PROFILE

NAME: Plastic Designs, Inc.
LOCATION: Paxton, IL
FOUNDED: 1989
WEBSITE:
https://www.pdipaxton.com/

CHALLENGE

Plastic Designs, Inc. needed a fast and cost-effective automation solution to help their customer improve product quality and reduce waste. The solution had to be easy to use and simple to program for engineers with no prior robotics experience.

SOLUTION

The combination of the Epson T6-B All-in-One SCARA robot and RC+® Express intuitive robot teaching environment provided an easy-to-integrate automation solution that improved product quality and reduced scrap while increasing production capacity by 20 percent.

Fast and Easy

Epson RC+ Express Platform Helps Plastics Manufacturer Automate a High-Speed, High-Volume Operation

What do you do if you have a manufacturing process that's a constant headache, but you can't justify the cost of a turn-key automation system?

That was the case at Plastic Designs, Inc. of Paxton, Illinois (PDI) late last year. Project engineers Zach Allen, Ben Zihlman and Dustin Kurtz wanted to automate a pick and place operation used in the manufacturing of low-cost plastic shims, but the $600,000 price tag that turn-key automation suppliers had quoted was completely out of the question.

Instead, they decided to tackle the problem themselves using Epson's new RC+ Express programming platform and an Epson T6-B All-in-One SCARA robot. The total price of the solution, which included the robot, modifying the control system for the injection molding machine, and rebuilding the operation's conveyors and finishing equipment, was a fraction of the turn-key solution cost. Additionally, they were able to complete the project, from planning to implementation, in less than two months.

"None of us had any prior experience with industrial robots and programming or implementing them into production scenarios," Zihlman recalled. "Yet on the first day of installation, we were able to start writing and implementing our own picking, placing and palletizing program."

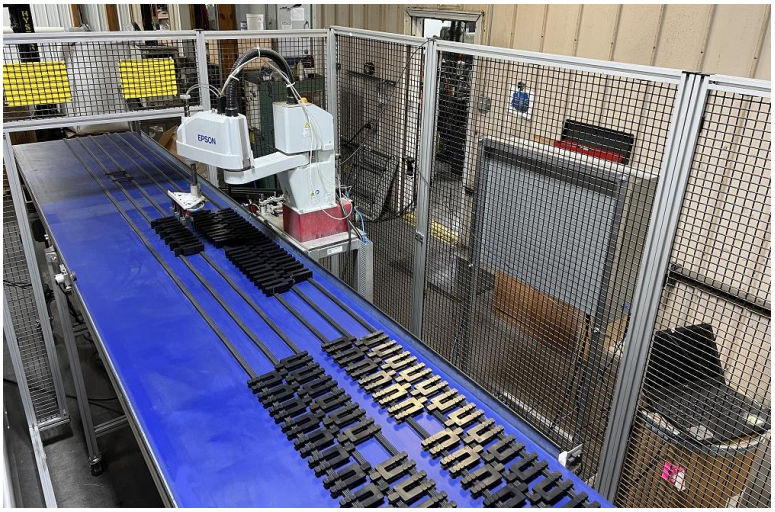
The project has been a resounding success.

Contract Manufacturing and Glazelock Shims

Founded in 1989, PDI Paxton is a contract manufacturer of plastic parts through injection molding and thermoforming processes. The company is known for its quality control, and it has been listed as a "Zero Defect Supplier" by Mitsubishi for several years.

"We work with small customers producing a few hundred parts per year, all the way up to those requiring millions," Allen explained. "For complex projects, PDI develops assembly fixtures and automation solutions in-house, and we invest heavily in new technology."

Among the products PDI manufactures is the Glazelock Stackable



Shim Pack, which consists of 16 injection-molded plastic shims, each 1/16" thick, used in the installation of windows, doors and cabinets. The shims are heat-sealed along one edge, so that users can break off just the thickness they need, from 1/16" to one inch.

The Shim Pack is Glazelock's most popular product, with sales of more than 16 million shims each year, but the market is competitive and price sensitive.

Traditionally PDI has molded the shims in bulk, but then has struggled to stack them and transfer them to the heat sealer before packaging. It's a high-speed operation, producing more than 90,000 shims per eight hour shift, or about 192 per minute.

"The most difficult part of the process," Allen explained, "is orientating the shims after they come out of the molding machine, assembling them into stacks, then holding them together while they are edge-sealed."

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- BEN ZIHLMAN, PROJECT ENGINEER, PLASTIC DESIGNS, INC.

A number of years ago, PDI engineers built a gravity-fed conveyer to help operators hand-stack and hand-transfer the shims. Still, “one source of errors was the deck height, so you might end up with 15 or 17 shims in the package, instead of 16. Another was waste. A lot of parts just ended up falling on the floor.”

A third issue was that the operators had to reach out 42” to pick up the stacks of shims. Even though they are very lightweight, this consistent, long reach was an ergonomic issue, causing pain and discomfort for workers over an eight-hour shift.

“We needed a robotic solution, but it had to be inexpensive and really easy to use,” Zihlman said. They found exactly what they were looking for at the Epson booth at the Assembly Show in Rosemont, Illinois, last October.

Designing a Solution

What most impressed the team, Zihlman recalls, was a demonstration at Epson’s booth showing the ease-of-use of the RC+ Express programming environment. Epson’s distributor, FPE Automation of Elk Grove, Illinois, followed up with a quote of less than $10,000 for an Epson T6-B SCARA robot, which includes the RC+ Express software and one day of training.

RC+ Express, an intuitive software development platform that works with most Epson SCARA and 6-axis robots, allows users to create simple applications without the need for any coding. It features a highly visual, block-style robot teaching environment plus a number of convenient, premade templates for common operations. It also includes a 3D simulator to help users visualize and fine-tune applications before hardware is even installed.

“We felt the T6-B could do the job we needed to do. We could integrate it with our PLC, the Programmable Logic Controller of the injection molding machine, and we were confident that we’d have a lot of support after we purchased it,” Zihlman explained. “The T6-B was far less expensive than other robots the team had considered.”

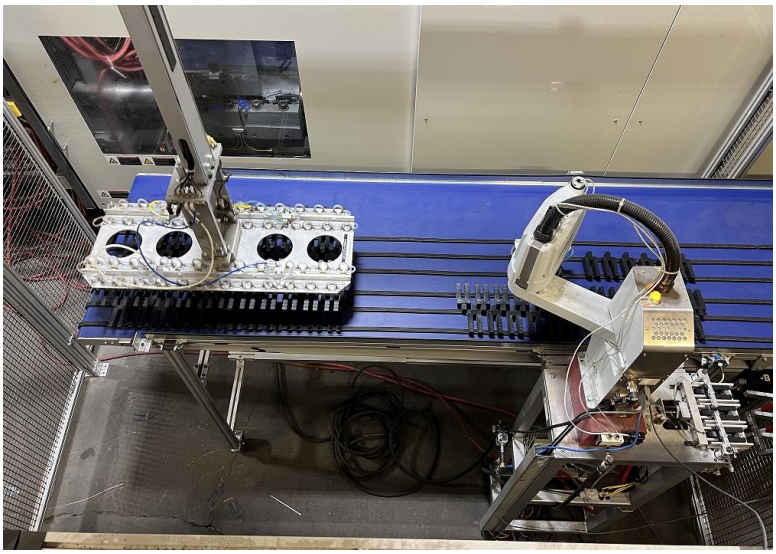
While the team got a fast start with RC+ Express, once they attended the training, “the whole process only took about two months,” Zihlman recalled. “But most of that was taking the time to build a new heat sealer, and then Zach did a lot of work on the PLC so it could communicate with the Epson robot.”

Zach Allen, based in Ohio, was unable to attend the RC+ Express training, but he says he had no problem learning to program the Epson robot on his own. “The drag and drop nature of RC+ Express made it really easy,” he said.

Once the new system was up and running, Allen was surprised at how much it was able to improve the operation.

Insights From the Implementation

There were at least five advantages to installing the Epson robot that went beyond what the team had initially expected.



"First, the robot is able to create a much straighter stack of shims, coming out of the heat sealer, than operators were able to achieve by hand. “The people at Glazelock really like the new appearance of the shim stack; it sets their product apart from their competitors,” Allen explained.

Second, troubleshooting the operation is now far easier, Zihlman added. “In the past, if we had a problem with the sealer, it would be hard to pinpoint the cause because it was hard to tell if the operator was doing something a little differently. But now, we’ve eliminated a potential problem area.”

Third, PDI has reduced the labor requirement from one full-time operator to one operator working one-quarter to one-half of his or her time. “That frees up our operators to focus more on quality checks and other more productive, less repetitive tasks,” Kurtz explains.

Fourth, the client is seeing the benefits of this type of automation and is now considering new sizes and configurations of the Shim Pack product. “It has opened a lot of doors for them,” Allen said.

Fifth, and most crucially, PDI has achieved a 20% improvement in throughput using the Epson robot.

“That’s a pretty significant savings on our end and we’re able to pass that through to our customer,” Allen said.

“Glazelock is the leader in the industry, but they have a lot of competitors. It’s our job to help them get even farther ahead, while ensuring the quality and consistency of the final product.”

In short, Kurtz said, “We’re really happy with the Epson robot and RC+ Express.”

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