



ABB's FlexPicker is the fastest, most accurate picking machine on the planet.

Engineer **Daide Rossi** is seen here monitoring our closest competitor.

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](http://www.abb.com/robotics)

**ABB**

# PACKAGING

ROBOTICS

A MAGAZINE FROM ABB

MAY

2005



**J&J Snacks** in New Jersey cuts manpower in half packing pretzels.

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**Charkman** is cutting edge when it comes to cutting meat.

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**Technology:**

New robots handle picking to palletizing.

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ABB product manager **Klas Bengtsson** says

ABB Robots take on packaging from end to end

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**ABB**

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## Editorial

### Total package

> These days, with consumers demanding an increasing variety of products at ever lower prices, companies that manufacture foodstuffs and other consumer goods have to come up with creative ways to satisfy the demand and still make a profit. As you can read in this latest issue of *Packaging Robotics*, it is obvious that robots play a key role in cutting-edge solutions for improving the picking, packing and palletizing end of the process (see story, page 10).

To streamline and make packaging more efficient, companies are seeing a need for a full portfolio of robots that can handle all stages of the process at all levels, plus user-friendly application software that works with all of the robots. ABB's recent launch at Interpack 2005 in Düsseldorf of three new robots – the IRB 260, the IRB 660 and the IRB 1600 (see stories pages 16–18) – is just one example of how we are meeting the challenge of providing one-stop shopping to our customers. And because we are a global supplier, service and support is a given anywhere in the world, and companies can be sure they won't be stuck with outdated robots and obsolete software incapable of updating.

In this issue of *Packaging Robotics*, there are plenty of examples of where the packaging industry seems to be heading. For example, meat packing, still done by hand in most places, can actually be done more safely, cleanly and efficiently using robots and the latest technology, as U.K.-based AEW Delford and Sweden's Charkman have proven (see story page 14). Even a product such as sheets of mosaic tiles, with the benefit of some ingenuity, can be glued into place using a robot instead of manually, as EMC in Italy has demonstrated (see story page 4).

With this issue of *Packaging Robotics*, there's a likely chance that some of the solutions featured here may give you an idea that could change your way of working. ABB along with the more than 50 system integrators and machine builders partners we work with, can help you turn that good idea into reality.

#### Henrik Andersson

Segment Manager, Consumer Industries  
ABB Automation Technologies  
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## PACKAGING ROBOTICS

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## Calendar

### MAY

**24-26, 2005**

PacEx,  
Toronto,  
Canada

### JUNE

**15-16, 2005**

Robotics Partner Seminar,  
Västerås,  
Sweden

### JULY

**26-28, 2005**

ProPak China,  
Shanghai,  
China

### SEPTEMBER

**26-28, 2005**

PackExpo,  
Las Vegas,  
USA

### SEPTEMBER

**27-29, 2005**

Processing & Packaging  
Machinery Association show,  
and Packaging Innovation Show,  
Birmingham,  
UK

### OCTOBER

**11-14, 2005**

Auspack,  
Sydney,  
Australia

### FEBRUARY

**14-18, 2006**

Ipac-Ima,  
Milan,  
Italy



## Meet the partners

> On June 15-16, 2005, ABB will hold its 7th annual Robotics Partner Seminar in Västerås, Sweden. The seminar typically attracts hundreds of ABB partners from all over the world to see the latest product and business developments in the robotics field.

This year a number of new products are being demonstrated, including robots and application equipment as well as new software. In addition, partners from selected market segments will be showing interesting application solutions.

The Robotics Partner Seminar is the place for networking, asking questions, getting expert advice on ABB products and to hear and see interesting application solutions from partners within specific market segments that ABB serves.

For more information, check out the website [www.abb.com/robotics](http://www.abb.com/robotics)

## ABB launches new web portal

> A new [www.abb.com/robotics](http://www.abb.com/robotics) site will be launched at the end of June. Visitors to the site will be able to see an improved and more user-friendly site. The new site reflects ABB's overall aspiration to be even easier to work with, whether it's with a customer, partner, supplier or others interested in robots.

At [www.abb.com/robotics](http://www.abb.com/robotics) everything you need to know about ABB robots, software, operating systems and application-specific robot solutions can be found. Every country will also have a specific website for the local market.

## Global packaging gathers at Interpack

> A total of 2300 exhibitors from 57 countries reserved 1.7 million square feet of exhibit space at the fairgrounds in Düsseldorf, Germany for Interpack 2005, the 17th International Trade Fair for Packaging Machinery, Packaging and Confectionery Machinery. The event took place from April 21 to April 27, with some 175,000 attending from all over the world.

At the fair, ABB launched three new robots, two of them fully dedicated to the packaging and palletizing business. The third robot is a unique all-round robot designed for use with nearly any task within the business. "ABB is seeing an enormous potential for robots within the packaging industry and is really prepared to meet the market needs. We've shown that we are the leading robot supplier with a complete product offer for picking, packing and palletizing with dedicated robots and supporting software," said Henrik Andersson, ABB. "Also, since ABB is located all over the world, partners and end customers can expect full service wherever they are."

Together with about 25 partners, ABB presented 40 plus robots working with different packaging and palletizing applications.

The next Interpack trade show will be April 24-30, 2008 in Düsseldorf. "ABB will be there in full force in 2008," says Andersson.



by Claudia Flisi  
Photos Maurizio Camagna

# A talent with tile

**In the conservative Italian mosaic tile industry, innovator EMC comes up with a solution for assembling tiles with robots.**



Massimo Piccoli assembles the FlexPicker arm, left; in the meantime, tiles undergo a new gluing process, middle.

➤ A high-concept designer floor lamp occupies a place of honor in the office of EMC Engineering in northern Italy. The lamp, designed by Peppino Campanella, a noted Italian artist and architect, serves as a parable for both EMC itself and for the work it does: The function is ancient but the form is modern; the materials – including tile, colored glass and metal – are classic but their assembly is innovative. The end result is a cutting-edge concept of illumination.

As a company EMC is also cutting-edge, and has been since it was founded four years ago a few hundred meters from its current location in Alpignano, a suburb of Turin. Marco Corti, the company's founder and co-director, chose the name EMC to evoke his three chosen areas of business focus: engineering, manufacturing and consulting. "Our focus was to be on high

value-added, high-productivity projects in several specific areas: welding, handling and food," he explains.

He was joined in this enterprise by a childhood friend, Paolo Durio, thanks to a trick of fate. "I was in a shop in downtown Turin to buy this," he recalls, pointing to the designer floor lamp, "when by sheer accident I ran into Paolo." The two had been friends as children but had lost touch when Corti's professional career took him to Milan. One thing led to another, and they decided to set up business together.

**Two years ago** ABB approached EMC with a request to work in the ceramic-tiles industry. This was not only an industry unknown to Corti, it was and still is a conservative industry where innovation is not prized.



Mattia Palumbo and Massimo Piccoli oversee production.

#### >FACTS

#### EMC

EMC's name explains its focus: engineering, manufacturing and consulting for robotic applications for welding, handling, food and, most recently, the ceramic-tile industry. The company was started by Marco Corti in October 2001, in Alpignano, a suburb of Turin, Italy, and now has 12 employees and a worldwide network of outside experts. Corti runs the technical side of the company; Paolo Durio heads up the commercial side. Revenues in 2004 were 2.5 million euros.

“You could say that ABB was responsible for growing the robotics market in Italy.”

Marco Corti, EMC



The project facing EMC was to help mosaic cutters – third-party suppliers who receive tiles from ceramics producers and cut them to make small decorative elements for borders and accents on walls. These mosaics may be uniform in color or multicolored, mono-form or multi-form. They are sold in squares or in strips held together by either expensive mesh or inexpensive paper backing.

The assembly of these small squares of tile had traditionally been done by hand; EMC's brief was to remove the manual element while keeping the precision. EMC came up with “Moses,” based on ABB's FlexPicker. Moses, a picking robot, sorts the mosaics and arranges them in squares or strips.

In addition, EMC was asked if the company could develop an alternative to the paper backing for the mosaics.

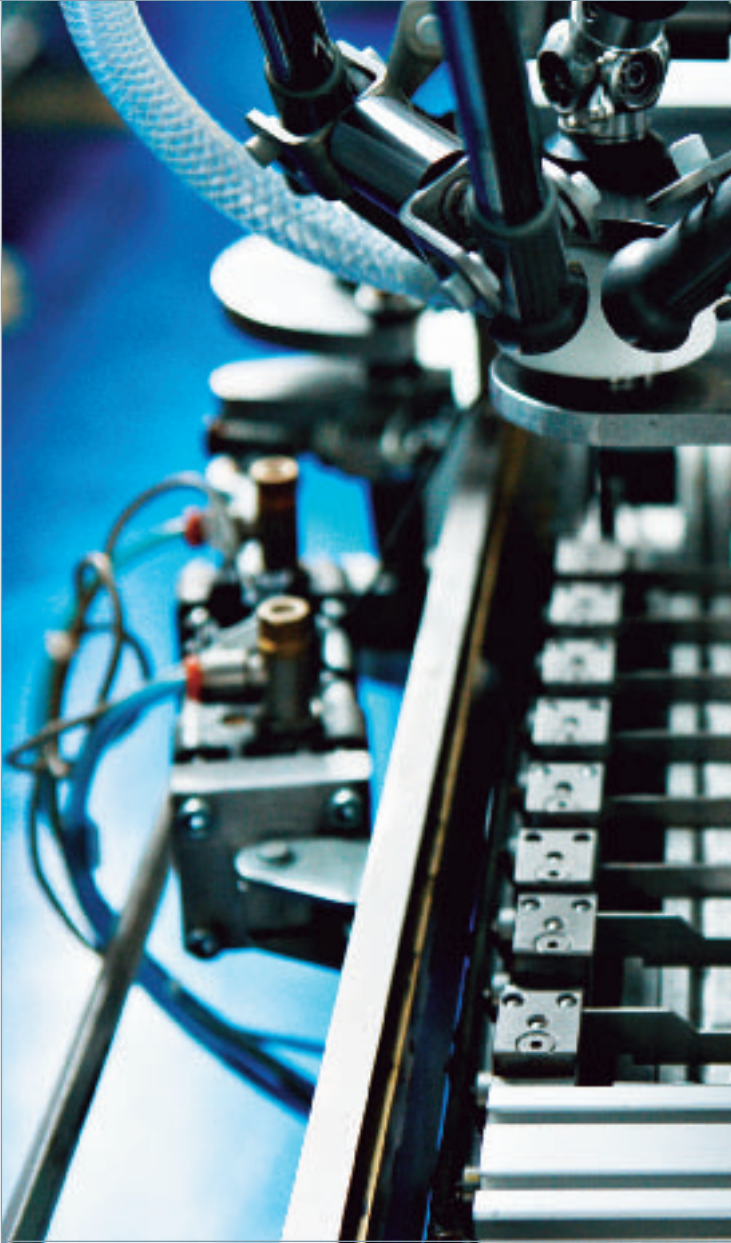
**Meanwhile** in the process of developing Moses, EMC realized the need for a new gluing method to maximize the flexibility of robotic handling. “Working with partners, we devised a new system to glue the mosaic tiles together,” recalls Corti. “We had to develop a new glue and a second robot to apply it, which we called the sticking machine. The FlexPicker places the tiles onto a sticky sheet of plastic, which holds them stable. Then they pass under the stick-

ing machine, where special glue is applied that holds the tiles together. The outcome was so outstanding that we could eliminate the use of paper backing, mesh and templates.”

Durio adds: “This solution has become one



Mattia Palumbo, chief engineer, checks out the FlexPicker.



EMC's innovative new gluing method allows tiles to be assembled with robots instead of by hand.

### Innovation in a conservative industry

- The global ceramic-tile industry is worth about 20 billion euros today and is expected to grow to about 35 billion euros in the next decade, according to European Union estimates. EU countries, notably Italy and Spain, are responsible for more than half of world revenues today but are projected to lose more than 10 percent of that market share by 2015. The continued dominance of EU countries depends largely on R&D efforts, according to the European Construction Technology Platform (ECTP). Robotics can play a major role in such efforts.
- Marco Corti, head of EMC Engineering, notes that robotics provide “performance, flexibility and simplicity in production, all of which are requisites of the ceramic tile industry.”
- Working with other companies, EMC has developed robotic solutions based on ABB's FlexPicker. These solutions assemble and manipulate tiles and mosaics; they prepare tiles for gluing and apply a new kind of glue to hold them during subsequent phases of transportation and application; and they provide customized robotic solutions for the production phases of ceramic manufacture. And beyond robots, EMC has even developed tiles that are colored throughout rather than on the surface, with the advantage that if a tile is chipped, one still sees color instead of a telltale white spot.



of the most important parts of our business, representing one-third of our revenue.”

Both Corti and Durio have had about 20 years of business experience, with Corti's experience almost totally dedicated to robotics. A Milanese by birth, he moved to Turin when he was six, and there he completed technical school in mechanical engineering. At the age of 20, he returned to Milan to begin his professional career with what was then Asea Robotics, now part of ABB. He was fascinated by robotics and found himself in an ideal place to develop that fascination: “You could say that ABB was responsible for growing the robotics market in Italy,” he says.

**After Asea,** Corti worked in both Italy and the United Kingdom for a number of other robotics companies, doing everything from technical

support to engineering and training, before moving into management.

EMC was launched in October 2001. “Everyone told me the timing couldn't have been worse,” Corti says, laughing. “Plus, doing business in Italy is costly and obstacle-ridden, and in Turin it is mostly automotive-driven. To succeed, you need creativity, methodology, technical expertise and courage.”

Four years later, these attributes have been rewarded. In December 2004 EMC moved from its original 350-square-meter facility to a new 800-square-meter headquarters. It has 12 employees, and the structure is already too small. Its business objectives have been achieved to date without advertising or marketing. The biggest challenge facing Corti and Durio is how to direct and manage the company's future growth. No problem: They have a lamp to guide them.

Text: Graeme Forster  
Illustration: Salgood Sam

# Packing a punch for meat producers

Reporter *Graeme Forster* takes a hard look at the latest trends in the meat industry and how they are changing the whole meat packing process.

> It may be the land of the Beefeater, that ancient guardian of the Tower of London and the Crown Jewels, but the United Kingdom is also setting the pace globally when it comes to the automated packaging of meat products. You can thank the U.K.'s supermarket rivalry for this, along with advances in robotics, plus the difficulties and expense involved in getting staff to work in the meat-processing industry.

So what's happening, and why? First, consumers are becoming increasingly demanding about what they want when they shop for meat. They can be more demanding because U.K. supermarkets are fighting hard for market share by offering greater choice and more competitive prices (the bulk of non-restaurant meats and poultry are bought today through supermarkets). One way of offering keener prices is to reduce the amount of stock actually held by the supermarket, so that delivery supplies echo the "just-in-time" delivery method in manufacturing industries – a process that also means the supermarket can devote more store space to selling, rather than unproductive storage. In turn, this means that meat producers have to be more efficient, and here size definitely matters.

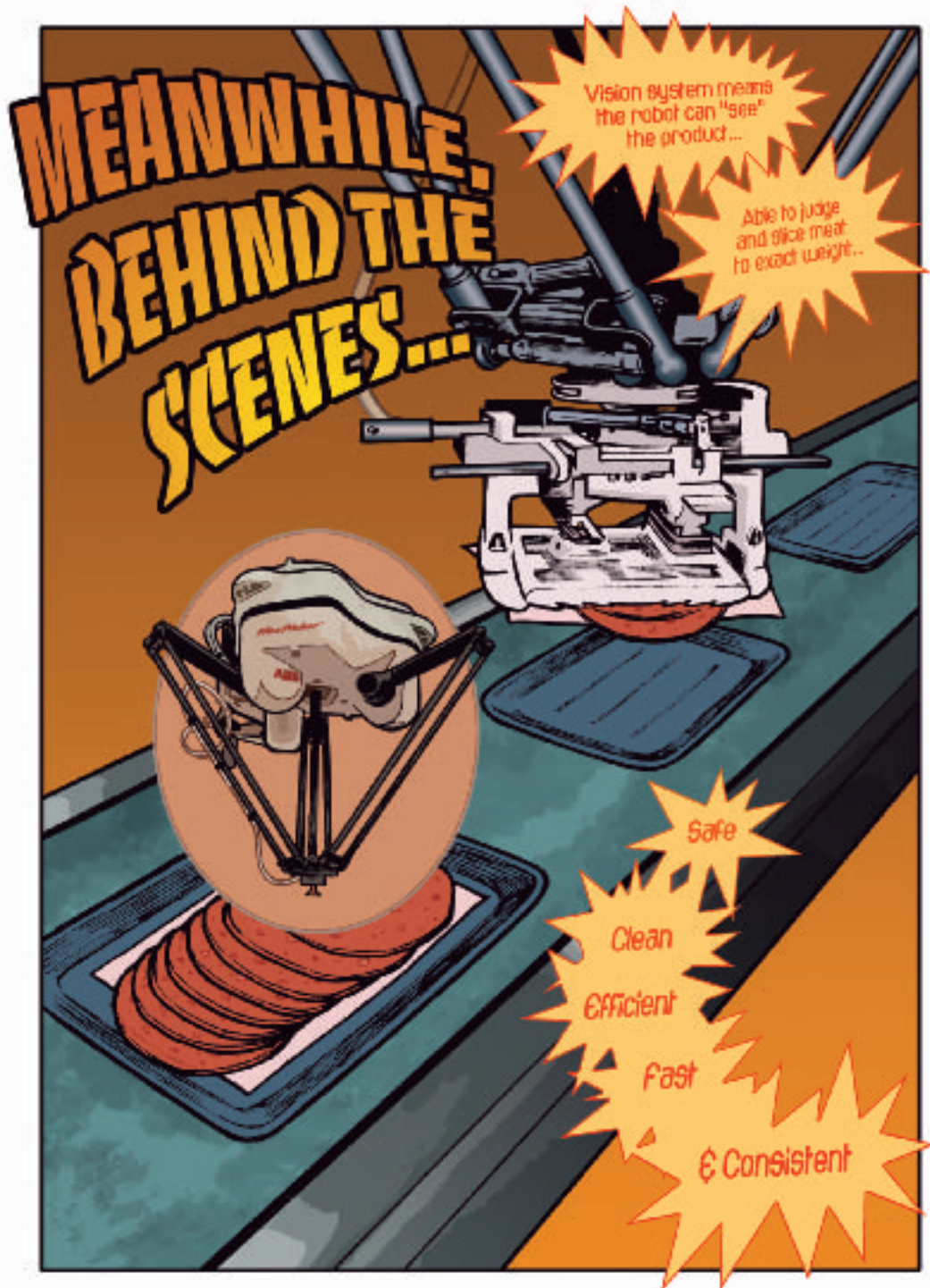
**Across Europe**, there is wide-scale consolidation of meat producers taking place, because only by being larger can companies hope to meet the volume demands required by the supermarkets. But it also enables producers to meet the demand for flexibility; larger companies are able to introduce products more quickly onto the market. Major supermarkets can start by ordering small quantities of a product, and if this proves to be a success, they can scale up rapidly in terms of volume ordered. (It can also go the other way, which is why flexibility is important). Not surprisingly, producers are



looking to automate production and processes that have traditionally been done by hand.

This represents both an opportunity and a challenge at the product-processing and primary packaging stages. The availability of labor has always been problematic for this type of work – standing in a cold meat-processing factory, doing boring repetitive tasks has generally





> meant a high staff turnover, absenteeism and lots of staff retraining, all adding to the cost. Robots are faster, work longer hours and don't complain. But they need to be just as flexible as their human counterparts, say, when it comes to picking particular types of meat. And they need to be built in washable stainless steel.

These advances are now being made: Robot pickers are being integrated into the production line, and the robots themselves are becoming more sophisticated in their design. Vision systems give the robots "eyes" so that they can locate individual pieces of product. Speeds of operation have gone up considerably – ABB's FlexPicker IRB 340, for instance, can make two "picks" a second. And technology adoption rates

will blossom as prices fall, according to Henrik Andersson, who is responsible for packaging applications at ABB. Although robot automation is still in its infancy, Andersson is confident that the benefits of "smart" robot pickers will justify the investment by the processing industry.

Furthermore, robot penetration will also increase in case packing and palletizing, Andersson says. This means flexibility in the whole packaging process from primary packaging of individual products down to the palletizing of boxes or crates.

**Advancing automation** is also a driving force in the shape of meat-product packaging, says Tony Ambrose, sales and marketing director at

“There may well be a drift toward thermo-formed packaging, today most commonly found on cooked meats. It’s cheaper than the existing preformed tray-and-film method.”

Tony Ambrose, AEW Delford

AEW Delford, a U.K.-based company that installs automated food production lines throughout Europe. There is a big swing toward case-ready packaging, where all the packaging and labeling is undertaken in the processing plant, away from the supermarket, he says. While automation is nothing new in product processing, it used to be restricted to “hard automation” – specially designed machines dedicated to producing specific types of product – and packing boxes onto crates. Now the entire process of meat handling – from identifying and selecting individual items by size or weight to packing and preparing for transport – can be undertaken by flexible automation.

When meat is delivered to the supermarket, it comes off the truck and straight on to the shelf. That differs from earlier times when meat was cut up in the shop (remember the days when blood would leak through the wrapped polystyrene tray?). Today, 80 percent of all meat products sold through supermarkets in the U.K. is sold in a case-ready form. Ambrose reckons that this is where the country is setting the trend, along with the Netherlands, though other countries are also seeing the advantages of the system. The United States has started moving away from in-store preparation to centrally prepared meats and is increasingly embracing the case-ready concept. “They’re still about two years behind us,” says Ambrose.

**Automation will change** the way we purchase fresh meat products. Today, most cooked meats are sold in fixed-weight packs, as is fresh poultry, although usually not fresh red meat. European regulations require that the average weight of the product be at least the weight advertised on the pack. Consequently, to avoid falling foul of the law, the average weight of packs sold are

a little more than the weight indicated on the pack. The problem is, that the more natural the product, the more difficult it is to get close to the mark without altering the shape of the product. Advanced portion control slicing technology, combined with automated picking capability, will now make this possible as well as enable the meat producer to minimize scrap.

Even the now-familiar film-sealed polystyrene tray may not be with us for long. Though these have long been the life blood of the case-ready program (certainly in the U.K.), Tony Ambrose says, “There may well be a drift toward thermo-formed packaging, today most commonly found on cooked meats. It’s cheaper than the existing preformed tray-and-film method.”

The Beefeaters of Olde England may be buying their steaks in thermo-formed plastic packs in future.

#### > FACTS

##### Trendsetter

If robotics are key to the changing trends in meat packing, then ABB’s FlexPicker is helping make this possible. The FlexPicker system comprises the IRB 340 robot with its controller, dedicated PickMaster software and a vision system. It is not an articulated robot, like the regular 6-axis robots that the company produces. Rather, it is a parallel robot.

All the motors and gears are fixed in a plane in a parallel structure without any heavy moving parts, so the moving mass of the robot is no more than a few kilograms. This allows it to be much faster – up to 10 g acceleration, compared with 1–2 g for a normal robot.



The number of workers needed to sort pretzels has been cut in half.

by Susan Phillips  
Photos William Johnson

# Smart handling for salty snack

**Soft pretzels get soft treatment from robots in Pennsauken, New Jersey.**

> In Philadelphia, one of the oldest cities in the United States, soft pretzels are a dietary staple, sold on every downtown street corner. J&J Snack Foods of Pennsauken, New Jersey, lies just across the Delaware River from the City of Brotherly Love (as Philadelphia is commonly known) and houses the world's largest soft-pretzel factory. J&J Snack Foods makes 2.1 million pretzels a day, serving as the dominant player in the niche market of soft pretzels. With the recent use of the ABB FlexPicker IRB 340 robots to package its frozen, soft pretzels for retail, J&J Snacks acquires greater efficiency while reducing labor costs and on-the-job injuries. The IRB 340s also provide better hygiene by reducing employee contact with the product.

"We had a very labor-intensive operation," says Phillip Heffelfinger, director of engineering for J&J Snack Foods. "Now we're able to provide extra value to the consumer at zero cost." The value added includes a re-sealable bag that was integrated into the system by JLS Automation Systems and Robotics of York, Pennsylvania.

Heffelfinger says J&J wanted to lower labor costs and evaluated several alternatives before JLS representatives told them about ABB's FlexPicker.

"We were doing everything by hand," says Heffelfinger. "Now we're replacing monotonous, repetitive jobs with a robot so we can offer people skilled labor jobs instead."

**Without the IRB 340,** workers manually sort and pick the pretzels, insert salt packets and coupons, and package the product. With the new system, the number of people needed to work a shift is cut by almost half.

## JLS Automation

- Began in 1955 as a distributor of automation components.
- Currently produces and integrates automation solutions with a focus on high-speed picking.
- Located in York, Pennsylvania.
- Employs 32 people.



“We’re able to provide extra value to the consumer at zero cost.”

Phillip Heffelfinger, J&J Snack Foods

#### >FACTS

##### Benefits of the ABB FlexPicker IRB 340 robots:

- Reduced labor costs by re-positioning 27 full-time employees.
- Greater efficiency, allowing 250 pretzels scanned, sorted and packed per minute.
- A more sanitary environment, which has added benefits for the consumer.
- Reduced repetitive motion injuries.
- A longer up-time with less maintenance.
- Greater product consistency and quality control.
- Lower production costs.
- Reduced human error, resulting from greater hygiene and precision of robotic production.



Vu Duc likes that the new robots are safer and rarely cause stoppages.

Owner Gerald Shreiber began J&J Snack Foods in 1971, after purchasing a soft-pretzel factory at a bankruptcy sale for 72,100 u.s. dollars. The company has grown each year, with USD 417 million in sales for 2004. J&J is an important niche player in the USD 30 billion snack-food industry, selling more than a billion soft pretzels a year. The company accounts for 92 percent of the supermarket soft-pretzel sales and 65 percent of the food-service sales.

The FlexPicker allows frozen soft pretzels to leave the freezer on a continuous conveyor belt, where stationary and rotary brushes make sure the pretzels travel in a single layer. A second, faster belt picks up the pretzels to insure they are spread evenly. Then they are rolled beneath a high-speed camera, or vision cell, which snaps a picture. The image is sent to a computer where the ABB PickMaster software scans for pretzel quality and position on the belt. It takes fractions of a second for the software to give the robots detailed instructions about handling each pretzel.

The robot’s “gripper fingers” pick and sort the randomly located pretzels as they come down the belt. The IRB 340 can pick up and toss out defective pretzels or place them in a consistent orientation on the parallel, lugged conveyor. Together, the two vision cells and the five robots at J&J Snack Foods can pick and place 250 pretzels a minute.

The lugged conveyor takes the pretzels to

the bagger, which also inserts salt packets and coupons. The sealed bags are then placed into boxes and are ready to ship.

**JLS Automation provided** the staging and integrated the system for J&J Snacks. JLS began distributing automation components in 1955,



The robots pick and sort some 250 pretzels per minute.



From twisted dough to finished product.

#### >FACTS

In 1971 Gerald Shreiber had just sold his machine shop and was looking for a new business. He happened to walk into a waterbed store where the owner was trying to sell his bankrupt soft-pretzel factory.

Shreiber seized the opportunity and bought the plant for USD 72,100. That first year, he did USD 400,000 in sales with eight employees. Shreiber had a vision: He took Philadelphia's favorite snack national and expanded the plant to produce other niche market snack foods.

Today, J&J Snack Foods employs 2,700 people nationwide and in 2004 sold USD 417 million worth of snacks. The company now manufacture churros, funnel cakes, raw dough for cookies, frozen beverages and baked goods for the food service and retail supermarket industry.

Its pretzel business has expanded to include sweet cream cheese-filled and jalapeno cheese-filled pretzels, turning these snacks into mini-meals. And consumers as far away as Mexico City can now enjoy soft pretzels.



and developed its own line of gantry robots in the 1990s. They have since moved into integration. It took two years to complete the project for J&J Snacks, which JLS installed in April 2004.

Steve Edris is director of sales at JLS. He says this was one of the company's most complex projects. "The toughest part of the job was designing fingers that will drop the minimum number of pretzels," he says. The tooling was not the only challenge. The cameras had to be designed in conjunction with ambient factory lighting to eliminate shadows on the conveyor belts. And with a robot moving as fast as the IRB 340 does, care must be given to designing a frame that will make sure the robot does not, literally, shake itself apart.

"A key part of our design is using 3D modeling," says Edris. "This allows us to see mechanical interferences before building." JLS used Pro/ENGINEER and SolidWorks software programs for their mechanical designs. The robots are encased in stainless steel and Plexiglass, or Lexan, to insure a high level of sanitation. They can also be hosed down with water and detergent without causing any damage.

**JLS integrated** the entire system at its York, Pennsylvania, facility before installation at J&J Snack Foods. "Sometimes, things don't go together the way you think they will," says

Edris. "So we make the adjustments here, and it doesn't have to happen on the factory floor."

JLS also gave hands-on training to J&J Snack Foods' employees before installing the new line at the factory. Heffelfinger says this training helped employees overcome their fear of a changing work environment.

"We did something unconventional," says Heffelfinger. "We custom-trained all the production people at JLS. People were frightened of the robots at first. But they were able to see it all in place before it came in, and that gave them ownership of the project."

Vu Duc, a worker on the line, agrees. He started at J&J Snack Foods 10 years ago after emigrating from Vietnam. "These new machines are very safe," he says. "You can shut them down anytime you see a problem. With the old machines, they were constantly breaking down and I was always fixing something. It was very dangerous."

Heffelfinger says the uptime goal is 94 percent, but they are currently operating at about 86 percent. He says the entire job cost USD 2.5 million with the robot portion costing USD 1 million; payback is projected at just over two years. "It allows us to increase output with less staff and reduced maintenance downtime," says Heffelfinger. "It just keeps running and running and running."

Text: Bert Menninga  
Photos: ABB

# Robots benefit new Regal Cream plant



Regal Cream, producer of popular Australian Bulla brand dairy products, has found it easier to palletize bottles with a robot instead of doing it by hand.

➤ In 1910, Thomas Sloan established Bulla Cream Co. – now called Regal Cream – at Moonee Ponds, a Melbourne suburb, where milk was pasteurized by standing open cream cans in coppers fired by wood. Cream was collected from the country region of ‘Bulla’ and then transported by horse and cart to the city and the now famous Bulla brand was born. Now one of the top names in dairy Down Under, the Bulla brand of creams, yoghurts, cream cheese and other dairy products is well-known throughout Australia.

Of course, the production of dairy products has changed dramatically in the nearly hundred years since the company’s founding. At Regal Cream’s new greenfield plant in Colac, South Western Victoria, for example, Bulla products are now palletized using four ABB FlexPalletizer robotic palletizing systems with IRB 640 robots, two laser-guided automated vehicles (AGVs) and a pallet management system. The system has been in place for close to a year, and the company is enjoying some great benefits.

**The robots are currently** palletizing six of the 10 lines in the Regal Cream factory. The lines process up to 300 bottles a minute, and the bottles then have to be stacked, palletized, wrapped and refrigerated within 10 minutes.

All this is now achieved totally automatically, with the only human intervention being the touch of a button to change product lines and to monitor the controls. In addition, laser-guided forklifts have replaced manual forklifts in the palletizing area and operate seamlessly with the whole system.

In a potentially incident-free environment the robots exceed Regal Cream’s productivity requirements without any bottlenecks at all, which had been one of the company’s concerns.

“The installation has exceeded the expectations of our management in every respect, including on-time delivery, budget and performance,” says Regal Cream’s Operations Manager, Justin Downey.

“We’ve also had huge improvements in the OH & S arena. The palletizing robots have released 20 people from physically demanding work with occupational health risks into control and operational roles that allow them to use their intellectual capabilities much more. We’re all reaping the benefit of their improved well-being and morale.”

“Robotic automation systems such as these are highly effective in ramping up production, reducing ongoing operational costs and enhancing customers’ competitive edge,” says Peter Bradbury, sales manager, ABB Robotics.

## Benefits for a better Bulla

The robot palletizing system provides a number of benefits for Regal Cream.

- Manpower reduced
- Production ramped up
- Virtually no bottle-necks
- Fewer health and safety risks
- Higher morale

Text: Terry Starkey  
Photos: Pontus Johansson

# Any way you slice it

**A new robotic system that slices and packs Charkman prepared meats at Fernebrand Chark in Sweden is on the very cutting edge of automation.**



A fully automated line slices and packs meats using an IRB 340 robot from ABB.

> When it comes to cold cuts, sausage, ham and other processed meats, leading player Charkman holds a unique position in the Swedish market. The Charkman Group, which produces and processes cooked meat products, is made up of 12 small- to medium-sized private companies that for over 30 years have cooperated closely

with each other on most aspects of the food processing business. This includes everything from buying raw products to pooling production resources and selling only Charkman branded and private-labelled products to wholesalers, hotels, restaurants, institutions, supermarkets and multiple retailers throughout Sweden.

One of the 12 companies that are part of the Charkman Group is Fernebrand Chark, Borås, in southwestern Sweden. The plant belongs to Kjell Fernebrand whose sons, Pierre and Pontus, continue a family tradition of sourcing and developing new and innovative ways of maximizing output.

The latest innovation introduced at the plant has dramatically increased output: a fully automatic slicing line that slices and packs high

“Shingled slices can be quickly and perfectly handled...”

Kjell Fernebrand



Kjell Fernebrand and his son Pontus, two of the men behind Fernebrand Chark.

volumes of salami, ham, turkey, rolled pork and other cooked meats that requires only a small team of operators. At the heart of the line is a new intelligent portion loading (IPL) robot and junior slicer from AEW Delford Systems, added to the already existing polyslicer plus slicing line.

The new system also provides a very high level of flexibility in that it slices a wide variety of products and can be programmed to handle some 26 pack variations and sizes. However, this is just the start. The robot can be set up to handle as many as 100 product programs and, at a later date, up to five further robot cells can be added to the existing master control and vision system to provide even greater flexibility and output.

**The junior slicer** works continuously, producing well-presented shingles and stacks of product which are then conveyed to the IPL robot for consistently gentle and accurate loading into thermoformed trays. Typical loading formats range from 180mm long shingles containing 10–12 slices, up to as many as 24 slice shingles per tray. The robot picks up 12 slices at a time and for the 24 slice pack it rotates the second shingle of slices through 180 degrees to give visually pleasing overlapped packs.

Loading rates vary according to the type of product, but speeds are typically in excess of 50 packs per minute. The system then automatically conveys the loaded trays into a flow wrapper for packing and sealing prior to being



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### Key advantages

Automation of the slicing and packing line at Charkman has some big advantages over doing the job manually:

- More hygienic
- Greater consistency and precision in packing
- Less manpower required
- Safer
- Increased output

weighed, priced and labelled by an AEW Delford Systems' weigh price labeller. Finished packs are then placed into cartons for shipment.

The labor-saving benefits, easy hygiene and safety aspects of the new system are impressive in their own right, but the proven capability of the junior slicer combined with the astounding qualities of the IPL robot convinced Kjell Fernebrand that this system was indeed a wise investment. "Now, shingled slices can be quickly and perfectly handled with a level of precision and consistency that a human could never achieve," he says.

For Fernebrand, Charkman's well-earned reputation has never looked stronger.

### Robot solutions

The intelligent portion loader (IPL) robot used in loading the portions at Charkman is an IRB 340 robot from ABB. Along with the picking robot, easy-to-use PickMaster software from ABB has allowed for easy integration of the new system into the whole production process. "The robot's power combined with the flexibility that PickMaster allows for is key to the success of the line, which can be adapted for some 100 product programs and the later addition of up to five robot cells using only one master control," says David Marshall, ABB sales manager.





Baked goods get picked before being wrapped.

# All wrapped up

Text: Maité Salvador  
Photo: Synchronpack

**Making the switch from mechanical systems to electronic robots has been a boon for Spanish company Synchronpack.**

> At the end of the 1990s, management at Spanish wrapping specialist company Synchronpack decided to take a gamble on the future and redesign its extensive range of horizontal wrapping machines. The full range included models that can be specified either by the different characteristics or the different dimensions of the products to package, the type of film used, the type of sealer and cross cutter, or the maximum attainable production speed.

Along with internal and external mechanical redesign, Synchronpack decided to take a technological jump and move from traditional mechanical machines with a central motor, chains connecting movement groups and adjusted by geared wheels, to a new generation of electronic machines, equipped with independent servo motors and synchronized using PC-based control technology.

The advantages were quickly evident: vastly increased flexibility of use including easy format changes; reliability and precision of operation; a drastic reduction of the operations requiring maintenance; and a significant increase in maximum running speeds.

Faster running speeds pushed Synchronpack to also develop new automatic product feed systems with belt transporters, with independent motors and synchronized to each other by means of PC-based control technology to get

the same benefits that were obtained on the wrapping end of the process.

What Synchronpack needed to achieve this were intelligent robots with artificial vision, ultimately deciding on an IRB 340 FlexPicker from ABB, equipped with PickMaster software.

Since the initial purchase of the FlexPicker has become one of the elements regularly incorporated into Synchronpack projects, as much to feed individual product flow-wraps, as for grouping and feeding multipack wrapping or for additional manipulation that is not directly related to the wrapping.

## About Synchronpack

Founded in Barcelona in 1980, Synchronpack specializes in providing automated solutions for packaging all types of solid products in flexible film. Currently, Synchronpack has more than 1400 machines installed around the world and employs an experienced team of professionals with a long history in the packaging and packing sector.

Synchronpack specializes in the design and construction of electronic flow wrapping machines and automatic product feed systems with belted infeeds fully integrated with the wrapping operation and designed specifically for the product's characteristics and automation processes.

# Compact powerhouse

The new IRB 260 packs a punch in a small space.

> The new IRB 260 is a robot whose small size and top speed are optimized specifically for packaging applications. Based on the IRB 2400, an already proven and reliable robot, the IRB 260 uses the same ABB motion control in combination with conveyor tracking and vision to make it a robot that works very well in flexible production flows. And flexible production flows can mean a reduction in hard automation costs and an increase in productivity, thanks to a higher utilization of the robot.

The IRB 260 is also designed for easy integration into new or existing packaging lines, with the ability to work close to the base in order to minimize floor space. Low in weight and height,



The new IRB 260 is a dedicated packing robot, optimized for speed...

the IRB 260 fits easily into compact production cells. Speed, moreover, has been optimized for an 800x800x800 millimeter working envelope, making the new robot ideal for packing applications. Running on 4 axes, it's not only dedicated to packing applications, but also ensures high throughput and the ability to operate flexible packing concepts. Like all ABB robots, the IRB 260 can be combined with PickMaster – ABB's vision-guided packaging software that makes packaging applications easy to integrate and easy to work with – and the IRC5 controller.

**When it comes** to speed and efficiency, the new IRB 260 is a dedicated packing robot, optimized for speed and payload with its low-weight upper arm in aluminium, a 4-axis design and parallel rod system. The IRB 260 has a reach of 1.56 meters, and is available with IP 67 protection, perfect for food handling where it is imperative that no dust is present.

The packing cycles for small-box packing with the IRB 260 is 60 cycles per minute at 10 kilograms – ideal for handling chocolate bars, for example. For large boxes, the IRB 260

## Specifications

### Facts about the IRB 260

Handling capacity 30 kg
Reach 1.56 m
Load offset 300 mm
Number of axes - 4
Integrated signal supply 23 poles, 50V DC
10 poles, 250V AC
Integrated air supply 1/3 inch hose, max 8 bar
<b>Performance</b>
125/500/600 mm 35-40 cycles at 20 kg
90/400/90 mm 50-60 cycles at 10 kg
<b>Physical</b>
Total height 1493 mm
Manipulator base 723x600 mm
Weight 333 kg
<b>Environment</b>
Ambient temperature 5° C -45° C
Relative humidity Max 95%
Degree of protection - IP 67
Noise level Max 70 dB(A)
Emissions EMC/EMI shielded
Data and dimensions may be changed without notice.

packs at 40 cycles per minute at 20 kilogram such as for shampoo bottles. The packing working range is large enough for all major packing operations – 800 mm cube, and the payload of 30 kilograms is high enough for more than 85 percent of all packing applications, including packing bread, dairy products, meat, hygiene products, chocolate and candy, among others.

# Perfect palletizing

With a long reach and incredible speed, the IRB 660 sets a new standard for palletizing robots.

> ABB is currently introducing the IRB 660, a brand new, dedicated palletizing robot. Thanks to its state-of-the-art 4-axis design, customers can look forward to a speedy machine that combines a 3.15 meter reach with a 250 kg payload, making it ideal for palletizing bags, boxes, crates, bottles and more.

The IRB 660, with its optimized motor power and motion performance, ensures ever shorter cycle times. The palletizer, with its impressive reach, can service up to four in-feed conveyors, two pallet stacks, one slip-sheet stack and four palletizing out-feeding lines. And it boasts a maximum palletizing height of 2,980 mm.

The IRB 660 comes in a high-speed version capable of handling 180 kg payloads at full speed, and as a 250 kg through-put version.

The robot is built using a p-link concept, in which all cables for power, signals, buses and air are assembled inside the robot.

The internal cabling is designed to keep wear and tear down to a minimum. Thanks to its IP 67 tightness, the entire robot is built to handle the harshest environments imaginable, robust enough to ensure extra lengthy service intervals. But perhaps most important is the IRB 660's unique blend of speed, reach and payload – which provides for unrivalled palletizing throughput.

**The palletizer is easy** to come to grips with. In fact, ABB's multi-functional IRC 5 controller houses all the key functions for accessible programming and intuitive operation on the shop

## Total package

Covering the range of robotic needs in packaging, ABB has an entire line geared specifically to the needs of the packaging process, including newly launched products: The IRB 260, a 4-axis, aluminum-arm case packer, (see story page 17); and the custom-designed palletizing robot IRB 660, both complement an already extensive range. Together with the IRB 340, specially designed for high-speed primary packing, the three robots cover all the needs of integrator and end-users.

And finally, with the company's comprehensive packaging line software package – a common picking, packing and palletizing platform for all our robots – ABB has added another dimension to one-stop-shopping.

## Specifications

### Facts about the IRB 660

Number of axes	4
Reach	3.15 m
Maximum palletizing height	2,980 mm
Handling capacity, payload	180 kg, full-speed version 250 kg, through-put version
Position repeatability	0.1 mm
Path repeatability at 1 m/s	0.3 mm
Footprint	1,136 x 850 mm
Tightness	IP 67
Noise level	73 dB(A)
Ambient temperature	+5 – +52



The IRB 660 is designed for palletizing.

floor. Off-line programming, including cycle time verification, is readily performed on a PC. This cuts down on, or even eliminates, all that costly and time-consuming testing. The graphical Teach-Pendant opens up fresh possibilities for creating custom-designed operator interfaces – making life in the robot cell a lot easier.

MultiMove, moreover, allows up to four robots to run on the same controller. Built-in collision detection means the machine has never been safer.

The IRB 660 along with the rest of ABB's comprehensive packaging line automation offer allows integrators and end-users to build standards around one product line concept, where all mechanical arms are controlled by a common software platform.

**Able to reach backwards, handle loads of up to 10 kilograms, all with minimal cycle times, the IRB 1600 is a true athlete of a robot.**

# All-round winner

> The IRB 1600, the latest member of ABB's small robot family, is a fast, strong, backward-bending robot, with an optional IP 67 classification. Available in four versions, it has a reach of 1.2 meters or 1.45 meters, and a maximum payload of 5, 7 or even 10 kilograms with axis 5 pointing downwards. The higher payload makes the IRB 1600 the strongest robot on the market in its class, well-prepared for flexible duty and saving costs in many application areas.



... the IRB 1600 is also designed to work as a devoted specialist...

The combination of proven technology and well-tested innovation offers high reliability and production up-time. With its superior speeds in the main axes and high speed in all the axes, along with ABB's unique motion control, the IRB 1600 minimizes the cycle time. Further, the robot's position repeatability and its path-following capacity result in parts that are consistently well-made and handled. The wide reach, long stroke, and ability to handle large payloads mean maximized utilization.

**Versatile mounting options** – wall, floor, inverted and tilted – and the backward-bending concept meet the high demands for flexible integration and production. The slim forearm and the small offset are vital when operating in narrow spaces. Spatial flexibility, combined with optional reach and payload, make the IRB 1600 a very versatile robot, excellent for a wide range of applications such as material handling, including packaging.

A flexible all-rounder, the IRB 1600 is also designed to work as a devoted specialist with specific applications. Thanks to its robust design, the robot is resistant to sensitive production environments. With the added option of

## Specifications

### Facts about the IRB 1600

Handling capacity	5 – 7 kg (10 kg with wrist down)
Reach	1.2 – 1.45 m
Position accuracy	0.05 mm
Mounting	Floor, inverted or wall mounting
Tightness	IP67

ABB's IP 67 protection, all moveable cabling is enclosed to ensure that the IRB 1600 releases very few particles into the surrounding environment, making it suitable for packaging applications in food and other industries that call for the handling of sensitive products.

Together, the controller IRC5 and the IRB 1600 constitute a cooperative team that is easy to program via the simple operator interface. The programming can be carried out on- as well as off-line. Up to four robots can be independently operated from the same controller, using ABB's MultiMove feature.

"The compact design, the high speed around the main axes, the accuracy, and the flexible patterns of movement make the robot agile and obedient," says Arne Broberg, product manager for the IRB 1600 at ABB. "Such a robot is in itself easy to program. Add to this the easy-to-use software and the intuitive operator interface of the IRC5 controller and you have moved one step further in putting the robot to work exactly the way you want to."



At Löfbergs Lila in Sweden, coffee makes its way through the production process.

# Coffee, courtesy of robots

Text and photos by  
Alexander Farnsworth

**Automation is a requirement in many businesses. The coffee industry is no exception.**

> “We are as automated as we can be today,” says Lars Andersson, head of maintenance at Kaffehuset i Karlstad AB, a subsidiary of Löfbergs Lila, Sweden’s second biggest coffee manufacturer. Kaffehuset i Karlstad operates the roasting, packaging and warehousing operations for the company. It is one of Europe’s most modern coffee production plants.



Kaffehuset i Karlstad’s head of maintenance, Lars Andersson, has seen the benefits of robots in the packing of coffee at the plant.

Thirty-nine people are employed at the Kaffehuset i Karlstad to watch over the highly automated production to ensure a high-quality coffee of the right flavor. In addition to careful handling at all stages, Löfbergs Lila is a packaging and distribution-intensive business where 16,700 tons of coffee per year are packed into packages varying in weight from 50 grams to six kilograms. These are grouped into boxes and palletized for shipment. Automatic conveyor belts are everywhere throughout the factory.

To aid in the process, Löfbergs Lila uses four robots from ABB Robotics. The two IRB 640 robots have articulated arms and move in a very human fashion. Their function is to automatically take cardboard boxes from the end of the line and feed them onto a Euro-pallet until the pallet is full and ready for shipment. They are programmed to perform seven cycles per minute, although they can work faster. The robots also fetch the pallets.



An IRB 6650 robot handles the palletizing.

### Behind the purple package

- Löfbergs Lila, a family-owned business since 1906, is Sweden's second largest coffee manufacturer, with a 22 percent market share. Löfberg is the family's name; Lila – purple in Swedish – refers to the purple packaging that has become synonymous in Sweden (and increasingly in the Baltic States) with high-quality coffee. The Baltic States are the company's biggest export markets.
- Löfbergs Lila is based in Karlstad, in the province of Värmland. The company roasts, grinds and packages more than 16,700 tons of coffee per year. It sells more than 100 different items or kinds of coffee and has annual sales of approximately 800 million Swedish kronor.
- The coffee beans are carefully selected and imported, primarily from Brazil, Kenya and Costa Rica. They arrive by train via Gothenburg, Sweden's second largest city and most important port, one 22-ton plastic "Big Bag" per container.
- In 2001, Löfbergs Lila earned a place in the Guinness Book of World Records after it had dressed up its landmark coffee-roasting house in Karlstad to become the biggest package of coffee in the world. The size of the package was 15,210 cubic meters, the equivalent of 16 million 500-gram packs of coffee.

“... people no longer get hurt.”

Lars Andersson, Löfbergs Lila

Both IRB 640 robots were installed in 2000, and they have increased the plant's flexibility in palletizing different types of boxes. They have also drastically decreased the incidence of work-related injuries at the company.

“The big argument for robots is that people no longer get hurt,” says Andersson. “And besides, lifting boxes onto pallets is a very monotonous job.”

**Another robot cell**, the FlexWrapper, was installed in 1999. This robot handles four 250-gram coffee bags at a time. The machine places them lying flat in a cardboard box. This process is repeated two more times before the final four bags are packed standing up for a total of 16 bags in the box. The robot essentially makes maximum use of the space in the box. The boxes, which are erected in the machine, are then whisked away on another belt.

“This is not easy to do with a conventional machine,” says Andersson. “But the advantage with the FlexWrapper is that it is very flexible in the pattern of its actions. And it is easy to adjust. Originally, we wanted the coffee bags to stand in the box, but that meant we would be shipping a lot of air. But the FlexWrapper was able to do

three similar motions and complete it with a different one with the bags standing up, thereby minimizing the amount of free space in the box.”

**The final robot**, the IRB 6650, is used in the de-palletizing process. Although some wholesalers want a whole pallet filled with the same type and packaging of coffee, supermarket chains may instead want a mixed pallet, a unique selection of pre-packed boxes filled with different articles and loaded onto a pallet. So what the IRB 6650 does is to dismantle different pallets according to customer wishes or given patterns, and send the boxes on a conveyor belt to the other two IRB 640 palletizing robots.

“We have a service contract with ABB that includes all of our robots,” says Andersson. “But we rarely need to use it. The robots just keep on going. They will be cost effective for many years to come.”

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### Automation at Löfbergs Lila

Löfbergs Lila uses four ABB robots in its coffee-packaging process. Two IRB 640 robots load Euro-sized pallets. A Flexwrapper machine was installed to erect boxes and pack them with 16 250-gram bags of coffee. The fourth robot, the IRB 6650, takes care of the de-palletizing process in which customers can receive pallets filled with a variety of products. All four robots were installed with accompanying software and are maintained by ABB.

Text: Claudia Magli  
Photos: Tecno Pack

# Fresh-baked success



Tecno Pack management plans its muffin solution.



**Sensitive bakery products haven't usually been packaged using robots. But that's all changing.**

> The first requirement for success in the consumer goods industry is a solid product manufactured with appropriate technology to reduce costs, errors and downtime. Modern techniques of flexible automation and, in particular, robotics are often the key when the objects being packaged must be handled rapidly.

In the food industry, the situation becomes complicated. Not all products can benefit from the same treatment. Bakery goods, in particular, require special handling since they are irregular in shape, delicate and easily broken. For this kind of product, manual methods are still widely used, in particular at the packaging stage.

**One solution** to the problem is offered by Tecno Pack, a company based in Schio in Italy, which specializes in the flow-packing of bakery

goods and, in particular, in the manufacture of packaging machines and packaging systems for croissants, snacks and breadsticks.

Under the guidance of its present managing director, Davide Pozzer, the company has recently undertaken a transformation of its business, including an ever-greater use of robotics for its automation systems.

One example of this new technological route has been a project for a handling plant for a well-known manufacturer of muffins. Pozzer explains: "The requirement we received from the customer specified the handling of 350 items a minute, placed in trays of two and four. This would be unthinkable when working in the conventional way, i.e., by picking things up individually and then setting them down, which is why we decided to use robots. Of course a dedicated technology was required: Because of their shape and structural characteristics, muffins actually crumble very easily and are therefore quite sensitive to picking operations."

**Tecno Pack's solution** in fact provided for the use of four ABB IRB 340 robots. A feature of this series of pickers, which have been specially designed for the rapid movement of consumer goods, is their ability to operate at a speed of 150 pick-ups a minute. "While the upstream part of the process provides a conventional system for turning [the products] out from trays, the loading process is based on two independent units, each equipped with two ABB robots," Pozzer says. "By

"...muffins actually crumble very easily because of their shape and structural characteristics, and are therefore quite sensitive to picking operations."

**Davide Pozzer, Tecno Pack**

doing this we've been able to guarantee the customer that 380 items a minute can be packed."

The use of a double unit ensures that the plant can operate both at full capacity and at half speed. In addition, the unit can pack two different products – for example, a plain muffin and a chocolate muffin – in a mixed arrangement. In a conventional system all this is normally done in two runs, with a reconfiguring process for the second operation.

The equipment uses a viewing system combined with an ABB PickMaster control system that is capable of recognizing objects set down on the moving conveyor in a random way and providing the proper input to the robot for high-speed pick-up. "In this way," says Pozzer, "it is also possible to carry out quality control on the shape of the object, so that any rejects can be identified even at this stage."

**The first step** in implementing the project was a preliminary analysis of all plant activities. "Before the packaging unit was built, we simulated the main operating stages, including the recognition stages, on a computer," Pozzer says. "This was essential because it helped us understand balances in the distribution of the working load from the outset."

At some speeds the machines operate with very high efficiency, close to 100 percent, so it was necessary to create algorithms to help understand what the real boundaries to design were and, in particular, to establish whether there were units under varying degrees of stress.

At the same time every machine had to be capable of handling both muffin varieties within its own working area. Using feedback from the analysis, a series of corrections were carried out and the information was passed on to the devel-

opment team, which concentrated on adapting the project on site.

Another requirement of the solution was the ability to transform and convert the system. "All clients want to safeguard their own investment in light of possible future developments," Pozzer explains. "In the food market people are always developing new products, so the manufacturer must provide a solution that can be adapted to new items through modifying and personalizing the technology. In this instance more than 70 percent of the equipment for muffin production can be preserved with a few adjustments to the programming, the press tools and part of the feed."

### Flexible robotics

> "The consumer industry has followed in the footsteps of the motor industry of the 1970s and 1980s, so that it is now one of the main frontiers for robotic applications," says Davide Michelini, ABB's sales manager for consumer industries in Italy.

"In the packaging sector there is a growing need for flexible automation, as shown by the high labor component that is still present. Because of this, in the past five years ABB has based part of its robot range on the needs of the sector in terms of performance, working areas and load capacity."

The IRB 340 FlexPicker, a model that has a distinctive arm shape and is capable of operating at speeds of 10 m/s with accelerations up to 100 m/s<sup>2</sup>, has been specifically designed for rapid movements in the consumer industry field.

Because of the TrueMove and QuickMove functions built into the robot, it can maintain a pick-up rate of 150 items a minute while, at the same time, ensuring the necessary accuracy during movement and positioning. There is a 4-axis washable version of the picker, the IRB 340SA, with flush bearings, special paint and corrosion-resistant components, that is designed for work in the food industry.

Control is entrusted to the PickMaster, a computer application that coordinates the high-speed picking of objects on moving conveyor belts. Combined with a viewing system based on a graphic user interface, the software can recognize the objects that must be handled without being influenced by changes in the environment, such as lighting conditions, reflections or contact between objects.

The software and hardware for identifying the products that must be moved can be controlled by drag and drop. PickMaster can be used to adapt systems to specific operating requirements. The remote camera can, for example, be positioned in a location suitable for recognition of the object, while the robot can be mounted in the handling area. It is also possible to connect the same remote camera to several robots, reducing the number of peripherals, or – by selecting the requisite applications program – to make production changes from one sequence to another.



The FlexPicker easily handles delicate muffins.