PACKAGING ROBOTICS

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In the U.S. and Canada, **Propack** pushes automation in the snack-food sector.
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Technology: User-friendly software update for PickMaster gives more options.
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PFM's **Daniel Gravini**

chooses robots **for flexibility** and accuracy.

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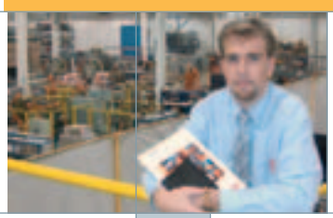

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ABB Automation Technologies AB
721 68 Västerås, Sweden
Tel. +46 21 325 000
e-mail: abb.robotics@se.abb.com
www.abb.com/robotics
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Editorial

Robots are the answer

> Welcome to ABB's *Packaging Robotics*, a magazine for those interested in the latest technology for the packaging and handling of everything from food to pharmaceuticals, cosmetics to consumer electronics.

As robotics expert Geoff Pegman points out in this issue of the magazine, today products not only have shorter life spans than ever before, but the time to market pace is faster while product volumes need to be increasingly flexible. At the same time, finding and retaining qualified workers remains difficult. All of this adds up to manufacturers needing the kind of flexible automation that robotics can provide.

In this issue, you can see how 6-axis robots, along with dedicated robots for picking, packing and palletizing and user-friendly software, all from ABB, are being used in everything from the packaging of snackbars for Les Aliments Multibar in Canada, to making sure Switzerland's Roland Pretzels don't get broken in the box before they ever make it to the consumer.

As the market matures, I predict we'll see even more solutions such as these, with the most growth in high-speed picking, which requires some of the most complex robotics solutions, but can offer some of the greatest savings in efficiency and ultimately cost.

Whether you are a system integrator or a manufacturer of consumer goods, we've created this magazine with you in mind, showing a range of solutions from our partners along with viewpoints from industry experts on the latest trends. We hope you enjoy *Packaging Robotics*.

Henrik Andersson
Segment Manager, Consumer Industries
ABB Automation Technologies
henrik.j.andersson@se.abb.com

Calender

NOVEMBER
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PackExpo International
Chicago, USA
Phone +1 703 243 8555
E-mail expo@pmmi.org
www.packexpo.com

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Emballage
Paris-Nord Villepinte, France
Phone + 33 (0)1 496 854 37
www.emballage2002.com

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Phone +44 20 7862 2063
E-mail propak@oesallworld.com
www.propackbeijing.com

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Interpack
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E-mail rklemm@mdna.com

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PACex International Packaging
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www.pacexinternational.com

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E-mail info@expotrade.net.au
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Celebrating 30 years of robot production

> In 1974, the first IRB 6 robots came into operation, produced by what was then the Swedish company Asea. Since then, Asea has merged with the Swiss manufacturer Brown Boveri to become ABB. The robot manufacturer has undergone a number of other changes, including the acquisition of companies in the U.S. and France, among other places, and the further concentration of operations to Västerås in central Sweden. In 2002, ABB passed the important milestone of selling 100,000 robots, the only robot manufacturer in the industry to have done so far. Today, ABB is proud to celebrate 30 years of robot production, and looks forward to a future where automation can only increase.

New solution from AEW Delford Systems

> AEW Delford Systems have introduced a robot portion loading system (RPLS) that will pick single, fresh or frozen, bone-in or boneless meat portions or sliced groups – such as bacon or cooked meats – from a portioning slicer, saw or conveyor and place them straight into trays or thermoformers ready for packing.

The new system, created by AEW Delford working with ABB, utilizes vision technology to accurately recognise the position and orientation of portions on the conveyor. This enables the machine's unique, mechanical action gripper to gently – but quickly – lift, transfer and place the portioned product with great accuracy into the tray or thermoformer.

Award for milking with robots

> Henk Hofman of Hokofarm in the Netherlands received the ABB-sponsored 21st Golden Robot Award in March 2004 at the annual International Symposium on Robotics. The award was in recognition of industrial robots for cow milking.

Hofman received the award for his work in expanding the use of robots in a non-traditional area that points to expansion not just within cow milking, but other industries where robots have not been used thus far. Hofman holds a number of patents related to the application of cow milking with the help of robots.




Robot-wrapped **birthday package**

by Claudia Flisi
photos Maurizio Camagna

PFM in Italy puts the lid on flexible film packaging problems.

> Baby wipes for a 40th birthday? They are appropriate if the "baby" in question is PFM, a family-owned Italian company specializing in flexible film packaging, celebrating its 40th anniversary in 2004. The packages for baby wipes produced by PFM are unique in that their plastic lids are applied not by human hands but by vision-equipped robots – the FlexPicker – supplied by ABB.

Baby wipes weren't the company's original focus, however. PFM (the initials stand for Pietro Fioravanti Macchine; "macchine" means machines) has been making packaging systems since 1964 from its home in Torrebelvicino (Vicenza), Italy, at a time when robots on an Italian production line were the stuff of dreams.

Italianapack, the company that was to become PFM, was created by Pietro Fioravanti for the production of horizontal flow-wrap packaging machines. That means PFM does not build machinery for paper packaging, but rather for flexible film packaging.

"We are the second oldest company in Italy in our sector and the only one with ISO 9001/2000 certification," points out Paolo Fioravanti, son of PFM founder Pietro Fioravanti and current managing director. "Our competitors are primarily in Italy and Germany. Together these two countries produce 80 percent of the world's packaging machines. To stay ahead of the game, we are always seeking new technology, proposing new efficiencies, faster equipment and a faster pace of change to our clients."

This is where the baby wipe project comes in. About 10 years ago, producers of "Pillow-Pack" type packages for moist baby wipes began asking PFM to put lids on these packages, so the wipes would be easier to extract and be protected so they wouldn't dry out once the package was opened. "We said 'Impossible. It can't be done,'" admits Paolo Fioravanti.

Then he saw ABB's FlexPicker at a trade show in 1998. The Vision system of the FlexPicker seemed to offer a way to apply glue to the lids without creating more problems than it solved. PFM started talking with ABB. Eventually several technicians from ABB came down from Sweden to offer support in Vicenza. By 2000, a prototype machine was ready.

While the first year saw many kinks that needed

FlexPicker key to solution

The FlexPicker system is composed of two feeding belts and a glue application gun. The robot's job is to pick the lid up from a cleated chain conveyor using a vacuum cup system, apply a continuous flow of glue, and place the lid on the target package with a precision of three mm. With the PickMaster system any shape lid can be used with a minimum usage of glue and a very fast changeover time (five to 10 minutes), according to Daniel Gravini, customer support engineer for PFM.

Gravini notes that the system is extremely user friendly and allows clients to set up and run new products without any problems or special knowledge.

Davide Rossi, robotics technician for ABB Process Solutions & Services (a branch of the Automation Technologies division of the ABB Group), adds that the modular system and the suction grip adapt to various lids and packs, in contrast to traditional systems, and are safer for the operator and more hygienic for the final consumer.

PFM cells work with everything from baby wipes to cookies.

to be ironed out, in 2001 ABB introduced a new generation of software for Vision – ABB's PickMaster, designed specifically for use with handling consumer goods like jar lids – which solved the problems, says Daniel Gravini, customer support engineer for PFM.

That year PFM gave a prototype to an Italian client, and immediately sold three more to that same client. They have since sold 16 machines to customers in Korea, the U.S., Germany, and the Netherlands as well as Italy.

The complete line costs 350,000 euro and produces 70 packs a minute. Formerly these packs had to go through two additional processes for sorting and orienting and produced 50 packs a minute. Moreover, the equipment traditionally used was inflexible.

"We have seen that once it has been made for a lid shape it is very hard to change," observes Gravini. This inflexibility could be a big problem in a country like Korea, for example, where 40 different-shaped lids are available, from teardrop to square to round. Applying glue could also be a real challenge because of the problem of leakage in a product where hygiene is essential. But the FlexPicker and PickMaster provide the flexibility and accuracy that help eliminate these difficulties. And price is not a major consideration; payback comes in less than 18 months anyway. "Ease of use and positive results are what count for our clients," says Fioravanti.

PFM has a varied and interesting history. Between 1964 and 1974, flow-wrap machines, overhauls of used machines, and machine tooling work were the company's core business. In 1974, the company launched production of forced air rotary ovens for bakery goods. This business area would co-exist with packaging for about a decade. In 1984 a new law regarding mozzarella packaging set the stage for an explosion in this specialized segment of the packaging business, and PFM became its leader, a position it continues to maintain.

Production range is made up of around 40 models divided into flow wrap and fill, form seal packaging machines, various automatic feed systems, an infinite range of accessories for specific operations and for customization of machines and lines, as well as a complete series of linear and multi-headed weighing machines.

Products handled are cheese, fresh salads, bakery goods and confectionery, meats, detergents, cosmetics… and wipes for personal hygiene, naturally. "We sell in all sectors but are leaders in food, especially dairy," reports Paolo Fioravanti. "We are divided among dairy, produce, meats, and confectionery. Seventy percent of our machines are for food, 30 percent for non-food."

Today the company has seven plants, three in Northern Italy, and one each in the U.K., Germany, the United States, and Canada. Sales have been increasing 10 percent annually in recent years.

Total sales in 2004 are about 50 million euro, half from the main plant in Vicenza and half from the others. Half of the company's 300 employees are based at headquarters, and half of the total output of 1,000 machines is assembled there..

"To stay ahead of the game, we are always seeking new technology, proposing new efficiencies, faster equipment and a faster pace of change to our clients."

Paolo Fioravanti, PFM

Plenty of benefits

The advantages for PFM's popular solution for handling the lids of baby wipe packages include:

- Lower cost
- Simplicity for the operator
- Takes less space than traditional gluing solutions because the ABB FlexPicker robot is placed over the work area and not next to it
- More hygienic because there is less handling.
- Reliability.
- "If the client wants, we test every machine with the specified film and product right here before it is shipped out," says PFM customer support engineer Daniel Gravini. "Modifications done here are practically free."

photos Philip Blythman

The guru of robotics

R.U. Robots' managing director *Geoff Pegman* talks with reporter *Dick Cadwalader* about the latest trends in automation and the food industry.

> You have a highly diverse background in robotics. What is the food connection?

In economic terms, the food industry is one of the largest, worldwide. Automation companies and system integrators are now looking at food as "the next big area." Many of the present solutions are coming from specialists in packaging and palletizing that are starting to look upstream. A lot of what I do is about awareness. There are a few high-profile applications around, but most people in the food business are unaware of the potential in automation. Food assembly is the upstream issue I'm interested in – ready meals, sandwiches and that sort of thing. We are working on prototypes and one-offs for food assembly, not food packaging.

Describe the differences between assembly, packaging and palletizing.

Palletizing is basically a solved problem, with good technology already available. Packaging is different. High volumes are not a problem with hard automation, but lower volumes can be difficult to solve. Generally, in the packaging phase, you are dealing with nice, uniform items, such as biscuits, which are relatively simple compared to the upstream components. Food assembly using a picker is a challenge because making a composition, like a ready meal or sandwich, is hard to define and refine. It means having to handle flexible, wet and irregular materials. Defining these forms is not easy: tomato slices and pieces of turkey breast vary a lot. This pushes the requirements on vision systems and gripping technologies as well as speed.

What has been your biggest challenge, so far?

The one we're currently looking at is the

assembly of sandwiches with production runs down to as few as 100 sandwiches at once. Then, having to quickly switch to a new sandwich type, for instance from ham salad to sliced cheese, makes it even more difficult. A lot of getting this right has to do with how ingredients are pre-prepared and presented to the robot in a robot-friendly manner. In other words we don't necessarily go in to automate the same tasks people have been doing. We need to think of how best to approach the entire task.

Previously in the food industry, the only choices available were the use of people or hard automation, which is generally the choice of big producers. This choice involves large, expensive and specialized machines for limited sets of tasks. When you get into more advanced tasking, you quickly see how good people are at perceiving subtleties, such as form and color. There is a tendency to take people for granted. On the other hand, robots are very good at consistency, so the supermarket will always get what it asks for, which is not necessarily the case when humans do food assembly.

What are the drivers in today's marketplace?

The commercial drivers affecting small- and medium-sized companies are downward price pressures and the fact that it is increasingly difficult and expensive to recruit, train and retain workers. Also, food is becoming [like] fashion. Many products are designed to appeal to buyers for only six to 18 months. Subsequently, this puts pressure on time to market: You must be able to deliver quickly if you are supplying supermarkets. In addition, these drivers require producers to be flexible about what they produce, while retaining the ability to make changes quickly and easily.

What would be the ideal robotic solution for food assembly?

Some of the new robots, such as an ABB FlexPicker, are able to achieve the same rates as people and are often faster. Since a lot of these tasks involve assembly and transfer, you want a device that will travel about one meter with a radius of about half a meter. It should also be able to perform tasks similar to those humans do. Repeatability needs to be about one centimeter, so it is not like an industrial robot that might handle 0.2 millimeters. Payload only needs to be about one kilogram.

You need a vision system capable of driving the robot to a given location, with grippers and quick-change end effectors able to handle pieces as small as one centimeter. A reasonable level of quality assessment via the vision camera is coming, but these areas are difficult to define in quantitative terms.

Hygiene is also a driver, so the robot must be water-jet washable. Automation also gives traceability, even down to which robot did which sandwich.

One of the great ideals is to be able to teach a task by example. For instance, showing the robot how to handle a turkey breast by picking it up and laying it down a few times. You need this simplicity as at present the food industry does not have the IT staff and programmers to deal with more complex programming. However, these are not simple concepts to implement. Fuzzy logic and neural network concepts from the world of artificial intelligence are possible technologies for future use.

What sort of investment expenses and payback times are involved?

Solutions must not cost too much. After all you are replacing very adaptable humans. And even if they do come with certain problems, most of these workers are not highly paid.

Most small- and medium-sized companies are usually looking for a one- to two-year payback on their investment, usually based on a given product. Such solutions need to compete with the employment cost of replacing one or two people per year at roughly 25,000 to 30,000 euros per person.

> "We need to think of how best to approach the entire task." **Geoff Pegman, R.U. Robots Ltd.**

Geoff Pegman knows robots.

What are your thoughts about using these advances in other industries, and what other areas should we watch carefully in the near future?

The technologies we are discussing might be adaptable for industries dealing with non-standard shapes and composition, such as clothing manufacturing. Soon, we will see more robots coming into public spaces and at home.

One big area is medical robots. Today we have robots assisting surgeons. Soon the balance of decision-making may move more towards the robots. Theoretically, if you have enough money you can build a robot for virtually any task, yet no robot is adaptable across a range of tasks.

Geoff Pegman
Age: 50
Hobbies: "Robots, sad as it sounds; also computing, reading, film and travel."
Title: Managing director of R.U.Robots Ltd., one of Britain's newest robot companies.

RUR develops prototypes for use in new areas, such as nuclear safety (search and rescue robots), defense, construction and foods. After 14 years in the defense industry, Pegman helped establish the UK National Advanced Robotics Research Centre and went on to manage the research program. Following this, he played a key role in the commercialization of the center, setting up UK Robotics and heading that organization for nearly eight years. Pegman was recently elected as chairman of the International Advanced Robotics Programme (IARP). He is the U.K. representative of the European Space Agency Advisory Group on Advanced Robotics. He also chairs the special interest group on advanced robotics within the British Automation & Robotics Association (BARA). Further details are available at www.rurobots.co.uk

Packing snacks **made easy**

by Mark Cardwell
photos Mark Cardwell

Propack, one of North America's leading carton-loading automators, aims to make life simpler and more efficient for candy and cookie manufacturers.

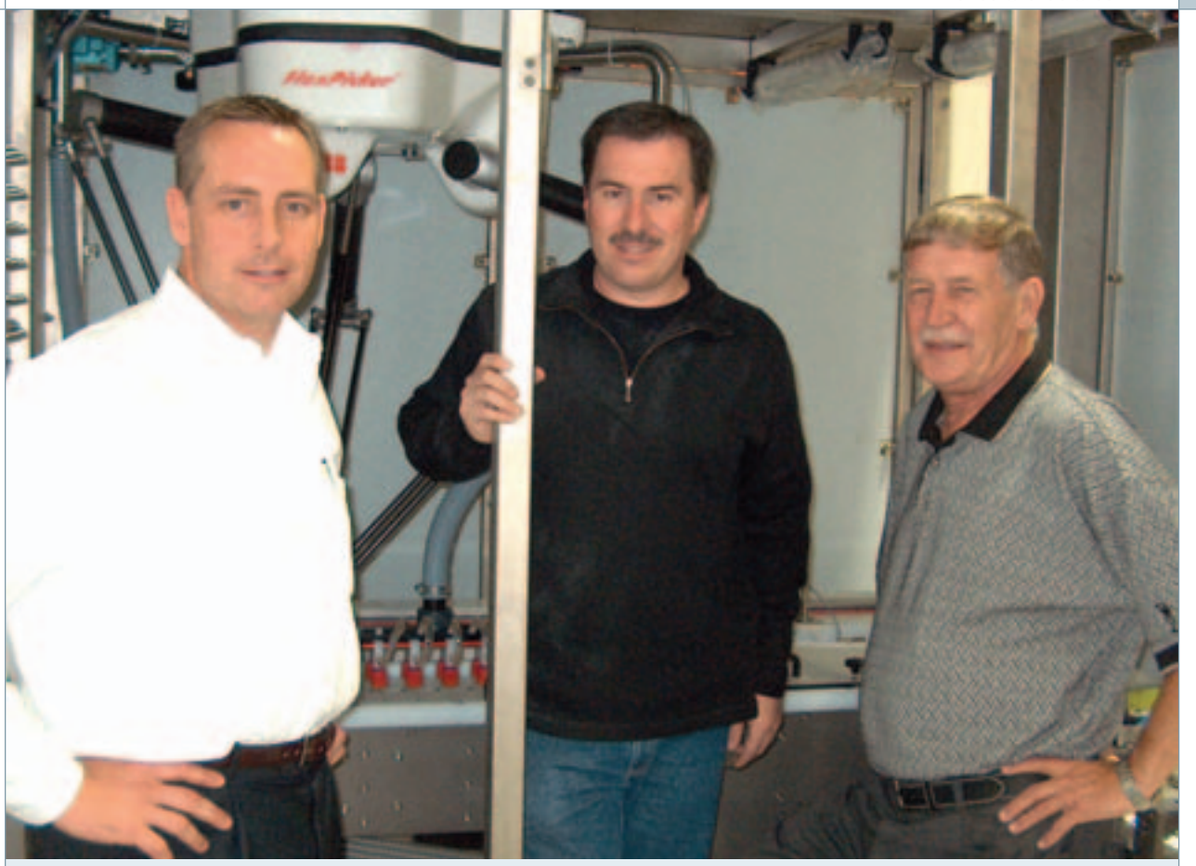
> The North American confectionary packaging industry has few secrets for Chris Follows. So when he realized a few years ago that snack-food makers wanted packing machines that offered more flexibility and took up less floor space, he responded.

As president of Propack Processing & Packaging Systems, a Canadian manufacturer and distributor of standardized carton-loading machines, Follows overhauled the make and design of his company's core product line – the LJ Series. "We needed to increase the number and variety of tasks our machines could do," he says. "We also needed to downsize our machines. Their footprint was too big."

To solve the problem, Follows decided to change the robotics at the very heart of his machines. Gone was an old big 6-axis, side-loading system. In its place was ABB's FlexPicker IRB 340, a 4-axis, top-mounted picker system. The change, says Follows, was immediately embraced by Propack customers across Canada and the United States. "The 4-axis machines offer our customers more options and they are more durable," he says. "We've got more than 50 of them in the field and we've had no issues with any of them. When our customers are happy, so are we."

That's a maxim Follows came by as honestly as did his knowledge of the packaging industry. The son of a manufacturing representative for an American packaging-machine maker, he trained and worked as a mechanical technician before joining Klockner Packaging Machinery. After five years as head of the company's sales department, he left in search of a new challenge and founded Propack in 1996.

Initially, the company was a literal one-man show, with Follows acting as the North American manufacturing representative for Dutch packaging-machine maker Tevopharm BM. Since then, Propack's product line has continued to grow. Today, in addition to selling a variety of models in its own LJ Series, which are assembled at a manufacturing facility near Quebec City, Propack is the North American distributor for Houdijk Holland's biscuit-packaging systems and Tevopharm BV's flowrapper and multipurpose modular in-line infeed systems. The company is also a distributor for Bradman-Lake, a carton machinery manufacturer based in North Carolina, and Schneider Packaging, a packaging equip-



Propack President Chris Follows, with V.P. Kevin Crosby and engineering manager Dave Young.

"I don't buy things for the price, I buy them for quality."

Raymond Guilbeault, Les Aliments Multibar Inc.

ment maker in Brewerton, New York.

The company's customer list is equally impressive. Follows says that some of North America's biggest food- and meal-supplementary drug-making conglomerates are using Propack-supplied packaging machines to wrap and pack everything from cookies and cakes to candy- and meal-supplement bars. "We completely dominant the latter sector in Canada," he says. "We have 17 LJs there. I think that represents all of the machines being used."

Propack has also continued to grow in terms of the number and quality of its employees. "Technically, we have one of the best teams in the industry," says Follows of his company's 10-member staff, most of whom work in the company's unpretentious suite of offices in an industrial strip mall in Oakville, Ontario, a 20-minute drive south of Toronto. "That allows us to check out machines properly. And the fact that all the models in our LJ Series run the same program saves us time and trouble, too."

The most notable addition to the company's personnel in recent years has been Kevin Crosby. After spending a decade helping one of North America's largest candy-bar makers build a high-speed robotic collating system, Crosby joined Propack in 2001 as both a partner and vice president of manufacturing and engineering. "Kevin brought a huge wealth of knowledge and understanding about the confectionary industry to our company," says Follows.

It was Crosby who first suggested replacing an old robotics system in the LJ Series with ABB's IRB 340. A more flexible machine, together with a customized PC platform that makes both hardware and software easier to upgrade and support, has helped Propack become the dominant player in the medium- and high-speed confectionary packaging markets in North America. "Our systems are so easy to use that our customers can change the settings themselves. They don't need a robotics technician," says Follows. "That allows them to switch product lines with little time and trouble. That's exactly what companies want, especially the smaller ones."

Big ones, too, it seems. One of Propack's biggest customers, Montreal-based Les Aliments Multibar Inc., has ten LJ500 models for its assembly process, which produces two million snack bars a day for customers like Quaker Oats and Atkins. "I don't buy things for the price, I

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ABB's Mikael Packalén likes to get people excited about robotics.

"Our systems are so easy to use that our customers can change the settings themselves. They don't need a robotics technician."

Chris Follows, Propack

> buy them for quality," says company owner Raymond Guilbeault. "With Propack, I get both." In addition to small improvements Propack has made to the LJ500 in response to his company's needs and observations, Guilbeault says he appreciates the personal and professional attentiveness he gets from Follows. "I've dealt with Chris for 15 years. He knows his stuff, he's a good guy, and I can reach him anytime," says Guilbeault.

Despite the accolades, Propack's owners aren't resting on their laurels. In an effort to break into the highly-competitive, low-speed packaging market, Follows and Crosby are in the midst of developing a new model in the LJ Series – a single-train system that will be able to run 500 pieces per minute and load cartons. "We're looking to reduce end-cost dramatically," says Follows, who hopes to unveil the new machine at the Interpack show in Düsseldorf, Germany next April. "That's what our customers want. And by staying in tune with them, we'll continue to be successful."

Big plans for Propack

> Propack president Chris Follows is understandably hesitant to discuss the ongoing development of the newest addition to his company's LJ Series of packaging machines. He will say, however, that the new model will incorporate more ABB technology than the IRB 340 FlexPicker, the robotics system at the heart of all LJ machines. The new one, he says, will also have the IRC5, ABB's fifth generation robot controller.

A new modular concept with an ergonomically-designed portable interface, user-friendly Windows layout, and touch-screen operations, the controller offers increased life-time profitability for end users – the same qualities and benefits that Follows wants to pass on to Propack's customers. "It will help them reduce their costs," he says. "When our customers are happy, I'm happy – and our customers will be happy with our new machine."

Those comments are music to the ears of Mikael Packalén. As channel partner sales manager of ABB Robotic, Automotive & Manufacturing - Canada, his job is to develop the non-automotive manufacturing industrial market for ABB by working with integrators and machine builders that supply robot-based automation to the consumer industry, particularly the food, beverage, and pharmaceutical fields. "My job is to get people excited about robotics," explains Packalén, who hails from Sweden.

Among ABB's many Canadian partners, Packalén considers Propack to be one of the most dynamic. "They are very focused on what they do and they're very knowledgeable about their market," he says. "They are also an important partner and channel for us into the North American packaging market."

Through Propack, Packalén hopes to see a big increase in the sales of the IRB 340 FlexPicker thanks to the rapid growth in the use of robotics in the North American food industry. "The industry is now adapting to robotics, particularly for applications like palletizing, picking, and packing," he says. "The growth potential is huge, particularly when you're working with a dynamic partner like Propack."

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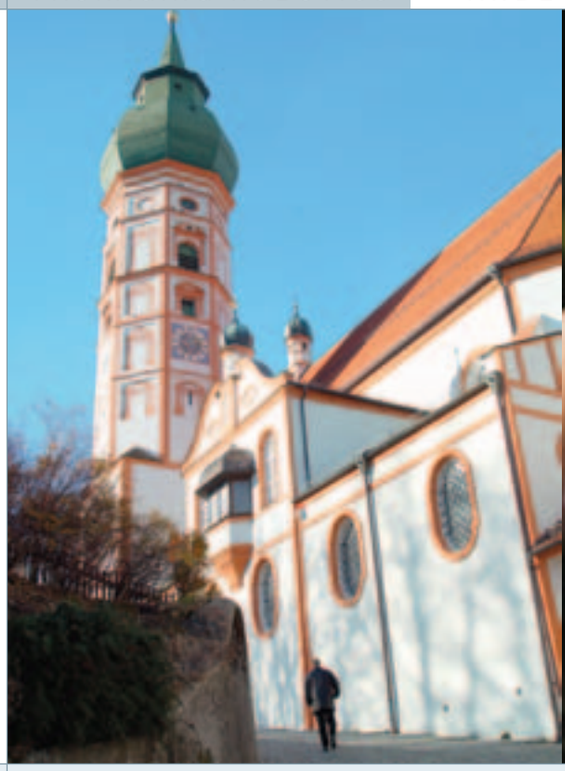


Bless this **brewery**

Modern techniques allow monks at the Andechs Benedictine Monastery to continue brewing beer.

> Brewing beer has been a long tradition in the Andechs Benedictine Monastery. Since the Middle Ages, monks have served their own barley brew to travelers and pilgrims. Today, the monks' brewery produces over 10,000,000 liters of beer – an output made possible by the latest technology.

Initially to meet their own needs and then to provide for guests, monks started producing beer themselves at a very early date.

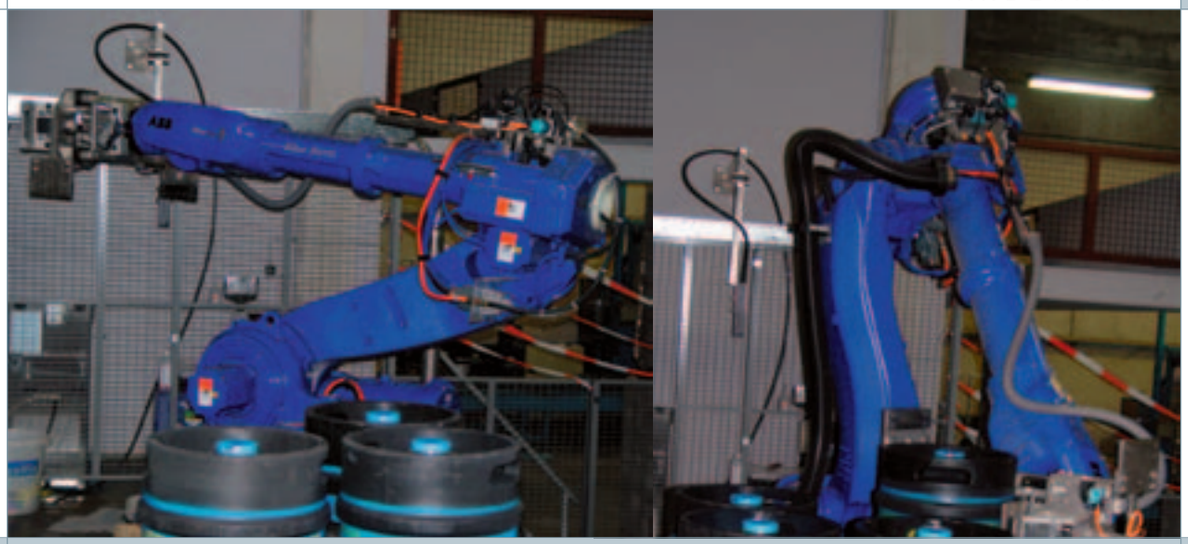
They quickly discovered that beer not only satisfied their thirst. When it was brewed full and strong, it actually filled their stomachs too. For this reason, beer became known as "liquid bread."

But good beer was rare in the Middle Ages. The brew the monasteries obtained from surrounding villages was usually only thin oat beer. The monks therefore had no other option than to take up brewing themselves. As most monasteries conducted their own agriculture anyway, they simply planted more barley. This produced better-tasting and more nutritious beer than oats.

The monks' beer quickly became far superior to anything brewed in the surrounding district. The main reason for this, apart from the better-for-brewing cereal, was that individual monks were able to attend exclusively to brewing beer and the educated brothers took a scientific approach to the task, becoming true specialists and acknowledged master brewers.

Monks also gave anyone who knocked at the monastery gate something to eat and, of course, a measure of beer. In addition, for a fee, the monasteries were able to acquire the right to sell their beer commercially and to serve it in what were known as monastery taverns. In this way, many a monastery developed over time into a well-run hostelry.

This is precisely what happened at the Bavarian Andechs Monastery. Beer had been brewed in Andechs back in the Middle Ages, after the Duke of Wittelsbach, Albrecht III, had founded the Benedictine abbey in 1455 on the Andechs mountain. And they became so skilled at brewing that their high-grade barley brew became appreciated far beyond the monastery walls. In the brewery today they produce five sorts of bottom-fermented and two sorts of top-fermented beer,



At Andechs Benedictine Monastery, "Blue Berty," an ABB 6650 robot, helps out with packing kegs of beer.

The IRB 6650 robot, known affectionately by the brewery workers as “Blue Berty,” is the key machine in a kegging line...

which are sold throughout Germany and in many European countries.

When the Benedictines at Andechs asked themselves in the 1970s whether the tradition of brewing beer should be discontinued in view of economic changes or continued but using new technology, the monks decided in favor of building a completely new brewery. In 1972 they erected a comprehensive brewery at the foot of their monastery. The new establishment was finally complete in 1983 when the brewing room went into operation with fermenting and storage cellars.

Since that time, all the technical brewing facilities have been consistently renewed and brought into line with the modern brewing industry. This long-term investment policy by the monastery not only guarantees a high-quality beer and environmentally friendly production, but also a good working environment.

One contribution to good working conditions was the introduction of a palletizing robot from ABB in October 2003. The IRB 6650 robot, known affectionately by the brewery workers as “Blue Berty,” is the key machine in a kegging line made by Albert Frey Dienstleistungs AG. As a specialist in flexible solutions in the beverage industry, Albert Frey successfully employs ABB robots for keg handling.

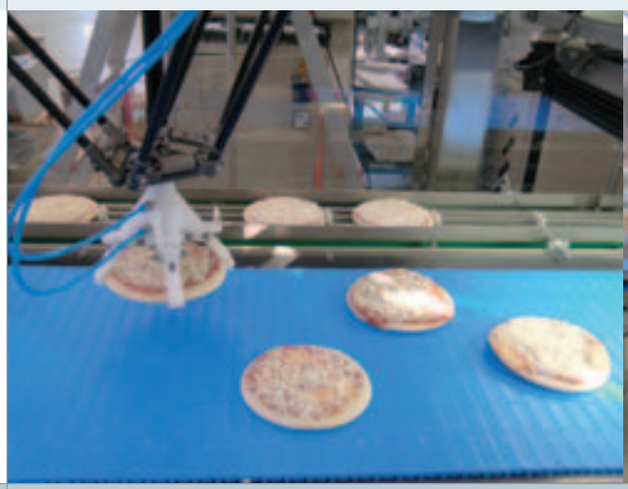
Kegs, as the cylindrical stainless-steel or plastic jacketed drums are known, weigh a good 63 kilograms in the case of a full 50-liter container, for example. Over the working day, quite a few metric tons in weight have to be moved by personnel. But the robot can do far more than simply stack pallets with the various sizes of container, from 50 liters down to 10 liters. The new facility created by the beverage specialist from Wald in the Allgäu was designed and programmed to be very flexible to operate.

During normal production, the robot takes the keg from the “empties” conveyor, transfers it to a sealing station where the keg closure is tightened and passes it on to the cleaning and filling line. Then it lifts the full keg up again, applies the sealing cap, dates it with an ink-jet printer and places it on pallets on one of two full-keg conveyors, according to the type of beer. Depending on which conveyor the kegs have been palletized on, the kegs which were not filled because of a technical problem, for example a defective closure, are set aside on the other conveyor. When started up in the morning, the robot loads the cleaning and filling line with empty kegs until the first full keg is ready to be palletized. The entire facility is operated via an easy-to-understand touch-screen panel.

High technology and tradition form perfect partners at the Andechs Monastery. The model created jointly by the monks and personnel is clearly the key to the corporate culture of the brewery and of the other monastery undertakings. Say the monks: “It is our tradition to be progressive; our progress is due to a great tradition.”

by Claudia Flisi
photos courtesy Vortex

Picking **pizza pickers**



Great frozen pizzas require more than the best ingredients. Proper packaging makes sure you get what you expect, nothing more and nothing less.

Frozen pizzas take special handling by robots.

> A good pizza maker is hard to find. You have to know how to prepare the dough, how long to let it rise, to shape it without patting, to choose the proper accoutrements (tomatoes, mozzarella, herbs, cheese) and cook it, according to tradition, in a wood-burning oven.

An expert pizzaiolo might prepare a pizza in a few minutes. But if you are an industrial pizza producer, making the pizza is only the first part of your problem. You have to freeze it, sort it, wrap it, package it in accordance with regulations for freshness and hygiene, and make sure it doesn't loose its attractiveness during this process. For example, if the pizza starts out round, it better look round when it arrives in the customer's kitchen. If cheese has been sprinkled on top, it better be there when the customer opens the package… and not wind up on the factory floor.

Enter Italy's Vortex Systems and Sweden's ABB. Vortex is located in a part of Italy (Fossalta, near Ferrara in Northern Italy) where the traditions of machine making are almost as deeply rooted as those of cooking. ABB's Process Solutions & Services (PS & S) is a branch of the Automation Technologies division of the ABB Group in Italy.

In 2003, the company began experimenting with the packaging of frozen products, and ABB became involved.

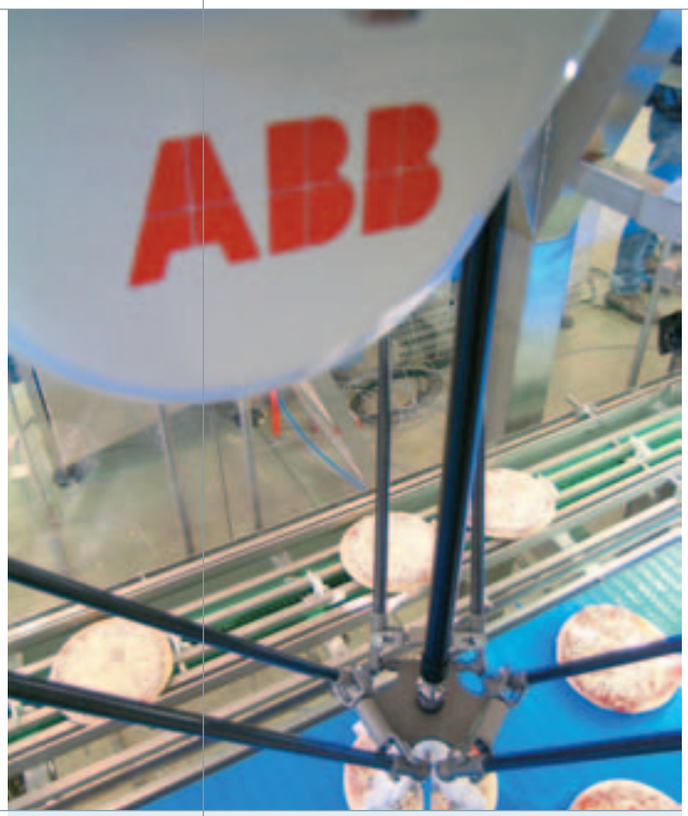
"We decided to enter this market because we may have some peculiar and new solutions for this industry" says Garbellini, "even if it's a more complex market that demands great flexibility and a high hygiene standard."

Vortex already made its own "robots," but frozen products processing demands more manipulation of the product while on the production line. At the same time, these products come in a variety of shapes, and these shapes may change every few months, depending on consumer tastes. Vortex engineers decided that what was needed for this special application was a vision system able to "see" the products coming down the line, and a more sophisticated, fast and flexible robotic system that could work on at least four axes.

The answer turned out to be the FlexPicker from ABB, which not only gives Vortex flexibility, but the accompanying PickMaster software has a user-friendly interface that makes it simple to use.

To start with, ABB made its FlexPicker available to the company. "They gave us a sample robot to work with, to learn about, to experiment on. We played around with it and developed an application with four axes robots having innovative features and advantages compared to other solutions on the market," says Garbellini.

The first industrial system picks each differently shaped pizza up as it moves along a production line coming from the freezer, positions it in continuous in the flow-pack chain (Otem



"These machines, with Vision, can handle triangles, ovals, rectangles, and more than 40 different formats and sizes."

Marco Garbellini, Vortex

flowpack machine) and packages it. During this process, ABB's Vision system guides a robot hand developed by Vortex to pick up each pizza. The "hand" has four "fingers" that simulate human movement to avoid dropping the pizza. This solution ensures that the product is not touched by human hands from the time it exits the freezer to the moment it is packaged.

The challenge lies in the fact that the pizzas are not collated neatly on the line and may not be perfectly uniform in shape. Also, they must be handled delicately: There may be cheese or other items on top of the pizza and these can't be lost in the trip from line to package.

Packaging has to be both fast and reliable; downtime means a lot of product will go to waste. ABB's FlexPickers handles 100 pizzas a minute with payback in six months or less.

According to Garbellini, the advantages of the FlexPicker for this application are not only that it is cost-competitive, but it is more flexible than traditional pick and pack magazines. "These machines, with Vision, can handle triangles, ovals, rectangles, and more than 40 different formats and sizes," he says. In addition, quality control is built in and it is more hygienic because the product is picked up and packaged immediately without an intermediate step for sorting. Every step eliminated is a step forward in hygiene, he notes.

ABB's FlexPicker using PickMaster software – the second product ABB has provided for Vortex, with a third on the way – has performed so well for pizza that Vortex is now using it in packaging machines for breaded meats. Meat is more difficult to package than pizza because there are more hygiene requirements and the breading is more delicate.

Vortex Systems works with more than pizzas, of course. The company was founded in 1987 at a time when robotics in Italy were used for automotive production lines, not for food. But through a series of encounters, Vortex Systems was confronted with the problem of designing machinery for packaging ice cream cones. "The opportunity came about by chance, but Vortex Systems devoted itself to the challenge," says Garbellini.

Vortex Systems' first projects were installations for the packaging of ice cream cones for Algida (owned by Unilever), the biggest ice cream maker in Italy. French, English, and German customers soon followed. Machines for the picking and packing of sticks, cups and sandwich novelties were added.

Today Vortex Systems is part of the CT Group. Sister companies of Vortex inside the CT Group include Catta27, which works with ice cream processing; Otem, which works with flowpack machines; and Mopa, which works with feeding systems. Together with Vortex, this group represents a global player in providing integrated solutions to different packaging and process needs.

"Now we can compete with larger German and Swiss competitors and have a better presence internationally," says Garbellini.

>FACTS

Vortex facts

In 1990 Vortex Systems had about 20 employees; today they are 75. Half of these are engineers and technical specialists, the other half are commercial, administrative, and production staff. The company makes about 30 integrated lines or systems a year, most of them designed for the specific application of a particular client, with a turnover of over 15 million euro. Vortex sales in 2004 will show a growth of about 20 percent compared with 2003.

Essential software **gets even better**

An upgrade of PickMaster means more flexibility for the user-friendly software.

> With the April 2004 release of version 2.30 of PickMaster software, ABB continues to ex-pand on the success of the PickMaster 2 platform.

PickMaster is easy-to-use software designed for use with flexible packaging. The software was specially developed for the fast moving consumer goods industry, which has high demands such as very quick time to market and process reliability.

The target market for the software is very fast primary packaging operated through the ABB FlexPicker. However, PickMaster is available together with any robot type and represents an ideal standard vision tool for many applications.

PickMaster 2.30 introduces a host of new features, including the latest in digital vision technology from Cognex. The new complete vision kits include tiny digital CMOS cameras and give access to inexpensive high-resolution vision recognition as a standard option.

In addition to new vision technology and language additions, PickMaster 2.30 includes a number of other useful features. There is new camera calibration that allows for flexible and tilted camera mounting, and the graphic user interfaces have been improved for ease of use, simplifying the inspection training and providing an improved analysis of the results.

PickMaster features intuitive graphical configuration of flexible packaging lines.

If all this is still not enough, you don't have to stop here. The PickMaster SDK offers powerful customization capability for adding custom vision models and since version 2.30, even complete sensor systems can be integrated in the PickMaster concept,, be it a simple bar code reader or a complete vision system.

PickMaster 3.0 will soon be ready to meet the new ABB controller generation, building on the advantages of earlier versions.

Take all this packaged intelligence, spice it up with some new functions, connect to the brand new modular IRC5 robot controller and you've got the recipe for the new PickMaster 3.0 generation.

ABB provides compatibility to already installed equipment and smooths the change over to this new controller generation. PickMaster 3.0 supports the co-existence of the S4Cplus and IRC5 controller in the same installation. In fact, users will hardly notice the difference. Handling and user interfaces remain unchanged while the controller interfaces are internally hidden.

PickMaster 3.0 introduces a new powerful customization concept – programmable user hooks using the Microsoft .NET interface give access to read and manipulate target positions well before they are sent to the robots, thus enabling interaction with other devices, logging and many other tasks.

PickMaster 3.0 will be available in six languages.

More about PickMaster

PickMaster is a scalable integration of high-speed picking operations, vision and conveyor tracking. Specifications include:

Maximum configuration
- One PickMaster/PC
- Eight robots/PickMaster
- Two vision cards/PickMaster
- Eight cameras/PickMaster
- Eight work areas/robot
- Six conveyors/robot

Vision
- Search tools PatMax/Blob
- Inspection (multiple feature evaluations: size, shape, relative positions, histogram, plus more)
- Interfaces for custom enhancements

Why choose a robotic vision system?

The reasons for deciding to use a robotic vision system are many.

> Wahen evaluating a robot application that includes a machine vision component, one critical decision is where to purchase the machine vision system. Should the system be purchased from a robot supplier, or is it better to purchase from a vendor who sells general-purpose machine vision?

The first question to ask is how much application time is required to get a robotic vision system working. Products available from robot suppliers are specifically designed for robotic applications with features tuned for robotics. The vision portion of robotic applications can be set up using a graphical interface with no programming required. Typically, vision is set up within a half day or less.

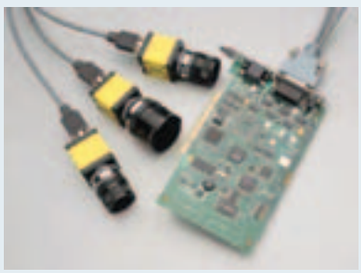
A general-purpose machine vision system will have a broader range of options but few specifically related to robot vision. Setting up robotic vision with a general-purpose machine vision system requires extra time to sort out what features should be used for the application and extra time for all the programming required.

Another question to ask is how calibration is established between the robot and the vision system. Products available from robot suppliers have built-in, easy-to-use robotic vision calibration based on either calibration grids or motion-based calibration. The calibration supplied with general-purpose vision systems tends to be clumsy at best. One supplier required manual input of robot points within a separate graphical panel for each point in the calibration. Not only is this awkward, but it is also prone to error.

Many applications require or benefit from more complex setups that may include any number of elements. For example, this could include rotating an angled gripper, offsetting an entire robot path or transforming to alternate robot frames. Other elements could include putting a part or camera on the robot, requiring multiple camera views to image a part or adding 3-D input through stereo or other imaging techniques.

With these types of complexities, applications are far easier to set up with a robotic vision system that has the required built-in features.

Extensive programming is required to compensate for missing features when using a general-purpose vision system for robotic applications. Plus, when using general-purpose vision for robotic applications, there is no built-in support for programming a robot. On the other hand, with a robotic vision system there is significant built-in support.



The Cognex MVS-81xx vision system works with ABB's PickMaster Software.

What happens if something goes wrong? When there is a problem, users must determine if the problem is caused by the robot application or the vision application. If a general-purpose vision system is used, there is no easy way to determine if the problem is with the robot, the vision system, or some combination of robot and vision. If the vision was purchased from a robot supplier, it is likely that the supplier has experience with similar applications. Thus, the robot supplier, based on previous applications, is able to supply a "cookbook" approach to the problem and find a solution more quickly.

Deciding on whether to use robotic vision purchased from a robot company or to use a general-purpose vision system comes down to asking the following question. "Are the broader range of options available in the general-purpose system worth the extra time and cost required to make use of them for a robotic vision application?" The more experience system integrators have with vision, the more appreciation they will have for the value of a "ready-to-use" robotic solution.

Vision system from ABB and Cognex

PickMaster – ABB's packaging software – uses Cognex MVS-81xx Series, an advanced vision system developed by Cognex Corporation, one of the world's leading supplier of machine vision systems which are used to automate a wide range of manufacturing processes where vision is required. In 2003, Cognex posted USD 150 million in revenue. Since its founding in 1981, Cognex has generated over USD 1.6 billion in cumulative revenue and shipped more than 225,000 vision systems. The company also has acquired more than 190 patents, with over 80 U.S. and international patents pending.

The best robot controller is flexible, easy to use and easy to program.

Gain control over **robot control**

> The IRC5 controller sets new standards in user-friendly robot control with its modular concept, a completely new ergonomically-designed Windows interface unit, and fully coordinated multiple robot control through the MultiMove function.

For packaging applications, the IRC5 controller is integrated in the new PickMaster™ 3.0 from which it can even be controlled in parallel with already installed S4Cplus systems.

When it comes to modularity, the IRC5 has a logical split of functions into control, axis drives and process. Each module can be housed in its own cabinet with identical footprints so they may be stacked for minimal floor occupancy or distributed up to 75 meters. The modules easily slide under a conveyor or fit on top of a robot frame.

The hub of the IRC5 is the control module that performs all the control functions and path calculations for up to four 6-axis robots plus additional axes such as work positioners, with a total maximum of 36 axes. The drive module controls the position and speed of up to 9 servo axes, and the servo drive cards. Up to four drive modules can be linked to the main control module to drive up to four robots and additional axes, which is the basis for MultiMove applications. The process module has the same communications and interface arrangements as the control module, and an identical footprint, and therefore is linked in the same way to the control module.

The modular IRC5 has a small footprint.

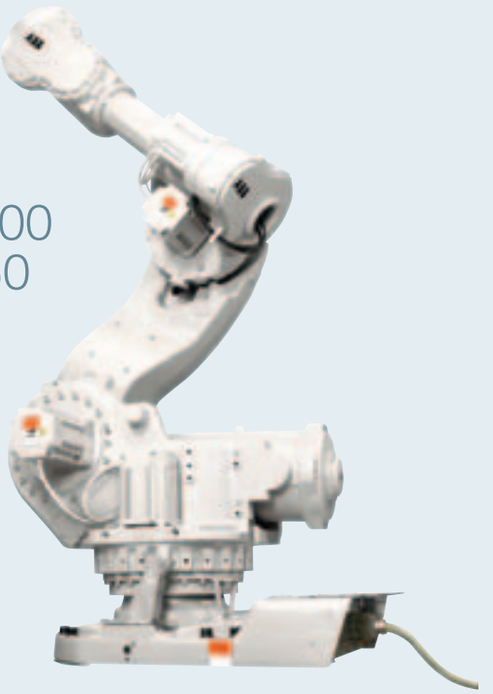
In terms of user friendliness, a key element is the Flex-Pendant interface unit. The FlexPendant has only eight 'hard' fast-access buttons, four of which are fixed and four assignable, plus a unique ABB 3-way joystick for intuitive jogging of the robot, and an emergency stop.

FlexPendant software uses the Windows CE.NET operating system. The layout is identical to any Windows page on a PC and rather than being language-based, uses readily recognizable icons that are 'clickable' by finger on a fullcolor touch screen. One of many advantages of using Windows CE is that the system is open, and the screen can be easily adapted to new industries and languages.

The FlexPendant is easy to use.

@ More information about IRC5 can be found at www.abb.com/robotcontroller.

Loaded with safety features, the IRB 7600 can handle up to 650 kilograms at a time.



Taking on the big jobs

The IRB 7600 can deal with the heaviest of heavy-duty handling for packaging of consumer goods.

> Since the introduction of the "power robot" IRB 7600 a couple of years ago, there has been a growing demand for this robot for use in heavy-duty palletizing for the consumer goods packaging industry. There are many examples of such applications, everything from full-layer palletizing and beer keg handling to palletizing bricks used in building, just to mention a few.

The IRB 7600 allows manufacturers of consumer goods to handle really big loads, up to 650 kilograms at a time.

A major concern with robots handling payloads of up to 500 kilograms is to safeguard personnel in the unlikely event of an accident, as well as to protect the robot itself. To help ensure security, ABB has developed a range of software products called Active Safety.

Active Safety includes a number of elements. First, collision detection reduces the collision force substantially. An Electronically Stabilized Path will ensure that the robot will maintain its planned path to its best capability considering acceleration, drag, gravity and inertia. This feature is secured through a feature called TrueMove. Plus, the Active Brake System controls the braking while ensuring the robot maintains its path. To achieve optimized performance, the robot adapts to true payloads through its Self-tuning Performance. This feature is based on QuickMove.

A built-in Service Information System monitors the motion and load of the machine and optimizes service requirements by itself.

There are also a number of passive safety features. These features include options like load identification, moveable mechanical stops and double-safe limit switches.

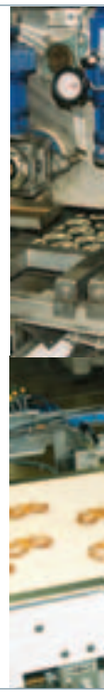
More about the IRB 7600

Specifications for the IRB 7600 include:

Robot versions	*Reach*	*Handling Capacity*	*Center of Gravity*	*Max. Wrist torque*
IRB 7600-500	2.30 m	500 kg	360 mm	3010 Nm
IRB 7600-400	2.55 m	400 kg	512 mm	3010 Nm
IRB 7600-340	2.80 m	340 kg	360 mm	2750 Nm
IRB 7600-150	3.50 m	150 kg	360 mm	1880 Nm
(IRB 7600-150 loaded with 100 kg			1660 mm)	

Extra loads can be mounted on all variants
50 kg on upper arm and 550 kg on frame of axis 1.

Handled With Care



by Melanie Nyfeler
photos courtesy
Roland Murten

The latest innovation at Roland Murten AG is pretzels packed individually by robot – ABB's FlexPicker IRB 340. It's fast and the number of broken items has been reduced from between 10 and 12 percent to about 4 percent.

Roland Murten AG has reduced breakages by two thirds with the help of six ABB FlexPickers.

> What is small, brown, freckled like Pippi Longstocking, and very crispy? A Roland pretzel from Murten, of course. For years they have been popular with kids on long journeys, and the favored method of eating them used to be to dig around in the box for the whole ones and leave the broken ones until last.

Nowadays Roland Pretzels are sold in specially moulded plastic containers. And for six months now six ABB robots have been making sure they are placed in these transparent containers with great care. The FlexPicker, thanks to specially developed mechanics, lifts individual pretzels by their two loops and stacks them in the container until it is full. All this takes place at high speed – 134 kilograms of pretzels have to be packed every hour.

The plant never shuts down. Pretzels are made 24 hours a day in three shifts, and there's a familiar tempting smell as soon as you enter the factory. The production process takes just 50 minutes, from the mixing of the ingredients – flour, malt and yeast – to the moment the pretzels are packed.

In the first stage of the process, the raw ingredients are piped across the factory, weighed, mixed and kneaded into dough. The dough is then fed in two kilogram lumps into one of the 12 machines that give the pretzels their traditional shape: The machine divides the dough into little balls, each about the size of a walnut, and then pulls and stretches them into long thin strings. With a final flourish the machine twists the string into the right shape and lays it on the conveyor belt.

"The workers really appreciate how quiet these new ABB robots are."

Walter Fuchs, Roland Murten AG

It sounds complex, but is in fact surprisingly simple. Although the pretzels used to be made by hand by women piece-workers, they've been made by this same machine for the past 40 years. It is, sadly, not an ABB machine.

"It comes from the United States, and even today it's a minor mechanical miracle," says a proud Walter Fuchs, production manager at Roland Murten AG. "It can twist 40 pretzels a minute." Although repaired on several occasions, it refuses to give up the ghost. That would be a disaster for the firm, because Roland Murten prides itself on being the only producer in Europe still twisting pretzels. All their competitors stamp them out of the dough.

The pretzels, which have now been evenly distributed onto the conveyor belt are dipped in a bath of sodium hydroxide and sprinkled either with coarse grains of salt or sesame seeds. Then it's time for the oven, where they are baked for ten minutes at 350 degrees C.

This is where the six ABB robots, set up diagonally opposite each other, go to work. Each has a camera focused on the conveyor belt, which transmits the coordinates of each individual pret-

The ABB FlexPicker lifts each pretzel individually and lays it carefully in a plastic container.

Fewer broken pretzels

Production manager, Walter Fuchs, explains to reporter Melanie Nyfeler why Roland Murten AG decided to invest in ABB robots.

In what way can the ABB robots do a better job than the machines you used to have?

For one thing, the ABB robots operate considerably more quietly than the old machines, which is important for the people who work in the factory. Another thing is that we've been able to reduce the number of broken items from between 10 and 12 percent to about 4 percent. These robots can pick the pretzels up much more gently.

Are these the reasons you went for ABB robots?

Yes. It was also because we'd already been using an ABB robot on our Flûte production line, with which we'd been very pleased. Working with ABB has produced real dividends, because we were able to find solutions together. The experts over at ABB understood exactly what we needed, and made sure that we got it.

Are you pleased with the new set-up?

Yes, the robots are living up to expectations, even though the machines and the know-how are absolutely new. We've been completely won over by this method of picking the pretzels up, rather than sucking them with air. This is the only plant in Europe that can do that. But there are a few teething problems that still need ironing out.

zel to a computer. The computer programs the arm to lift each pretzel by its loops and lay it in a container. There are two challenges for this technology, which is being used in Europe for the first time: first, the extraordinary precision of the picking, and, second, the calculation of the shortest distance.

The calculation is made by the PickMaster software program. The arm does not, as you might imagine, take the pretzels off the conveyor belt in the order in which they arrive, but instead, always takes the one nearest to it. It always needs to know how many pretzels have already been placed in each container. Once the container is full, it is tipped and wrapped in plastic foil.

Production manager Walter Fuchs is delighted with this technology and the complex know-how behind it. The old packing system used air to suck the pretzels to the packaging, which was an extremely noisy business.

"The workers really appreciate how quiet these new ABB robots are," Fuchs says. There's a further major advantage of the new FlexPicker IRB 340: thanks to the precision of the technology, many fewer pretzels are broken than previously, which is important for the productivity and profitability of the whole enterprise (see "Fewer broken pretzels"). Because there are fewer breakages, fewer people are needed to check the packaged pretzels and replace the broken ones by hand.

"Before we had to take two people off the other machines to do the quality control," says Fuchs. "Now everybody can carry on working at their normal station."

Werner Erismann, the marketing director of ABB Manufacturing and Robotics in Altstetten, notes that the new robot technology is also very popular with workers: "The working environment has become more agreeable and more interesting."

This was also the case for the ABB Robot that the Manufacturing and Robotics department delivered and installed a year and a half ago for packing one of Roland Murten's other specialties – a puff pastry product, known as a Swiss Flûte or Murten-Stengeli. This too was a small technical miracle, as Erismann is keen to underscore. The robot can pick 100 of these extremely delicate puff pastry confections in one go and lay them on the conveyor belt. The Flûtes fall into containers and are then weighed. If they are too light, individual Flûtes follow automatically. It's a machine that Roland Murten is extremely happy with.

Thanks to ABB you will hardly find any broken Flûtes or pretzels any more – provided you handle them with care, of course. You'd have to drop a box of them on the floor in order for the kids to be able to pick out the whole ones, and leave the broken ones for last.

>FACTS

Roland Murten AG

Roland Murten AG was founded in 1938 and is now part of the Valora Group, to which the company formerly known as Merkur, as well as Kiosk AG, also belong. It's an enterprise with a long tradition, which employs more than 170 people in Murten, and produces around 20 tons of baked goods daily. 54 percent of production is exported to other European countries. In the beginning the company produced mainly crispbread and rusks, but today the range of products has been expanded to include items such as pretzels, bread sticks and the famous Flûtes.

by Brian Owens
photos Anders Kristensson

Automation pays off with greater efficiency and better working conditions for sausage-maker Swedish Meats.

Taking **the load off**

Swedish Meats' environment and hygiene manager, Håkan Berglind, left, with plant manager Roland Eklöf.

> In the sausage-making business, automation isn't just about greater effectiveness. It's also about improving the working environment for employees. And, says Swedish Meats plant manager Roland Eklöf, "it's about doing more with less."

Swedish Meats is a skinless-sausage manufacturing plant situated a few kilometers from Örebro, a small city in south-central Sweden. It employs about 78 people and produces about 9 million kilograms of skinless sausages a year.

The plant runs three eight-hour shifts – two work shifts during which the sausages are produced, and one maintenance shift during which the lines are systemically cleaned to prepare for the next two work shifts.

Some 28 people work on the production line

"We were concerned about the ergonomic aspects of packing the boxes."

Håkan Berglind, Swedish Meats

during a shift. The production line comprises the complete manufacturing process, starting with the grinding and mixing of the meat, followed by the smoking and cooling, and ending with the packaging.

All meats are purchased in Sweden, a point of pride for Swedish Meats, whose primary market is domestic. Swedish Meats belongs to a Swedish farmer cooperative, which is owned by some 13,000 Swedish farmers. They are, in effect, the shareholders, realizing any dividends if the plant performs well.

Since the early 1990s, when it produced a variety of meat products, the Örebro facility has narrowed its product range to specialize. Today it produces only skinless sausage. "We've come a long way," says Eklöf. "We're a midget in the concern but a giant on the market. We have 50 percent of the market; our next biggest competitor has 16 percent."

To achieve profitability, the plant manager is always striving to ensure that the factory runs as effectively as possible, which means pinpointing tasks in which workers are under more physical stress than is optimal over time. Two such tasks were isolated, involving the packing stages of production.

"We were concerned about the ergonomic aspects of packing the boxes," says Håkan Berglind, Swedish Meats' environment and hygiene manager. "You can imagine what this kind of activity will do to your back and shoulders after a while."

Swedish Meats turned to ABB to supply robotic solutions for the most physically stressful tasks on the line.

Robotic picking "cells" with ABB's FlexPicker robots were strategically positioned on each of two conveyor belts to pack the already plastic-wrapped sausages in boxes for transportation.

The newly installed picking cells are equipped with integrated video cameras and tracking systems to enable the robots to pick up the wrapped packages of sausages from the conveyor belts. The packages are then placed with labels and barcodes uniformly positioned in a box about the size of a shoebox.

One issue in developing the robotic solution was dealing with the reflection of the light on the packages. "Because the packages are made of plastic, the light from the lamps reflected back, blinding the camera," says Arild Larsen, ABB engineer re-sponsible for the solution. "What we did was light the conveyor belt from the side, reducing the glare."

The sausages are packed into the boxes at a rate of 96 packages a minute. Guided by the video camera, the tracking system tells the picking robots exactly when, where and how the packages are positioned on the conveyor belt, so the robot can pick them up. Because the packages are positioned randomly at various angles, the claws must be able to rotate to accommodate the placement.

"Our ABB team in Stockholm came up with a tracking solution that was a big step forward from the previous version," says Larsen. "It also made the system much more reliable." An even-newer version is being developed that will mean even greater benefits for Swedish Meats.

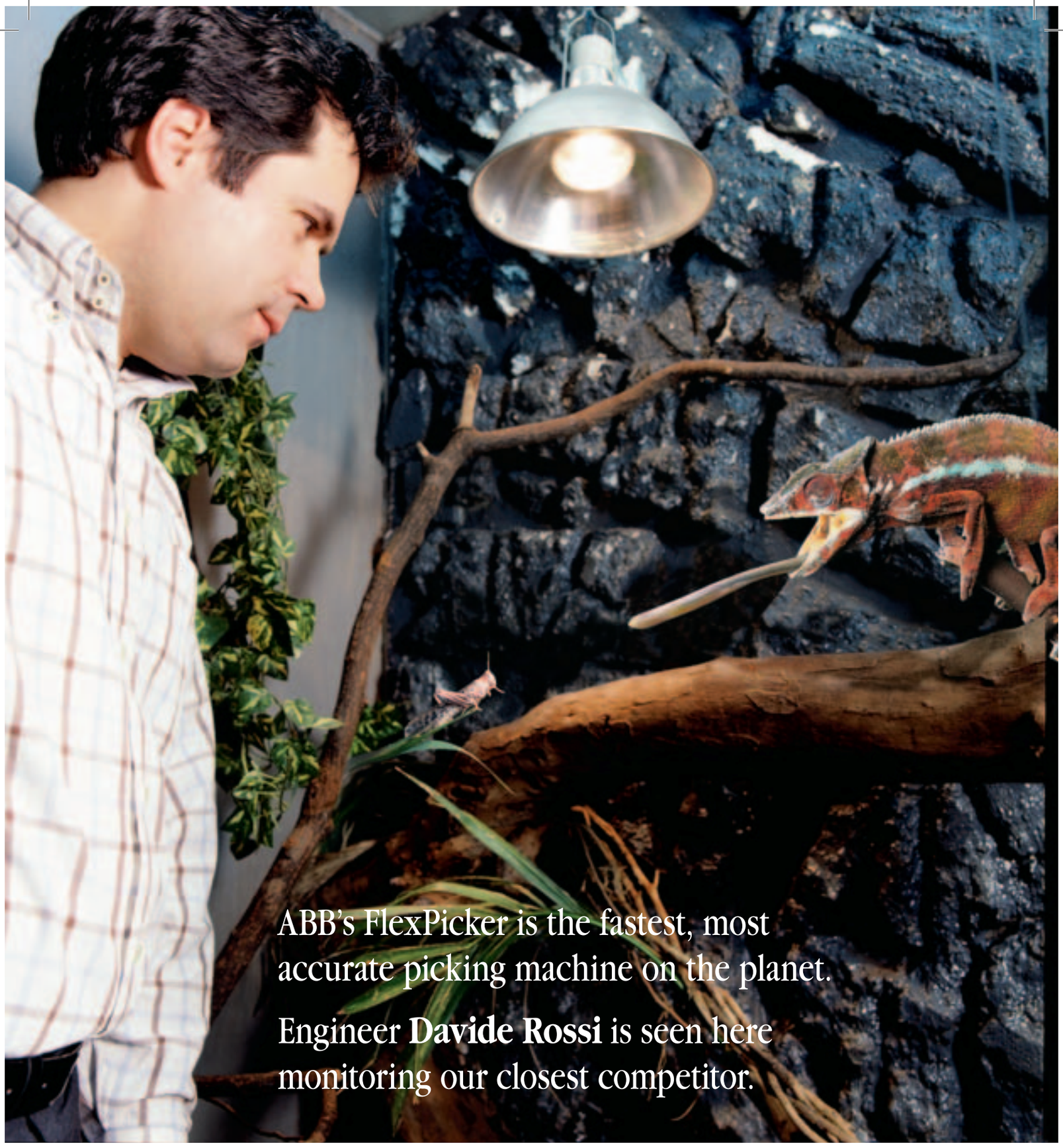
The suction cups for grabbing the packages presented another challenge for Larsen and his team. They needed to be of a material that was both durable and gripped the package surface well and at the same time was soft enough to avoid damaging the sausages or tearing the packages. Larsen and his team went with a Canadian-made silicone compound that had a soft surface but could last for 20 days, working 18 to 20 hours a day. Vacuum channels built into each suction cup helped to protect the packages as they were lifted, held and then released.

At the end of the production line, a much larger ABB robot was situated to place the packed boxes on pallets and move the pallets onto a wagon to be transported to the cool storage room to await shipment. The IRB 640 is capable of lifting five boxes at a time off the conveyor belt and onto the pallets.

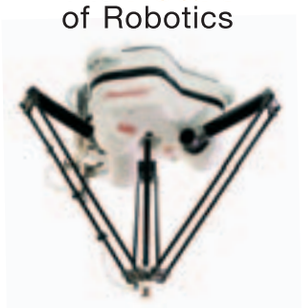
Larsen says the solution is "pretty standard software we use for palletizing applications."

The introduction of robots has not only greatly increased the efficiency of the sausage packaging process and reduced the backbreaking work of packaging and lifting, but it has paid off economically. In total, since the installation, the sausage factory has been able to reduce the production line staff by 10 workers.

The IRB 640 does its job at Swedish Meats.



The heart of Robotics



The IRB 340 FlexPicker has rapidly become a winner in a wide range of packaging applications. Davide Rossi, who provides technical support to system integrators and OEMs, knows why customers appreciate this product so much. Extremely fast, the FlexPicker handles an amazing 120 picks per minute with a one kg payload. But speed isn't the only attraction. Supported by the PickMaster software and world-beating vision technology, FlexPicker sidesteps flawed products and only picks perfection. Which truly makes it a rare animal in the world of packaging.

For more information on the pick of robotics, visit **www.abb.com/robotics**

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