

Helping Hands

HOW ROBOTIC AUTOMATION CAN HELP MANUFACTURING'S RESURGENCE

Matthew Jaster, Associate Editor

Before Mike Cicco was involved on the engineering side, he used to sell robotic systems to manufacturers. Most of his sales pitches were met with hesitation and skepticism as he tried to explain the “benefits” of replacing employees on the shop floor with an automated system. “Many times they would kick you right out the door for even suggesting such a thing,” says Cicco, director of material handling at FANUC Robotics America, Inc. “The perception through the years has changed, however, as companies began to realize that rising U.S. labor costs were too high and they needed to automate in order to compete overseas.”

The working relationship between man and machine has had many supporters and detractors in the manufacturing sector. Some companies strongly oppose the idea while others embrace it as an opportunity to keep the workforce in place that currently exists. It's a slippery slope, especially when downsizing or layoffs come into play. As U.S. manufacturing continues to bite and scratch its way out of recession, there's an argument being made that integrating more robotic systems will actually help the current state of manufacturing.

“Now more than ever it's a matter of necessity to cut costs wherever you can,” says Charlie Miller, vice president key account sales at ABB Robotics. “Labor costs, health care costs and everything else that directly involves employment. Companies have specific employee target numbers in mind and they need to strictly follow these.”

Dean Elkins, senior general manager/eastern region at Motoman and chairman of the Robotic Industries Association (RIA), sums robotics up like this, “They fill important gaps in the labor force; the tedious tasks that shouldn't be handled by human workers for safety and health reasons. Robotics began with the hot, heavy and hazardous jobs, but they've become an important tool in augmenting most manufacturing processes.”

Robotic automation has always been viewed as some-

thing that would take jobs away from human employees. Today, there are so many other problems in manufacturing that many business leaders are embracing automated alternatives. The RIA estimates that 194,000 robots are now used in the United States, placing the United States second only to Japan in overall robot use. It's estimated that more than one million robots are being used worldwide.

In a press release promoting the National Robotics Week initiative (April 10–18) RIA president Jeffrey Burnstein said, “The future success of our nation depends upon our ability to take advantage of critical technologies such as robotics, and we're looking forward to reaching more manufacturing and non-manufacturing companies alike with the message that robots can help them become stronger global competitors.”

Productivity Versus Perception

It's this competitive edge that continuously haunts executives trying to accomplish more with less in manufacturing. Robotic automation may very well solve many productivity and sustainability issues, but at what cost? The operators and assembly line workers that have been replaced by machines over the years might not share such enthusiasm.

“There have been plenty of layoffs for operators in the past,” Cicco says. “The norm today, however, is that the people that are tending the machines get relocated or they get trained to run the system that is being put in place.”

Perception seems to be changing thanks to training programs and the willingness of workers to become more skilled at their positions and accept new responsibilities.

“These systems increase quality and throughput, drive down costs and they're easier to use today from a control perspective,” Elkins says. “Robots are working side by side with humans on a more frequent basis. They're helping humans keep their jobs.”

Joseph Ellert, welding/applications engineer at Nachi Robotics, says robotic automation almost always creates better



ABB Robotics gripper design enables a robot to handle the complete cutting process in solar modules (courtesy of ABB).

job opportunities for skilled individuals today. “When a customer purchases new robotic automation they must also have the personnel to support and maintain production. This leads to new job creation for engineers, programmers and maintenance personnel.”

Miller at ABB believes it’s more an issue of quality than anything else.

“Hopefully manufacturers see it as creating better jobs for existing employees. You’re creating more rewarding and skilled positions by educating the current workforce on these new control systems. Employees become motivated, and they see themselves as more valuable to the company when they’re educated on new equipment.”

“Many companies are worried more about keeping the workers they have at this point in time,” Cicco says. “High technology jobs often lead to better opportunities, more responsibilities and higher paying positions. The game has changed dramatically since robots first reached the manufacturing floor.”

Elkins at Motoman believes the increase of robotic systems is going to play a large role in creating more U.S. manufacturing jobs. “This industry is creating a whole new class of assemblers, engineers and programmers. It’s an engineering culture that’s great for job stimulation.”

Improved working conditions and higher paying jobs are just a few of the added benefits to robotic implementation. Companies like Nachi Robotics, ABB, Motoman and FANUC support these systems by offering standard and custom training courses to meet the needs of each individual customer.

In addition to employee benefits, manufacturing costs are greatly reduced through technology upgrades.

“A single robot can move a part, weld the part and inspect the part in a single work cell, replacing at least three pieces of dedicated equipment,” Ellert says. “The newest generation of robots at Nachi is designed to minimize valuable floor space required to build a robotic work cell. This ergonomic design fits very well into lean manufacturing initiatives.”

Industrial robotics falls into four general categories including processing, inspection, assembly and material handling (moving stuff around). As robotic systems become more intelligent through increased vision and force sensing capabilities, manufacturers will be able to broaden the areas where these systems can be applied.

“Let’s face it, these machines were fairly modest in the 1980s,” Cicco says. “They moved from here to there, and that was the extent of it. Today, we have definitely broadened the applications we can automate because the robots are much smarter. They have a sense of sight and a sense of touch. The technology continues to grow each day.”

Ellert says Nachi’s machines are faster, consume less energy and have an effective design that fits very well into lean and green manufacturing. “Conserving both space and energy are important aspects for this movement, and robotic companies are always looking for ways to improve.”

While no one can predict the future of manufacturing, robotics assuredly will be involved. The more is less philosophy will be a major talking point as further robotic technology is

continued



An M-101A robotic unit demonstrates material handling for the food and consumer goods industry (courtesy of FANUC).



The M1iA is a lightweight and compact high speed assembly robot (courtesy of FANUC).

developed. Advancements in robotics will include:

- Increasing robot payload capacities to accommodate heavier parts;
- Improving servo technology to produce faster robots with better accuracy;
- Vision and sensor technology will be critical in more applications;
- New materials will be developed to provide lighter robots with higher speeds;
- Robots will be able to perform more complicated tasks and gain capability from advancements in computing speeds and other computer technologies.

Robotic companies will continue to create more flexible automated units and software development that will undoubtedly open new areas of business. "If we continue to drive down manufacturing costs with robotics, the U.S. market will continue to improve," Miller says.

A Growing Number of Resources

In the beginning, there was the automotive industry. Robotic automation's rise to fame in the 70s and 80s primarily involved automotive assembly lines. Unfortunately, the last couple of years haven't exactly been kind to anyone involved in automotive. Thanks to fuel efficient options and higher quality standards, however, there are signs of life once again on automotive assembly lines across the country.

"Things are starting to move in the right direction in the U.S. automotive industry, and that's huge for us," Cicco says. "GM and Ford are building new plants, and we're starting to see general industry picking up. The automotive industry fuels the rest of the manufacturing sector. As the Rust Belt gets going again, the rest of the country will follow suit."

Elkins at Motoman agrees. "We are seeing some positive signs, and I think by 2011 the automotive industry will be back in a big way. We saw a major slowdown of request-for-quotes last year, but they're starting to pick up across the board."

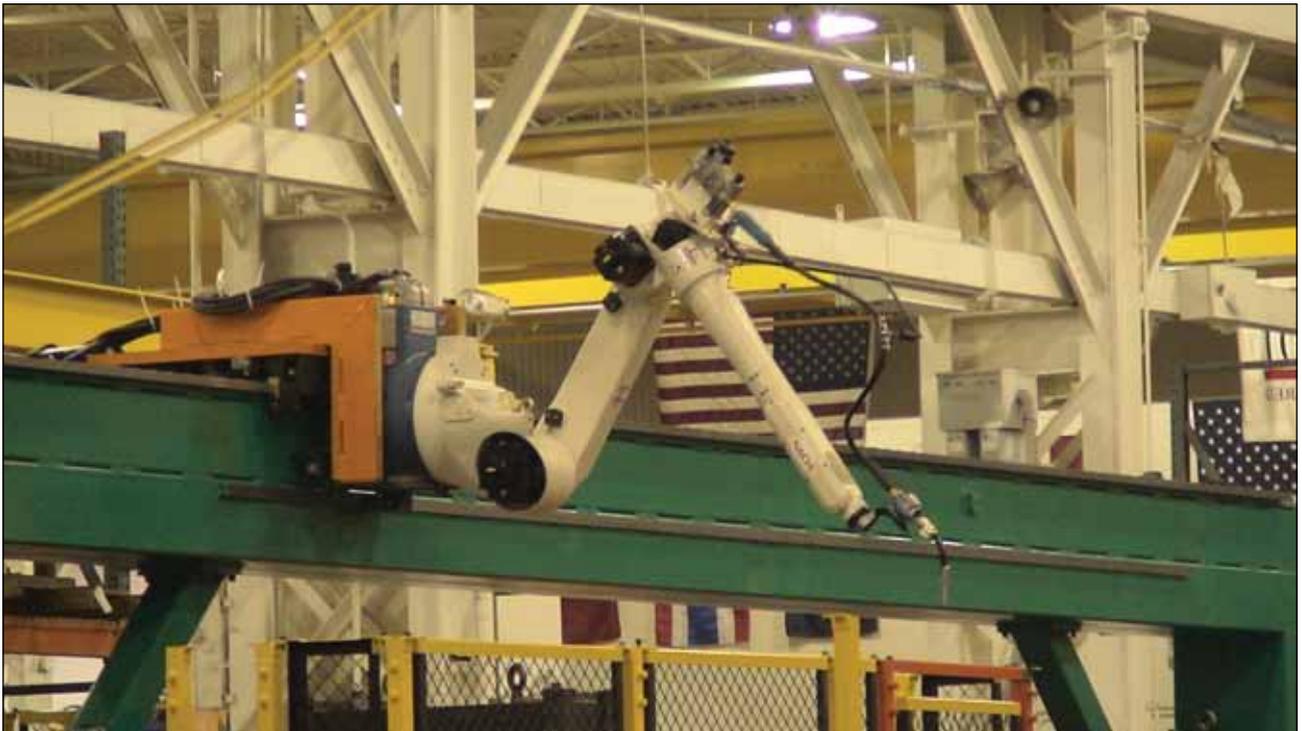
It's another case of that old, reliable trickle-down effect. Build better cars; get better results and the Tier 1, Tier 2 and Tier 3 automotive suppliers start getting more work.

"Due to the quantity of vehicles produced by a given manufacturer and the need for world class quality, the auto industry has historically been the largest user of robotics," Ellert says. "However, 2009 represented a major turning point for the robotics industry. In 2009, non-automotive related purchases rivaled automotive purchases, according to the RIA."

Automotive will always be important to robot manufacturers simply because people will always buy cars, and robots will always be needed to manufacture them. As a result of the slowdown, however, companies are diversifying sales strategies to provide automation to new industries," Ellert says.

And industry, in general, is buying into robotics at an exceptional rate. Miller has recently been encouraged by rising robotic orders in the life science, pharmaceutical, biomedical, alternative energy and food and consumer goods industries.

"Food and consumer goods have been a real pleasant surprise for us. This has been an area for many years where manufacturers were reluctant to adopt automation, but that's now changing."



This Nachi MV06-L Robot is horizontally mounted on a traversing servo driven slide unit (courtesy of Nachi Robotics).

FANUC has also seen a large increase in this area and Cicco believes the latest recession played a role to a certain extent.

“When times are tough, people head to the grocery stores. It’s just the way it is. We’ve done automation for Hot Pockets and french fries a lot lately. Food and consumer goods is becoming an area of exceptional growth and opportunity.”

The alternative energy industry continues to hold promise as well. Solar and wind energy applications will be growth areas in robotics as long as incentives and initiatives on the federal and state levels are passed.

“We’re hopeful solar applications, in particular, will start picking up here like they have in Europe and Asia,” Miller says. “We’re not there yet; there’s plenty of room to improve. When you look at alternative energy applications, robotics is a perfect fit. Vision tools and force sense technology are much needed upgrades when dealing with the equipment found in solar.”

“Our customer base is shifting toward solar and wind and we’re working with companies that are going to make these products in the Midwest, so it’s an exciting time for the alternative energy market,” Elkins adds.

People were terrified of robots in the 1980s, according to Cicco. FANUC began partnering with companies in a variety of industrial markets to present automation tools and solutions for areas like welding, aerospace, automotive and medical devices. “We wanted to find industries that don’t ever go off-shore for their specific needs, industries that supported U.S. manufacturing.”

Cicco adds that a sure sign of the staying power of robotic automation is the amount of companies that no longer use integrators like FANUC today.

“Several companies have their own in-house robotic operations and no longer need outside assistance. This is one ex-

ample of how the market has changed, but the industry itself continues to grow,” Cicco says.

To Educate and Instruct

Marketing has always been an interesting dilemma in robotic automation. Sales teams are instructed to come up with a variety of strategies to get the message out on the benefits of automation. This is accomplished with education programs and involvement in U.S. manufacturing initiatives.

FANUC, for example, is involved in a website dedicated to bringing business back to the United States (www.save-ourfactory.com). Members include ATI Industrial Automation, Motion Control Robotics, Schunk USA and the Society of Manufacturing Engineers (SME). The website serves as an online resource for articles and videos involving quality, efficiency, off-shore pitfalls and viability topics targeted at U.S. manufacturing.

“This is one of our biggest marketing tools and a way to reach out to industry leaders to increase manufacturing opportunities here in the United States,” Cicco says.

Technology Days at ABB Robotics take place April 21–22 at a training facility in Auburn Hills, MI. Onsite events like these allow ABB employees to host robotic demonstrations and in-depth technology seminars for current and prospective customers. An open house on the final day welcomes anyone interested in robotics to see the demonstrations, including youth organizations and students.

Nachi Robotics offers facility tours to local colleges and supplies robotic equipment to colleges and universities in order to support engineering curricula. The company has also been involved in the FIRST (For Inspiration and Recognition of Science and Technology) robotics competition (www.usfirst.org) for ten years.

continued

Motion Without Limits®

"7 Reasons to Team with Bishop-Wisecarver"

1. We **invented guide wheel technology**. Nobody knows it like we do.
2. Stainless steel and clean room **components and systems from stock**.
3. **Smooth, low friction motion** for both front end and back end processes.
4. **Motor mounts** are available to fit any manufacturer's motor or gearbox.
5. Our design support, 3D CAD, and FEA tools **save you time and money**.
6. Custom designs and assemblies are our unique ability; we're an **extension of you**.
7. **Freedom** to realize **your engineering potential** and design **outside the box**.

"Call or visit us online today and discover how our worldclass engineering and manufacturing team can turn your next project into a linear motion success!"



Ariel Oriel
Bishop-Wisecarver
Applications Engineer
arielo@bwc.com



Low particle emission to meet class 10



Clean room certified sealed belt drive actuator and motor mount



Excellent stability, low friction rotary motion, large center through hole accommodates other components



2104 Martin Way
Pittsburg, CA 94565
Tel: **888.580.8272**
Fax: 925.439.5931

www.bwc.com

"I get calls from local high schools all the time because students are interested in coming in and seeing some of our robotics at Motoman," Elkins says. "For career planning, the robotic industry embraces so many different engineering disciplines that it's really appealing to college and high school students."

These resources are a great way to show off the robotic systems and give people an idea where the manufacturing industry is heading in the future. And surprisingly, most companies are now embracing the technology, and the stigma of job loss is no longer the focus. In fact, with all the growth and new market opportunities, the real threat to robotic automation is more robotic automation. These companies continue to release new equipment and technology efforts in an effort to increase business.

"The industry has become very cost competitive," Ellert says. "Being attuned to the needs of customers and developing products to suit those needs is the road map to success. Humans and robots cooperating in manufacturing tasks will be commonplace in the future."

"And we haven't even begun to touch upon the huge labor shortage that's coming," Cicco adds. "People forget that many of the baby boomers that planned to retire recently had a change of heart when the recession hit. There's going to be a significant loss of manufacturing jobs in the next ten years when they finally decide to call it quits. Lots of empty positions will need to be filled."

Robotic automation is ready and willing to pick up the slack. 

For more information:

ABB Robotics
1250 Brown Rd.
Auburn Hills, MI 48325
Phone: (248) 391-9000
www.abb.com

FANUC Robotics America, Inc.
3900 W. Hamlin Rd.
Rochester Hills, MI 48309
Phone: (248) 377-7000
www.fanucrobotics.com

Motoman Inc.
805 Liberty Lane
West Carrollton, OH 45449
Phone: (937) 847-6200
www.motoman.com

Nachi Robotics Systems, Inc.
22285 Roethel Dr.
Novi, MI 48375
Phone: (248) 305-6545
www.nachirobotics.com

Robotics Industries Association
900 Victors Way, Ste 140
Ann Arbor, MI 48108
Phone: (734) 994-6088
www.robotics.org