.

Whereas linear robots had been used by the company to execute rigid geometric workflows with any special fittings needed to be mounted by hand, for

Straight talk with Christoph Zimmermann, production manager at Goerg Utz AG

Why did you choose an ABB robot system?

With volumes like these, an investment in automating the process was worth it. Several factors contributed to our selection of ABB: For one, we've already had good experiences with ABB. For another, ABB convinced us in the bidding phase with their robot simulation. Also, the contacts at ABB as well as their price persuaded us. Another decisive factor was the proximity of ABB to our factory in Bremgarten.

Are you happy with the new system?

Yes. The robots' work is just about flawless. This is especially important for the coding of the containers, so that the letter containers get to the right place in the postal system. With automation, we work much faster and more systematically. We can use the manpower that we save in this way for other, more sophisticated tasks.

The robot system was designed especially for the Swiss Post order.

What happens to the robots once the project is finished?

The construction and operation of the manufacturing cell makes it possible for us to gain much experience and to realistically estimate the economic use of 6-axis robots. In the future we will use the robots for similar post-processing steps. The challenge then will be the flexible use for different container models and amounts.



Christoph Zimmermann

the new containers an articulated robot was capable of carrying out these complex tasks in the required time. Utz set the highest standard: The robots should have no more than 13 seconds to provide the injection-moulded containers with the specified functions. The answer was an ABB Robotic Unit, which was awarded the contract for the new robot system.

To solve the problems involved in the complex manufacturing of the containers, ABB project manager Marcel Rieder conceived a sophisticated process using two IRB 4400 robots and one IRB 6600 robot using Robot Studio, ABB's simulation tool, which saved time and money. The task turned out to be relatively complicated. "We had to integrate many different functions and were only able to test the system on-site," Rieder explains. "The time requirement in particular turned out to be a tough nut to crack."

The initial teething problems of integrating the robots into the overall system leave no trace today – the three ABB robots rub metal elbows in a small robot park: Robot No. 1 takes two reinforcement plates and two vessels from the conveyor belt and places them in the welding machine. Robot No. 2 takes the boxes and operates two stamping machines that apply yellow markings and the Swiss Post logo. Finally, robot No. 3 has its turn, inserting the divider, applying the barcodes that are later used by the sorting system to identify the containers, checking them and stacking the finished containers on the pallet. An Utz employee finally transports the pallets into the storage area in which the containers are stacked seven meters high until delivery. But not for long: since spring 2007, they are criss-crossing Switzerland filled with the mail of Swiss Post customers. 📍



>FACTS

MKW Plastics at a glance

Headquarters: Weibers, Austria

Locations: Haag am Hausruck (Austria), Presov (Slovakia), Ermolino (Russia)


Revenues: EUR 37.2 million

Employees: 380

Products: Duroplastic and thermoplastic toilet seats, plastic, metal and wire accessories for bathroom, toilet and kitchen, moulds, tools and functional components for windows and sunblinds

Number of ABB robots: 14

Web site: www.mkw.at



Benefits of robot production

MKW has seen significant improvements by using ABB robots in their production:

- Production cycle time reduced by 80 percent
- Employees per plastic injection moulding machine reduced by 66.7 percent
- Programming time reduced by 80 percent
- Safer working environment

Plastic goes Fantastic

Family-owned MKW company has long integrated industrial robots to expand globally and become a cutting-edge leader in a market niche which has gone high-tech: toilet seats.

> In 1960, a tiny metal and plastics processing firm was established in Weibers in Upper Austria with just a few workers. In the meantime, MKW Kunststofftechnik (MKW Plastics) has emerged as the undisputed market leader in Austria for toilet seats, a major player in Western, Central and Eastern European markets, and a global exporter to Middle Eastern and Asian markets.

Its 380 employees post annual revenues surpassing 37 million euro, manufacturing 1.5 million duroplastic or thermoplastic toilet seats and 1 million square meters of powder coated surfaces annually, along with bathroom, toilet and kitchen accessories made of plastic, metal and wire as well as moulds, tools and functional components for windows and sunblinds. Production operations have been expanded to Haag am Hausruck, Austria (1984), Presov, Slovakia (1994) and Ermolino, Russia (2003). Major multinationals such as Internorm, Actual, Gaulhofer, Laufen, Villeroy & Boch, Bosch, Neff and Siemens rank among its customers.

In part, this impressive success story is due to exploiting state-of-the-art plastic injection moulding technologies, in-house design, mechatronic and

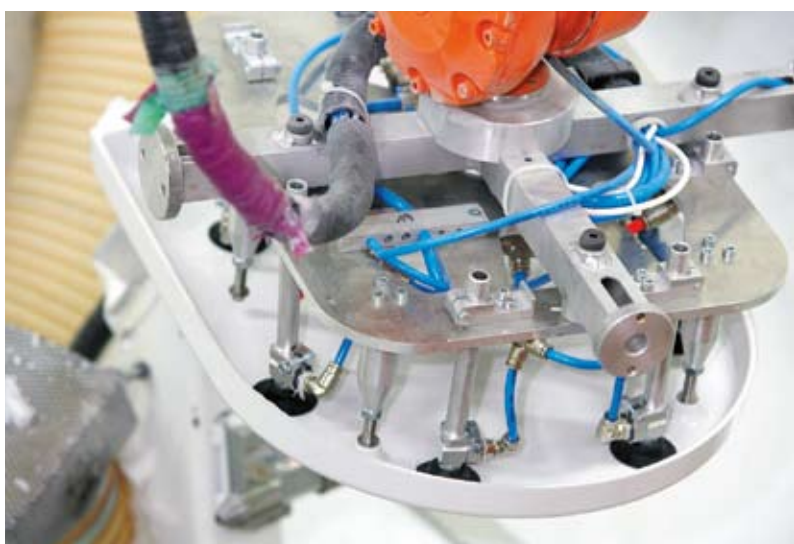
programming capabilities and innovative strength along with production and cost optimization measures. However, a crucial breakthrough in the toilet seat segment was first achieved when MKW became an Austrian forerunner in the use of industrial robots in the year 1987.

At that time, MKW personnel still did the final grinding and processing of the toilet seats manually. Achieving uniform quality was a major issue, staff costs and the level of discarded waste materials were high, and up to 20 percent of production time was lost to interruptions in the production process.

Today, MKW uses IRB 2400 and IRB 4400 robots supplied by ABB Robotics. Over the last two decades, the robots have helped MKW achieve a six-fold increase in revenues and a five-fold rise in toilet seat production. Production cycle time was cut by one-fifth, total waste material has dropped to 2 percent, machine shutdown time is now close to zero, and each injection moulding machine requires significantly less man power than three years ago. "Our investments in ABB robots have paid off handsomely and given us a clear-cut competitive edge," says Hannes Danner, managing director of MKW.

Within the context of an increasingly globalized world, many European companies have long shifted production to low-cost, low-wage markets, primarily in Central and Eastern Europe or Asia. Interestingly enough, the robots enable MKW to remain competi-

Hannes Danner, managing director at MKW, below left. Deburring of the toilet seat rims by an IRB 2400 robot, below right.





The IRB 2400 robots can be reprogrammed for a new toilet seat model in only 15 minutes.

tive in Austria, a country with high labor costs.

"They provide the bottom-line cost advantages, flexibility, top quality and increased productivity required to enable us to compete with emerging markets with regard to price. In addition, Weibern has not only remained our corporate headquarters, but serves as the know-how, design and product development hub for the entire Group," Hannes Danner says.

Moreover, the robots have provided the basis for MKW to keep pace with a rapidly changing business environment. Two decades ago, the product portfolio featured five types of toilet seats, available in a handful of colors. Today, MKW manufactures 50 different varieties in 30 colors, catering to virtually every taste, wish and price category. Rising living standards, increasingly sophisticated consumer demands, changing fashions and tough international competition now force the company to design and produce 15 new models of toilet seats each year, and develop completely new product lines every two to three years.

Trend-setting MKW innovations have included removable, fast fixing, height adjustable, automatic closing and designer toilet seats, as well as seats with antibacterial action and soft surfaces.

The robots ensure the level of precision needed to integrate these new technologies and functions, not to mention additional advantages such as creating a safer and cleaner working environment, reducing the strain on employees, enabling them to shift to more sophisticated work such as monitoring or programming and thus increasing employee motivation. The robots can be reprogrammed to manufacture a new model in 15 minutes.

Every 140 seconds, granulate is automatically fed into the eight duroplastic injection moulding machines, which then apply 400 tons of pressure at temperatures of 145 degrees Celsius to produce up to 2,000 toilet seats and lids daily. A conveyor belt brings the toilet seats to the eight ABB IRB 2400

robots, which use a high frequency spindle (44,000 rpm) to automatically grind and debur the rims, remove the sprue from plastic castings, and add buffers to the seats and lids, ensuring a high uniform level of quality for each unit produced. The toilet seats are then checked, final adjustments made and packed.

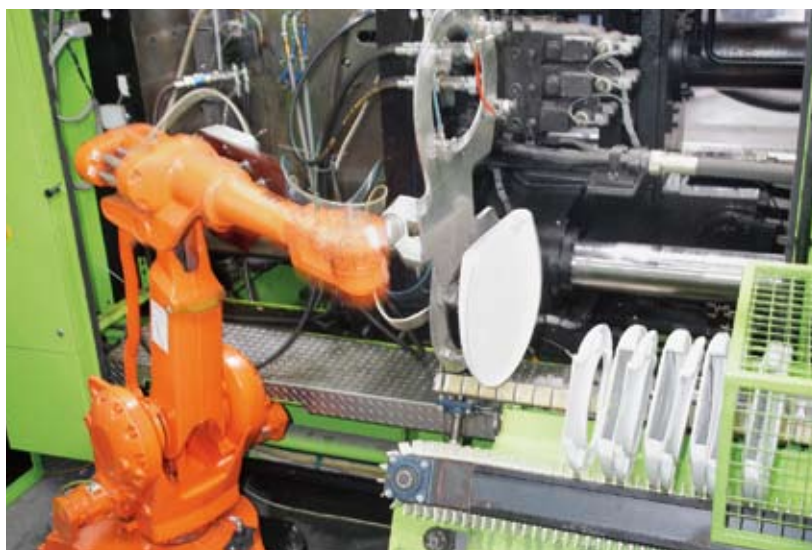
Each plastic injection moulding machine is electronically linked to a robot to ensure precise coordination. Thus, there are few production stops, except to reprogram the robots or change the machine tools used.

In addition, a production data collection project called Manufacturing Execution System gathers data from the plastic injection moulding machines and robots in an SQL data base and subsequently visualized online using ABB WebWare in order to achieve quality improvements.

MKW is not resting on its laurels. It is looking to expand even more to the high-growth markets of Central and Eastern Europe, which now account for 30 percent of its revenues, and further expand its partnership with ABB Robotics Austria. "The cooperation with ABB in project implementation is comprehensive and efficient, and the after-sales service is excellent, above and beyond normal standards," says Stephan Raab-Obermayr, Automation Manager at MKW. This year, MKW is once again a high-tech trend-setter, becoming one of the first companies in Austria to use Function Package Force Control Machining, which ABB recently launched in June 2007. The new generation of ABB robots featuring sensitive intelligence allowing the robot to adapt to the surface contour and consistency of the materials, will allow for a more perfectly deburred rim and more precise polishing, eliminate the need for manual finishing work and the constant readjustment of robots, and save up to 30 percent in overall finishing costs. ☉



Stephan Raab-Obermayr, automation manager at MKW, says ABB's after-sales service goes beyond expectations.



Better painting with less paint

Italian automotive supplier Ranger's new paint line features robots that have reduced production times by 50 percent.

> When Ranger, an Italian automotive supplier working with Audi, BMW, Porsche, Maserati, Volkswagen, Ferrari and others consolidated its painting line activity, it realized that it was no longer financially feasible to work so much manually. Despite highly qualified workers, it was impossible to achieve the consistent high quality needed.

"At that point, everybody agreed that the corporate objectives were no longer compatible with manual painting and therefore it was decided to switch to robotics," says Ranger engineer GianLuca Ceppi. "Some time earlier, a painting division was bought from a neighboring operating company, which used ABB robots, but without knowing them or using their full potential. This lack of know-how convinced us to start from zero instead of reorganizing the production department of our plant."

In operative terms, this meant training existing staff who were experts on the painting process but unused to this kind of automation. The company also decided to hire new technicians, unfamiliar with the process, but open to innovation represented by the use of robotics.

"Cooperation of staff knowing the process with the new staff turned out to be the winning choice," says Ceppi.

Once it was decided to switch to robotics, the company chose ABB and its IRB 5400-12 paint robot since it was considered to be the most reliable supplier, especially in the sector of automatic painting of plastic products in Italy.

A development center with a robot for off-line programming was created, which means production lines are kept running to the maximum. The off-line robot serves also as a learning and training center for operators, permitting to shorten start-up times and avoid removing essential tools from production.

"With this solution, we managed to avoid hours of overtime training and, most importantly, we managed to develop about eighty programs in slightly less than two months, putting them immediately in production," says Ceppi.

Today, the department consists of two lines, a



Ranger Production Manager GianLuca Ceppi and Maintenance Manager Diego Zotti; at right, an IRB 5400-12 paint robot works applying enamel for Italian and German automobiles.



> FACTS

Benefits for robots at Ranger

- Greater consistency
- Halved production times
- Less waste of raw materials
- Better environment for employees

completely automated primer line, where the first layer is applied, and a four-station finishing line (three robot stations and one manual station), two for application of enamel and two for application of the final polish. Three stations are operational and devoted to automatic painting of large surfaces.

When the automation project was launched, Ceppi says, the objective was to improve painting productivity and technology, doubling sales and maintaining the same employment level, and possibly reducing the cost of raw materials. The number of application stations had to be doubled based on this. Ultimately, the robots reduced the production times by half. Waste of raw materials was also key thanks to the possibility of automatic control of paint thickness in order to make it uniform. ☉

Web site: www.ranger.it

Plastic fuel tanks, flexible robots



Using robots for the cutting and machine handling of plastic fuel tanks for Big Three automakers in the U.S. has given TI Automotive new speed and flexibility.

> Many people entering an automobile dealership are drawn to a car for the styling, the performance, and these days for the fuel economy. Not many give even a passing thought to the gas tank tucked up into the undercarriage. But though it's not glamorous, there's no component more important for a car's safe functioning than the tank and its fuel lines. And one of the world's leaders in fuel storage and delivery systems is TI Automotive. How important is TI Automotive in this business? With sales of close to 3 billion U.S. dollars and a worldwide network of facilities, they supply half of all cars produced today with fuel, brake and powertrain technology.

In the United States one of TI Automotive's two plants is located among the cornfields of northeastern Indiana, not far from the hub of the U.S. auto industry in Detroit. Here some 450 employees work around the clock in three shifts producing complete fuel tank modules. Besides the Big Three automakers in the U.S. this plant is also supplying fuel tanks to Honda and Nissan. TI Automotive Engineering Manager Aaron Parisot has an equipment building background. He oversees the six automated lines in the plant. He points out the various production cells dominated by the color orange, a trademark of the ABB production robots.

"ABB has had a footprint in the facility since the first robotic line," says Parisot. That was in 1997, and even after a recent round of competitive pricing TI Automotive has found ABB still the best. In terms of customer support, explains Parisot, "They have been responsive. Now it's easy to find your contact there and get things resolved."

All the passenger car and small truck fuel tanks made by TI Automotive are produced in a multilayer blow moulding machine with the majority of the

Plastic fuel tanks make their way down the production line.



tank structure made of high density polyethylene plastic. Besides their corrosion resistance, plastic tanks are also lighter weight than steel and more resistant to impact.

Each of the six production cells in the plant moves in a straight, 200 foot line, beginning with the moulding operation where the pliable multilayer resin structure is extruded and moulded into the tank body, and ending 20 minutes later with the inspection station where the tank is tested and packed for shipment. All along the operation are IRB 4400 and IRB 6600 robots from ABB, performing cutting, inspection and material handling functions. The heart of the line is the welding cell. The orange, 165 kilogram capacity arms carry out precise welds on the various valves, fill tubes and clips.

David Betz is a plant process specialist. He sets up all the welding parameters and is the go-to guy for any problems the technicians may have with the welding operation and robots. He finds the ABB robots very reliable over the long term, noting that once the process is defined, the technology allows for precision, repeatability and robustness.

A key partner for TI Automotive is Axium Solutions, which delivered the turnkey solution for the

“What you gain are flexibility in location and performance of the welds.”

Aaron Parisot

>FACTS

Automation the way to go

The benefits that TI Automotive has found with using robots for the production of plastic fuel tanks include:

- Competitive pricing for the robots that includes strong customer support
- Reliability of robots means fewer stoppages and less need for service
- Robots are able to withstand the very tough environment within the plant
- Not only are the robots an improvement when it comes to accuracy, they provide consistency that manual production can't match and at a speed that means higher production levels
- Flexibility means that multiple parts can be run through one line



The heart of the fuel tank production line is the welding station.



tank line. Working with TI engineers they design and build modular robotic cells in its Montreal, Canada facilities, then transport the individual skids for assembly in Indiana. Axiom is currently working on a new automotive fuel tank line for TI, slated for an October delivery. Heading the gas tank engineering for Axiom is Dominic Prévost. "They're using our expertise as a robot integrator, but they are the owner of their own process," he says. "We prefer to be an extension of their engineering. We want to sit at their table and discuss their process and adapt the system to their particular needs."

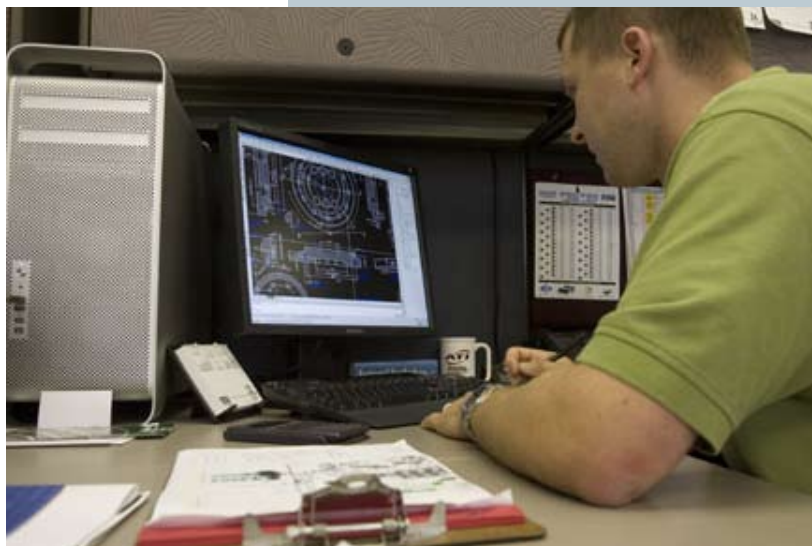
It's a close relationship. They've even set up a virtual web camera in their Montreal plant so that TI engineers can tune in and see the progress on the new ABB assembly line.

Using Robots in the production line streamlines the process, giving TI consistent, repeatable and highly accurate welds. Explains Parisot: "TI gains flexibility in location and performance of the welds. For instance you can run multiple part numbers through one line. The primary savings is in retooling costs."

Research and development continues at TI. In Indiana they strive to make the welding more efficient and build prototypes for new car and truck models. Companywide they're addressing issues like hydrocarbon permeation and emission reductions. One way they battle these emissions is to make co-extruded tanks with multiple layers to prevent the gases from escaping.

ABB has been helpful to TI Automotive's operations by developing multitasking features in its software, explains Parisot. "Things can be happening in the background while the rapid, interpreted language is processing. So we can do data handshaking between the robot and user interface while the robot is executing a move." 🔄

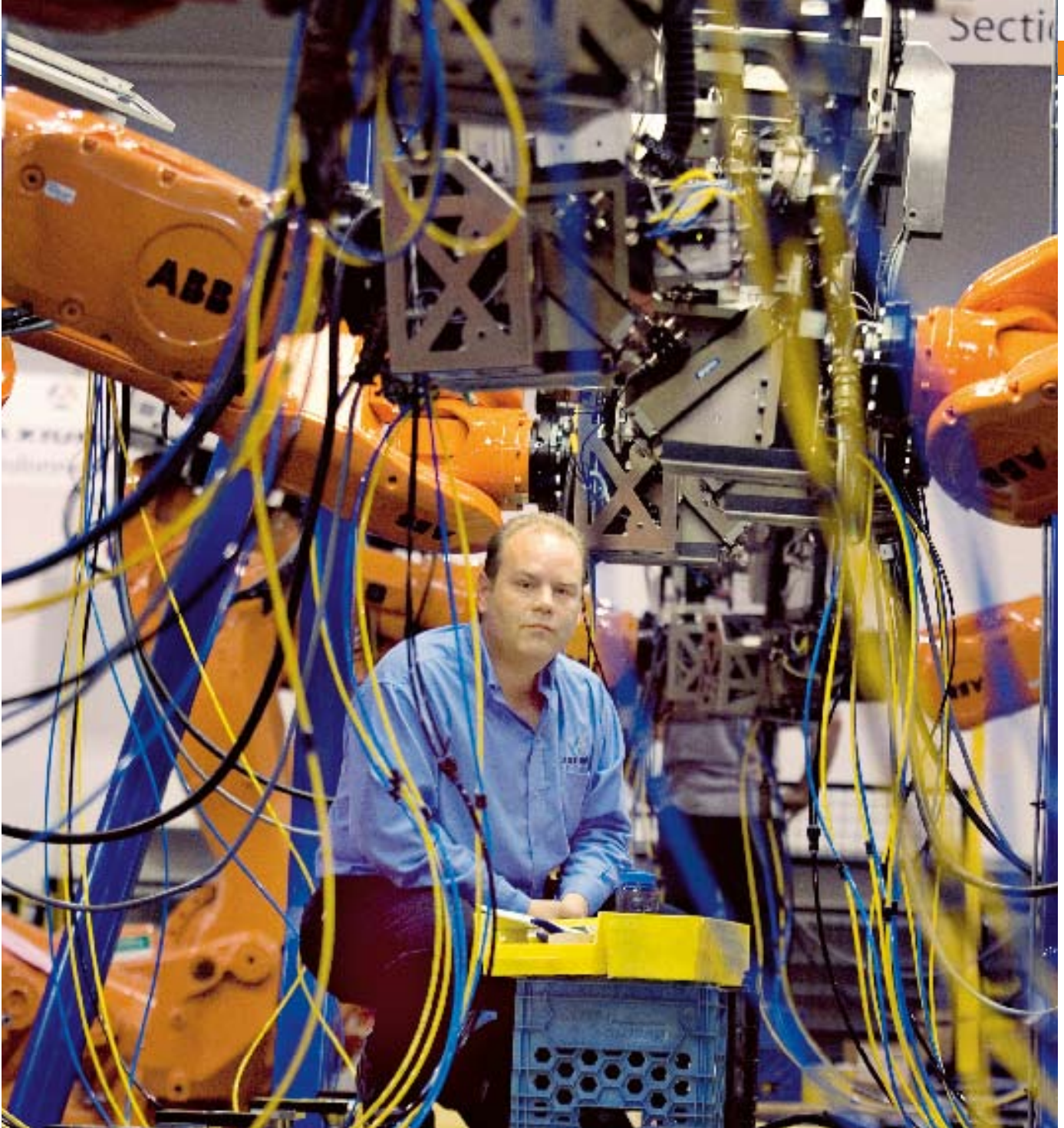
Operators' jobs are made easier by multi-tasking features that are part of the programming software from ABB.



>FACTS

TI Automotive at-a-glance

- **Business:** Global supplier of fully integrated fuel storage and delivery systems, and fluid carrying systems for powertrain and braking applications
- **Headquarters:** Warren, Michigan and Oxford, England
- **Revenues last fiscal year:** USD 2.9 billion
- **Employees:** Worldwide workforce of over 16,000 in 27 countries.
- **Markets:** Every major Original Equipment Manufacturer in the world
- **Two divisions:** Fuel Systems and Fluid Carrying Systems. Managed by Oaktree Capital Management LP and Duquesne Capital Management LLC.
- **Notable:** TI Automotive products are in over 80 of the top 100 automotive vehicles.
- **Web site:** www.tiautomotive.com



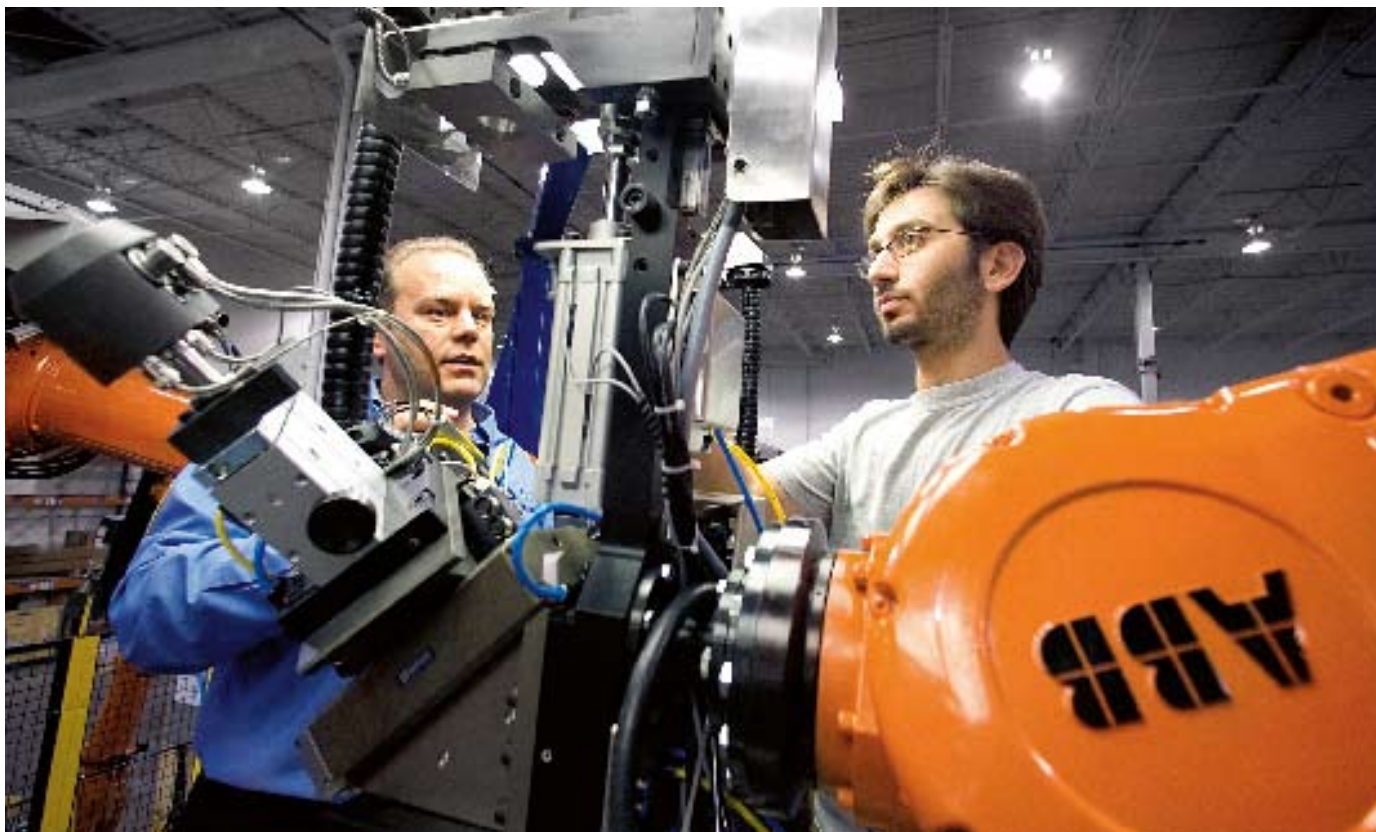
Dominic Prévost is one of the owners of ABB partner Axiom Solutions.

Partners in perfection

By Dwight Cendrowski
Photos Allen McInnis

Industrial automator Axiom is an expert in flexible solutions. Understanding customers' needs for robot cells that can be easily changed is key to its success, says Axiom's Dominic Prévost.

➤ Axiom Solutions has built a solid reputation in just 15 years. Based in Montreal, Canada, its engineers and technicians are equally at ease conversing in French or English. Axiom specializes in industrial automation for a wide range of customers, from industrial and pharmaceutical companies to agricul- ➤



“You can extend or decrease the size of the lines according to the processes you want.” Dominic Prévost

ture, plastics and cosmetics. The company knows industrial robots, supplying complete systems for material handling, assembly and specialized applications such as welding.

In its spacious 23,000 square foot facility, Axium assembles complete systems like a Honda gas tank line currently in process for TI Automotive. The company recreates the customer's worksite and runs complete tests before delivering and assembling the line. The Honda line will consist of 15 ABB robots in a downline, capable of processing a gas tank every 50 seconds.

Dominic Prévost, of Axium stresses the advantage of designing modifiable lines, especially for a company like TI Automotive that has to roll with

the punches as certain car models become more or less popular. “We know one of their problems is to reuse those cells. You need to be able to support some other model, or downsize that line to meet a new requirement.” That's why Axium likes to call them modular cells. “You can extend or decrease the size of those lines according to the processes you want,” he explains.

Axium is a preferred partner of ABB, being recognized as a leader in its field. This in spite of very severe competition from much larger companies. In 2006 Axium became an exclusive integrator for the plastic fuel tank business, and is represented and supported worldwide by ABB. The partnership is valuable for both companies.

Says Prévost about ABB: “They take their time in coming out with a good product. And the product is way more mature than you expect from a robot manufacturer normally. And people there are more than willing to help us. They will sit with you and say ‘What can we do for you?’ and for an integrator like Axium investing that much money in development, it's very important to be supported.”

Axium looks forward to strengthening the relationships with both TI Automotive and ABB. On the horizon are even more advances, including a new robot controller that is totally integrated into a cell to help in modularity and in simplifying the overall system. ☉

>FACTS

Axium at a glance

- Founded in 1992
- Supplies complete systems for material handling, assembly and specialized applications
- Customers include P&G, Kraft, Unilever, Johnson&Johnson among other pharmaceutical, agriculture, plastics and cosmetics firms
- 65 employees
- USD 16 million in revenues
- Web site: www.axiumsolutions.com

More car models equals more business

Flexible robotic ultrasonic welding enables Huaxiang to use one production line to handle multiple car models.

Text Jane-Juan Shen
Photo Zhang Heping/
Imaginechina/Scanpix

> Huaxiang Group in Ningbo China is a large auto interior and exterior trim supplier that ranks among the top 500 automobile parts companies in the world. Since its entry into the industry in the late 1980s, it has achieved 80 percent of the global market share in auto front cover trimming and 80 percent of the Chinese market share in auto air-conditioning and plastic assembly parts. It is also a parts supplier to multinational auto giants such as GM.

In 2001, Zhou Minfeng, president of Huaxiang, says that he first fell in love with ABB robots at first sight because of their advanced technology, unique and innovative software and their intuitive interface. So it's no surprise that one year later, ABB robots were installed at all the plastics lines of Huaxiang. The robots excellent performance was recognized by Huaxiang and consolidated the long-term partnership between Huaxiang and ABB.

"ABB robots prove their major roles in many lines and ABB's advanced technology and perfect service quality by facts. They are our only and best choice when we need more industrial robots in future," says Zhou.

As a supplier of famous car makers such as VW, DCAD, FAW and Chery, Huaxiang has many orders yearly of interior trim including door panels and columns A, B and C.

Originally, ultrasonic welding for plastic trimming was handled by special machines or manually. At the same time, in order to meet the market demand for more models and increased customization, car makers have to change their big orders for single models to small orders for multi models today.

In view of the ever-changing market, ABB tailored for Huaxiang a complete robotic ultrasonic welding system cell including an IRB 2400 robot, an ultrasonic welding machine and a positioner. Overall productivity was significantly improved by integrating the welding head to the sixth axis of IRB 2400 and making the robot drive the welding head to weld columns A and B for Ford and Audi. The production per day increased from 50 sets to 300, and enabled the customer to cater for the needs of two to five car models per month with single equipment investment and lower production cost.

Furthermore, the use of the system improved the customer's productivity, workshop environment,



Huaxiang produces plastic trim for car exteriors for customers such as Chery.

>FACTS

About Huaxiang

- Established in 1982, Huaxiang Group is a large-sized enterprise in China and one of the 18 key enterprise groups supported by Ningbo City.
- Ranks among Top 500 private enterprises in China and Top 500 automobile parts companies worldwide.
- Produces auto plastic parts and is a qualified supplier for VW's A Class and GM, and one of the important production bases of auto parts in China. Also produces special equipment, shelters, satellite communication facilities, television antennas, serial lightings, electronic connectors and deep frozen aquatic products.
- Sales in 2004 were 2.595 billion yuan (USD 313 million).
- Web site: www.huaxiangale.com

Benefits of the painting line

- Production increased from 50 to 300 sets per day
- High flexibility means single welding line can handle multiple car models
- Better environment for workers
- Improved corporate image
- Reduced costs

corporate image and competitiveness and reduced its cost. Today this robotic ultrasonic welding process is increasingly popular in the market and has been included in many customers' purchasing lists. ☉

Healthy infection of ideas

By Claudia Magli
Photos IMA

With pressure to save on costs and become more efficient, the pharmaceutical industry is learning robotic tricks from the food industry, with help from Italian automation specialist IMA.



Flow-packed droppers arrive in random order for pickup by the IRB 340.

> IMA Industria Macchine Automatiche, with headquarters at Castenaso, Bologna, has a philosophy based on research and innovation. For over 40 years, the company has produced hi-tech automatic machines for the pharmaceutical, cosmetics, tea and coffee industries, with a wide range of customers all over the world.

Recently, the company devised a special version of the Flexa cartoning machine that integrates ABB's IRB 340 robot. Specially designed for a U.S. pharmaceutical company, the solution automates the pick-up of flow-packed droppers from a conveyor belt (where they arrive scrambled), and the insertion of the droppers in a carton along with a bottle containing penicillin. And all of this is done at phenomenally high rates.

In no small part, the solution is a result of the courage of IMA in revising, while the project was actually being developed, the feed concept that had already been fully approved by the customer. Instead, IMA proposed a more effective solution that transferred methods and experience from the food segment and cleverly adapted them to the specific demands of pharmaceutical production.

The new versions of the Flexa cartoning machine was made to meet the demands of its American user, who needed to replace an old penicillin bottle packaging system where the dropper handling was mostly done by hand. The challenge, says IMA, consisted not so much in processing and placing the bottles in cartons, which is a usual demand that did not pose any problems, but rather in handling the flowpacked droppers, in particular at a rate of 150 pieces a minute. Flow packs are extremely variable, with some packs adhering perfectly to the product while others swell up, which makes them difficult to handle and position correctly for feeding into the cartoning machine.

To solve the problem, IMA used two FlexPicker ABB IRB 340 parallel robots. The robots pick up the droppers from a belt on which they arrive scrambled, and there the droppers are viewed and identified with the PickMaster, ABB's robot guidance system that includes vision based on Cognex hardware, which is integrated into the FlexPicker. Customized grippers were devised by IMA.



Once the positions and the orientation of the drop-pers have been calculated, the PickMaster transfers their coordinates via the ethernet to each of the two robots, while phasing both their workloads, and the robots are capable of working at rates that are a lot higher than those demanded by the customer. The system works in several stages that entail the temporary storage of the flowpacks in minipallets, their subsequent orientation and, only after that, insertion into the cartoning machine.

The solution devised in cooperation with ABB offers a series of advantages. For one, the overall layout of the machine takes up less space. A risk analysis has shown that there are a limited number of critical points. And a robotized system, in the mid- to long-term, guarantees lower maintenance costs and a far less complex tooling-up period compared to mechanical solutions.

But what really makes the difference above all is the flexibility. By merely replacing the pick and place head of the robots, they can handle similar products, anything from syringes to spoons instead of droppers.

As IMA has stated, the solution represents an “opening up, a dialogue between this segment and others, food first and foremost, in a continuous exchange of experiences and technologies, where everyone has a lot to gain. To confirm a certain synergy between the two areas that, up to even just a few years ago seemed far apart. More and more project engineers today committed to pharmaceutical companies have transferred over from the food sector, or at any rate come from the field of consumer products.”

This is due above all to the growing attention reserved to costs and times, IMA states, two competitive variables that the pharmaceutical industry also pays increasingly close attention to. The radical changes that

>FACTS

Why automate pharmaceutical packaging?

As pharmaceutical companies increasingly follow the food and other industries in automating their packaging processes, the solution from IMA using ABB IRB 340 robots is a good example of the advantages of using robots:

- the overall layout of the machine takes up less space
- limited number of critical points
- lower maintenance costs and a far less complex tooling up period compared to mechanical solutions.

IMA at a glance

- World leader in the design and manufacture of automatic machines for the processing and packaging of pharmaceuticals, cosmetics, tea and coffee
- Consolidated turnover: 425.2 million Euro for the fiscal year 2006 (export: 92.3 percent)
- Employees: about 2,700, more than 1,100 are based overseas
- 15 manufacturing sites in Italy, Germany, Spain, U.K., U.S., India, China
- Worldwide sales network covering more than 70 countries.
- Web site: www.ima.it

are affecting the entire pharmaceutical market force the producers – and thus their suppliers – to pay maximum attention to the overall efficiency of their lines; and in this the food segment has a lot to teach.

If in the past packaging lines were only devised for a single product and format, now they have to be flexible, efficient and adaptable to different products and formats. With these kinds of complex demands, robots can give the best answers as has been demonstrated in the food and in many other industrial sectors already. ☉

Movement under control

> Motion control is the key to a robot's performance when it comes to path accuracy, speed, cycle time, programmability, multimove and synchronization with external devices. By making use of these important features, users can improve quality, productivity and reliability.

ABB has long understood the importance of motion control, and in 1994 it launched the first generation of TrueMove and QuickMove. TrueMove ensures that the motion path of the robot is the same as the programmed path – regardless of the robot speed and the geometry of the path. QuickMove is a unique self-optimizing motion control feature that keeps cycle times at a minimum by ensuring maximum speed and acceleration at every moment. In essence, it provides automatic cycle time optimization.

By letting the system set all the motion control parameters automatically, operators can make sure that the stress levels on

mechanical components are in total control, thus assuring a longer life for the robot. Even if the robot is programmed to work at maximum speed there is no risk of problems. Manufacturers need not purchase a bigger robot and run it at less than maximum speed to make sure that the robot life will be held.

Not only do TrueMove and QuickMove give consistently accurate path following, these concepts also make it unnecessary for "path tuning" when speed parameters are adjusted on-line. This is particularly valuable in cutting and dispensing applications, for example, when speeds and orientations often have to be fine-tuned at the production start in order to get the optimum quality process.

The second generation of TrueMove and QuickMove ensures even higher performance for ABB robots by introducing more accurate dynamic models and new methods for the optimization of the path speed and acceleration. Ⓞ



>FACTS

TrueMove

- Enhanced motion path by up to 50 percent
- "What you program is what you get"

QuickMove

- Cycle time reduced by 20 percent
- Maximum acceleration and speed over the entire work cycle

Smart synchronization saves time

Machine Sync can reduce extract time by 10 percent, while reducing collisions and making for less wear on robots.

> Saving time is saving money, and when it comes to reducing the time needed for opening and closing machines for extraction, the seconds saved can be substantial. ABB's new product, Machine Sync, further increases the output of robot production by coordinating the machine opening and closing, thereby reducing cycle time. Furthermore, by synchronising the opening and closing, robot wear will be decreased and collisions can be avoided.

Machine Sync is easily configured

by ABB's programming language RAPID. Machine Sync is compatible with the ABB products Euromap/SPI and electronic position switches to guarantee redundant machine-robot safety. In combination with ABB's software RobotWare Plastics for easy robot programming and operation, a state-of-the-art system is achieved both in sense of optimized cycle time and ease-of-use. Machine Sync can be applied for machine tending and material handling in general and especially for injection moulding.

When Machine Sync is used, the work flow of robot and machines overlap to save time. With Machine Sync, at machine opening, as soon as there is enough physical space for the robot between the machine platens, a position signal from the sensor is set, and the robot starts to move into the machine, synchronised with the moving platen of the machine.

At mould closing, as soon as the moulded part has been gripped, the robot starts to move out of the machine. When the robot has reached the machine closing point, the machine starts to close. The machine closes safely while the robot is moving out. Time is also saved by the machine's early closing.

The obvious benefit of the Machine Sync is the decreased extract time, which translates to faster machine cycle times and higher production output. For example, a 3000 ton injection moulding machine using an IRB 6650 shelf robot could decrease extraction times by at least 10 percent simply by synchronising the opening and closing. At three shifts per day year round, a complete cycle of 30 seconds including an extraction time of 10 seconds would result in 35,000 more parts being produced. Ⓞ

>FACTS

Benefits include:

- Reduced extract time by 10 percent means reduced cycle time and increased machine time
- Decreased robot wear
- Avoidance of collisions
- Easy to configure and program

Machine Sync applied for Injection Moulding

Normal cycle



Cycle w Machine Sync



*The robot extract time overlaps with the machine Open and Close time. Depending on the characteristics of the cycle at least 10% of the extract time.

Small size, high power painter

> It isn't always easy to automate paint applications in tight spaces. But ABB has introduced a new small paint robot, the IRB 52, which is compact and capable of inverted, tilted or wall mounting. Despite its size, it has a large working envelope and great agility. And, thanks to its robust design, the IRB 52 is resistant to the harsh production environments found in a typical spraybooth.



The IRB 52 is suitable for a variety of paint applications, including with PU, UV and water borne paints. The 7 kg payload meets most requirements for single-, dual-, triple-gun or bell atomizers. It can work in different operation modes – automatic line with conveyer tracking, manual operating with a shuttle table or turntable.

The mounting options combined with the slim forearm and small offset mean that the robot is exceptional when it comes to operating in narrow spaces. The backward-bending feature allows only one robot to be used for two spray booths with face to face installation. The low weight proves for easier installation, especially for wall, inverted and tilted installation, the support structure is much simpler and has less impact on the spraybooth structure design. ☉



>FACTS

Best in paint solutions

ABB is one of the leading suppliers of paint solutions worldwide. With a long history and a clear vision of the future, ABB aims to be a life-long partner to its customers. At the heart of the solutions are ABB's unique Integrated Process System (IPS), providing the modern manufacturing industry with high finish quality, optimum use of paint material, low cycle times, accurate and fast process control, easy collection of production statistics and ease of use.

Smarter pattern with new atomizer

> When it comes to industrial painting in manufacturing, it's difficult to avoid the problem of over spraying. One strong solution to the problem is to use pattern control. By increasing the atomizer transfer efficiency and decreasing the overspray, as well as by choosing the appropriate spray pattern size for the coating area size and adjusting the spray pattern time, paint consumption can be reduced by up to 20 percent.

To make this possible, ABB has come up with a Double Shaping Air (SA) system

for its new atomizer series RB1000, which includes versions SAD for solvent borne paint, SSD for 2K paint and wsc for both solvent and water borne paint. Fine atomization is achieved by a new, powerful air motor and the pattern control function.

The key to the success of the system is a technique that allows for the changing of balance inside and outside the SA mechanism to control the pattern size. The bell speed can be quickly and efficiently changed, giving the system a very high response time and added accuracy. ☉



Wireless help means fast service

Using the latest in technology, ABB can now provide key support from afar with its Remote Service.

> A new Remote Service concept from ABB for customers with service agreements can troubleshoot problems with robots and dispatch immediate help. It can even predict problems long before they even happen.

The thinking behind the new Remote Service technology from ABB is to use the existing data in the robot controller and standard GPRS technology. The new service package has three main aims: to extend the mean time between failure (MTBF) of robots and robotic components; to shorten the subsequent mean time to repair (MTTR); and to lower the overall total cost of ownership.

The service technology centers on the concept of logging a robot's key performance data and sending this remotely to an ABB service center where it can be stored and used for reference and where alarms can be directly monitored.

To extend the MTBF, one of the key starting points is to fully understand the environment and workload under which the robot is working. A critical assessment is undertaken by a computer program and an exact and individual service schedule drawn up according to workload, with key service recommendations included to coincide with

Remote service technology optimizes performance and systems, says manager for product support and field service, Rene Nispeling, center, with Lennart Hansson and Dominique Blanc.



planned gaps in the customer's production schedule.

To shorten the MTTR with Remote Service, the robot itself automatically alerts the central database. It triggers an SMS to the on-call service engineer, who can immediately access a detailed data and error log and quickly identify the exact fault. From that moment on, ABB can support the customer remotely or through direct access to the robot's control system.

The third aim of Remote Servicing, to lower the total cost of ownership, may be the most important offering of the service. Here, the robot's performance data is taken at regular intervals and stored in the

central database. In this way, trends can be analyzed and compared with previous readings. Trends can be spotted before problems become evident and the customer alerted by phone about the need for future attention. These issues can then be attended at the next scheduled downtime – thus avoiding unpleasant and costly surprises.

This service concept has been designed in the first release to be compatible with ABB's s4C+ and IRC5 generations of robots. The next phase of the offering will make the system applicable to earlier generations. And the remote capability of the service means that ABB can provide a comprehensive service without being physically at a customer's side – meaning that customers in parts of Africa or the Middle East who have no direct representation can benefit strongly from the remote service capability.

"The Remote Service technology takes a new and more focused approach to the needs of our customers and to optimizing the performance of the systems that they buy from us," says Rene Nispeling, manager for product support and field service at ABB Robotics. "We use remote technologies to extend the life of our products, to be faster in responding to events and to actually predict and avoid potentially costly future events." ☉

>FACTS

Worth the investment

Potential customers calculated that the net effects of a stoppage in production would put the return on investment at four to five weeks; others estimated that an hour's breakdown costs would probably equal the cost of the agreement.



Less space, more flexibility

The new panel-mounted IRC5 robot controller from ABB takes up nearly 75 percent less space, and has the possibility of mounting within existing control panels. The result is smoothly integrated robot machine solutions with optimal space saving within for injection moulding, cutting machines and other applications.

> Easy integration with existing equipment designs, substantial space savings and exceptional versatility are some of the many benefits which the new panel-mounting IRC5 robot controllers from ABB Robotics offer to users of industrial robots. The controllers are ideal for integrating into applications such as injection moulding, cutting and for overall cell control.

To ensure maximum versatility, ABB's new panel-mounting robot controllers feature a modular design, with separate modules for robot control functions, axis drives and process control functions. This modularity makes it easy to configure assemblies which exactly match the requirements of the application, as well as making the systems straightforward to service and upgrade. Used in conjunction with the controllers, FlexPendant hand-held terminals with touch screens and Windows-style operation provide an intuitive yet powerful user interface.

The new units can each control up to four robots, allowing significant economies to be made in multi-robot installations. The TrueMove and QuickMove technologies used in the controllers automatically optimize motions for all robots and external axes, while MultiMove functionality allows for fully synchronous operation of multiple robots, opening up applications areas which would otherwise be difficult or impossible to address.

In water-jet cutting or grinding cells where typically two robots cooperate via MultiMove, minimal space is required when integrating the only 250mm deep panel-mounted controller into the cutting machine controller cabinet. If wash-down cleaning is required, the panel-mounted controller is just put into a stainless steel enclosure of the cutting machine.

Richard Seager, of AEW Delford Systems, says: "The new panel-mounted robot controller is a huge step forward, in terms of its design for easy integration and adaptation to various environments. We assisted ABB on the development of this product, as our experience in this field showed there was a gap in the market. As such, we were the first customer to trial the controller and have found that it sets new standards with its modular concept, ergonomic portable interface and its ability to control multiple robots.🌀

The new panel-mounted IRC5 controller doesn't just save space, it's also ideal for use with water-jet cutting where two robots must cooperate.



>FACTS

About the IRC5 panel-mounted controller from ABB:

- Dimensions: 750x498x280 mm
- Available for IRB 140, IRB 340, IRB 260, IRB 1600, IRB 2400

Simulation in half an hour

With only a PC and RobotStudio Machine Tending PowerPac, users can create a virtual robotic cell in only 30 minutes.

> In today's manufacturing world with workers having a wide range of skills, equipment that can be used by almost anyone can be key in staying competitive. ABB's new software package, RobotStudio Machine Tending, can be used by moulders and system integrators to create an accurate

representation of an automation cell without the need for extensive training.

Robot Studio Machine Tending creates virtual robotic cells that can test different configurations to help build the best solution for an application. It assesses cycle time, cell footprint and reachability so that the most suitable ABB robot for the task can be found. It can also be used to identify any post processes the robot can conduct while the machine is moulding a part.

The simulation uses a six-step process to create a 3D representation of a robotic cell, with the user being guided by the software's "Cell Wizard." The wizard guides the user through the process of deciding which machine matches which type of robot, where to position the robot, the type of part to be produced and which stations can be used for post processing. Once the process is completed, the program uses the general information to generate a 3D cell.

Dedicated graphic models are used to represent machines produced by the most popular brands. The program provides users with the flexibility to amend the model within the program. Alternatively, users can import their own CAD models. When the user has designed a cell, the software can

> FACTS

Robot Studio Machine Tending at-a-glance

- Reduced time to create a robot simulation
- Cell Wizard means only five steps to create a 3D cell
- Simulation automatically generated
- Footprint - estimates the area needed
- Pre-defined robot paths for each station
- Machine library with the market-leading brands
- Animated machine movement
- Graphical statistics – the "Analyzer"
- Post-processing – visualizes the robot's ability and flexibility

be used to simulate the machine tending process. With the Robot Studio Machine Tending PowerPac, system integrators can demonstrate a cell to customers and project engineers can select the optimum equipment and layout for installation.

Robot Studio Machine Tending PowerPac is an extension of RobotStudio, ABB's programming and simulation software. ☉



Success through specialization

> When Rokoma, located in Heeze in the Netherlands close to Eindhoven and the Belgian border, was formed in 1985, the company was a distributor of injection moulding machines. But a change of direction was needed when the largest customer opened its own sales office and turnover dropped significantly. But it took on a new life when Gerd Teeuwen and Patrick van den Boogaard acquired it January 1, 2002.

The two partners bought the company from the previous owner and decided to leverage their technical expertise and experience in the plastics injection moulding industry and switch from sales of machines to systems integration.

The switch has been successful and

Rokoma is currently handling an average of one application a week. The systems integration process is lengthy: it will typically take between six weeks and two years, a fact that indicates the company's ability to handle complex applications. Replication involves running the application at Rokoma's premises: installing the robot on the machine, together with the grippers and the mould and programming the system.

"When planning a project, it is always easier to agree on a solution if you can show a simulation," says Teeuwen. "With the RobotStudio Machine Tending PowerPac you can create a 3D animation in no time. It also guides you when it comes to making reach estimations, choosing the right robot and how



Rokoma owners Patrick van den Boogaard and Gerd Teeuwen.

to position it towards the machine. A great advantage for the Machine Tending PowerPac is that it is easy to learn, and easy to use. We have saved a lot of time using it." ☉

Web site: www.rokoma.nl

New agile machine-tending robots

ABB's IRB 6600 robot family has just become bigger and better, with the newest generation of robots optimized for the tending of machines from 600 to 5000 tons, both floor mounted and shelf mounted.

IRB 6600 family data

	load (kg)	reach (m)	Clamping force (tons)
IRB 6620	150	2.2	750-2000
IRB 6620 Shelf	150	2.20	600-1000
IRB 6640	130-235	2.55-3.2	1000-3200
IRB 6650	125-200	2.75-3.20	750-2700
IRB 6650 Shelf	90-200	3.00-3.93	750-5000
IRB 6660	130-225	2.55-3.2	1000-3000



The new IRB 6620 series is a compact machine-tending robot that provides ever more flexible and improved cell concepts. The unique compactness and agility of IRB 6620 makes it possible to mount the robot in floor standing, inverted or tilted positions. The low total weight of the robot, 900 kg, makes it easy to install and handle without the need for heavy-lifting cranes to mount the robot on top of a machine. The robot's very low weight is a great advantage in applications where the robot should be on top of a machine.

The IRB 6620 is a top tool for applications like material handling and cutting, as it can be mounted in an inverted position. The IRB 6620 Shelf is optimized for machines in the range 600-1000 tons.

The new IRB 6640 series is the latest high performance generation of ABB industrial robots optimized for machine tending and other applications.

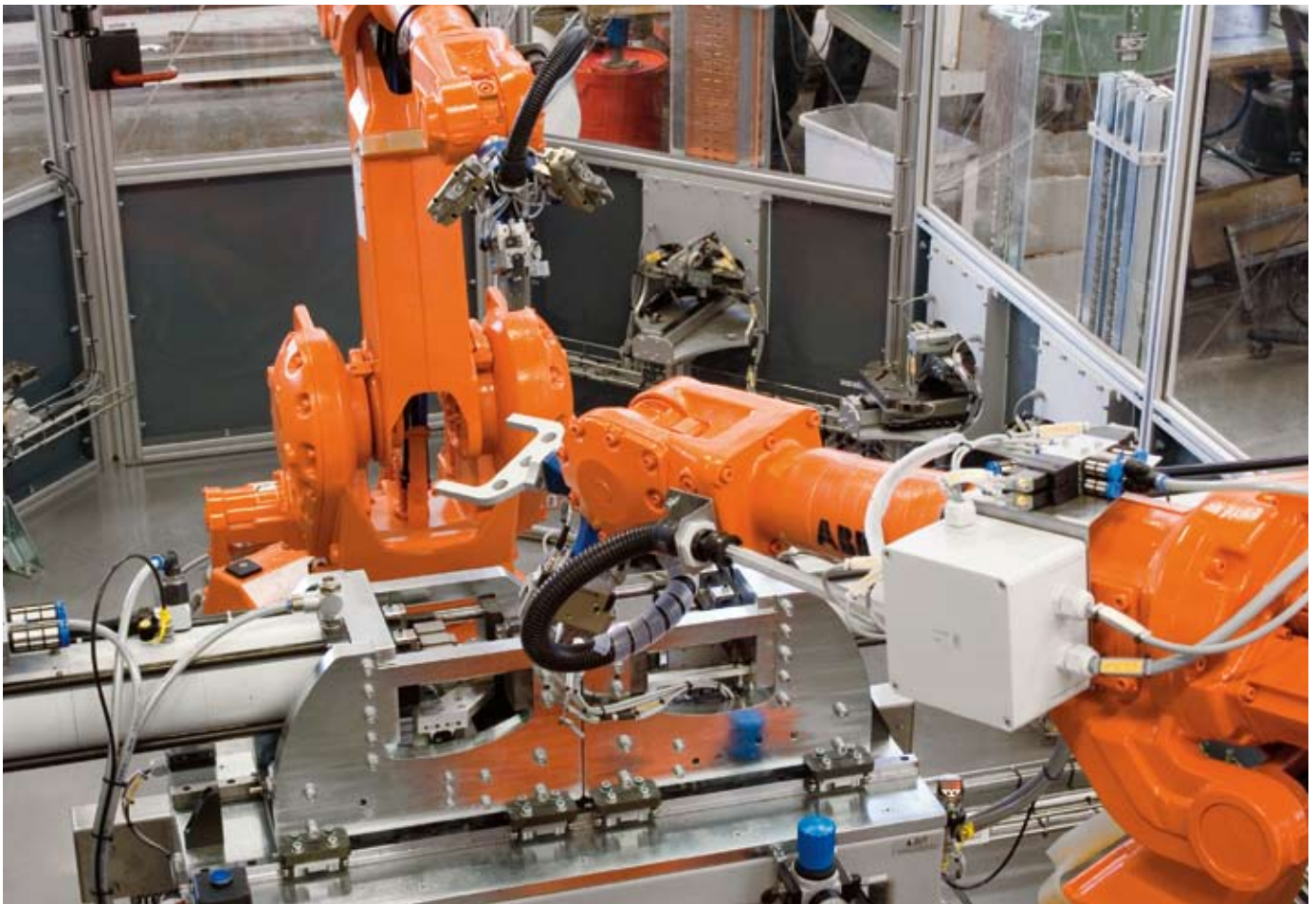
The IRB 6640 comes in different lengths of the arm and matching handling capacities, ranging between 130 to 235 kg and with a reach of up to 3.2 m. The maximum payload is 235 kg, making the robot suitable for heavy material handling applications. The robot also has outstanding inertia capabilities, so it can handle not only heavy but wide parts.

The robot is optimized for floor-mounted machine tending for machines 1000 to 3000 tons. As the robot can bend fully backwards, the working range is greatly extended and the robot fits well into densely packed production cells.

The new IRB 6660 series is an ultra fast machine tending robot. Designed for high productivity, uptime and accuracy, the new robot is perfect for press tending applications. It is also ideal for general machine tending such as injection moulding that requires minimized extraction times.

The IRB 6660 can reduce machine occupation time for part extraction with its improved speed performance. The most critical robot axes have been enhanced according to typical interpress cycle requirements, which means 15 percent shorter cycle times can be achieved inside the presses.

The maximum load for the robot is 130 kg, the maximum working range is 3.1 m, ideal for machines in the range of 1000-3000 tons.



Cable connections

An advanced robotic system with offline programming has saved Swedish cable accessories company Kabeldon untold man-hours and money.

> Cable cabinets, insulation, connectors, cable joints, cable terminations – these are all vital elements that ensure our world remains connected, wired and electrified.

“The reliability of a cable network depends on the performance of all the accessories,” says Björn Persson, from Kabeldon, an ABB company in Alingsås, Sweden, situated about 50 kilometers northeast of Gothenburg. “So the quality of the installation is vital.”

Kabeldon specializes in electrical power solutions that enable customers such as power companies to safely join and connect electrical cables according to stringent requirements for simplicity and reliability.

“Our core competence is in electrical connections

in cable systems, and we concentrate our research on stress grading, contact technology, polymeric materials and surface treatment,” says Persson. “Our products are used all over the world and fulfill very high reliability standards.”

In December 2006, Kabeldon installed a new assembly line comprising two robot cells with three ABB robots in total to manufacture four different sizes of a new generation of a fuse switch disconnecter. These are typically found in cable distribution cabinets and are ubiquitous in cities, residential areas and industrial parks.

Specifically, the assembly line consists of one cell with two IRB 2400 robots. One of them assembles >

Text and photos by
Alexander Farnsworth



An IRB 1600 ready to assemble fuse switch disconnectors.



Plastic parts for a fuse switch disconnecter.



Kristoffer Ekman and Björn Persson of Kabeldon.

the fuse switch disconnecter from three different pieces and places it in a press, while the other lifts it out of the press and assembles a spring before placing the finished product in a rack. The second cell uses one IRB 1600 robot to automatically mount screws in the unit.

According to Persson, the line is capable of assembling one fuse switch disconnecter per minute and has substantially increased Kabeldon's productivity. Previous assembly was done manually at four different workstations, which obviously took more time and required more floor space.

"Another benefit is that the quality of the units has noticeably improved," says Persson.

Kabeldon's new assembly line was designed and built by Specma AVT, which is conveniently located across the street from Kabeldon's factory in Alingsås.

Specma AVT designed, built, programmed and installed Kabeldon's new assembly line. The company also subcontracts some series production for Kabeldon.

But as an integrator, Specma AVT is one of the leading companies in Sweden to take full responsibility for the whole chain, from building the assembly line to maintaining it. The fact that the two companies are neighbors is pure coincidence. The company's clients include such heavyweights as Haldex (traction and brake systems), SKF (bearings) and Autoliv (airbags).

"Usually there are four or five different players on a project of this magnitude," says Tomas Eklöf,

> FACTS

About Kabeldon

Kabeldon is situated in Alingsås, Sweden, and has about 150 employees. Kabeldon is part of the ABB group and its products, from fuse switch disconnectors to busbar systems, can be found in electrical cable networks worldwide. Read more at www.kabeldon.se.

The robotic advantage

Kabeldon's new assembly line is capable of producing one fuse switch disconnecter per minute, representing an enormous savings over manual production, plus an improvement in quality. In addition, the new installation saves significant floor space compared to the previous solution.

>FACTS

About Specma AVT

Specma AVT was formed in May 2001 when Alingsås Verktyg AB merged with TLC Engineering AB. The company specializes in building customer-specific automation solutions for its clients, which include Haldex, Autoliv, Almondy, SKF, Atlas Copco and others. Specma AVT had revenues in 2006 of SEK 50 million and employs 45 people.

Web site: www.specmaavt.se



"We take full responsibility from beginning to end," says Tomas Eklöf of system integrator Specma AVT.



Anders Hedström of Specma AVT uses ABB Robot Studio software on a PC to program robots offline.

A virtual robot in a computer near you

➤ In 2006, Specma AVT won a contract to design, build and program a new assembly line for Kabeldon, an ABB company that makes essential equipment for electrical cable networks.

To ensure that the two IRB 2400 robots, and one IRB 1600 robot, did what they were supposed to, AVT's Anders Hedström used the ABB Robot Studio software on his PC to simulate their motion and angles of operation.

This powerful software virtually simulates how different robots should move depending on a series of parameters that Hedström supplied to the system.

"I started by importing the three dimensional CAD model of the installation into Robot Studio and then I chose the type of

robots we were using," says Hedström. "And from that I could teach (in the PC) about 150 point positions in space that govern how the robot was to move in the most efficient way. It was an enormous times savings considering we used to program robots manually."

Hedström used Robot Studio software extensively during the start-up phase of the project with Kabeldon to visualize and verify that the real robots on the factory floor were picking up, installing, swinging and dropping products in the best way possible.

Once all parameters were satisfactorily tweaked, the information and computer code generated in Robot Studio could be transferred by Ethernet cable from the PC to the robot cells thanks to ABB's Virtual Robot technology.

According to Hedström, Robot Studio was a huge help in making sure the ABB robots worked as efficiently as possible and didn't get tangled into each other's cables, for example.

The Robot Studio user interface makes it possible at the click of the mouse to focus the whole screen down to a screw on the gripper, and back again to the big picture of the installation. The image of the installation can also be swung in three dimensions to give the feel to the user that he or she is really there.

Hedström took a three-day course in Västerås to learn how to use Robot Studio.

"And I'll definitely use Robot Studio in the future. It made our job much easier," says Hedström. ☺

part owner and technical director of Specma AVT. "So when things go wrong it can become a real pie-throwing contest. The advantage with us is that we take full responsibility from beginning to end, so customers avoid such problems in the first place."

Specma AVT used ABB's Robot Studio software to program the robots offline. Like a simulator, Robot Studio can be run on a desktop computer to mirror exactly the setup of both robotic cells at Kabeldon.

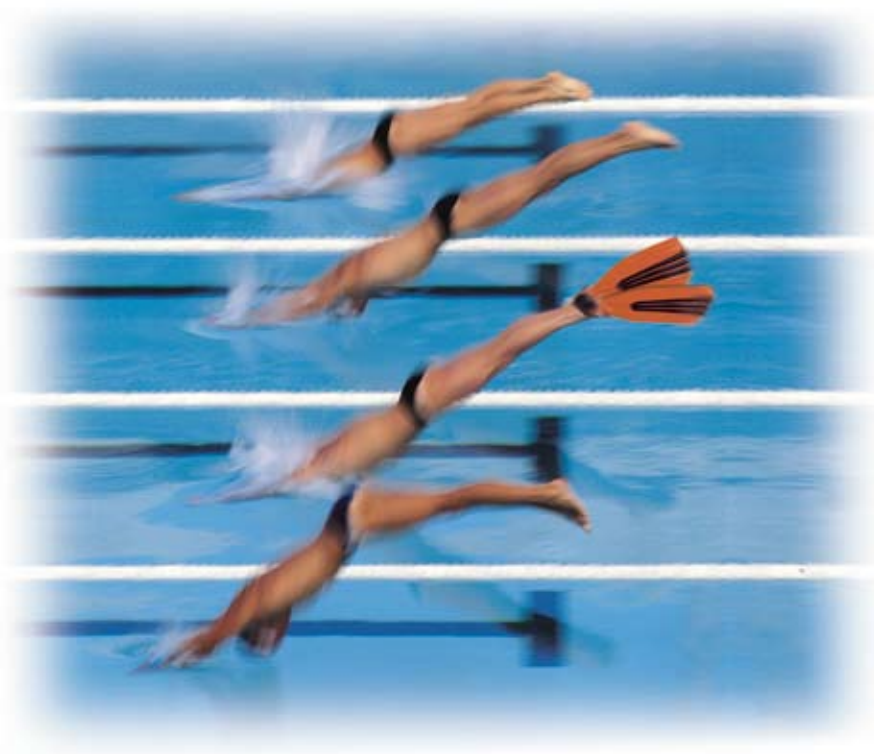
Once all parameters were satisfactorily tweaked,

the information and computer code generated in Robot Studio could be transferred by Ethernet cable from the PC to the robot cells.

According to Eklöf, Robot Studio was a huge help in making sure the ABB robots worked the way they were supposed to. The automated programming of the robots also saved a lot of time for Specma AVT.

This was the first time Specma AVT delivered ABB robots to Kabeldon. "And I hope it is not the last," says Eklöf. ☺

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