RAPID ROBOTICS

Solving Your Machine Operator Shortage: **8 Plastics Operations to Automate Right Now**

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How pre-trained robots are helping plastics manufacturers raise productivity and lower costs

Right now, plastics manufacturers are struggling with a unique set of interlocking challenges. Supply chain issues are causing feast-or-famine production levels. Inflation is hammering operating expenses, which makes every order even more critical to fill. And a chronic shortage of machine operators is compromising productivity, making it difficult to adjust to these circumstances.

Automation is a proven way to gain some breathing room and add flexibility to production lines.

But plastics manufacturers have been unimpressed with previous offerings, for good reason. Traditional robot deployments often take months to design and install, require huge capital investments, and frequently struggle with integration and programming issues once they finally arrive on site.

The good news is that a new breed of quickly deployable robots are rewriting the rules, making automation significantly more affordable and faster to deploy. In this overview, we'll take a look at eight use cases plastics manufacturers can implement today to elevate productivity and reduce costs with robots.

01. Hot Stamping

This manufacturer produces high-end equipment for the two major disc sports: golf and ultimate. The brand's distinctive graphics are applied to the discs in a two-step hot stamping process driven by two robots, also known as **Rapid Machine Operators (RMOs)** from **Rapid Robotics**.

The first robot picks up a blank disc from a stack, moves it into the first hot stamping machine, removes it after the first color is applied, and places it in the retrieval stack for the second robot, which puts each printed disc into another hot stamping machine for application of a second color. Both robots use a custom-designed "deer antler" gripper, earning them the nicknames Doe and Buck.

Simple pick-and-place operations like this are ideal for robots, which can run continuously with very little supervision. When upstream parts come directly from the injection molding machine, virtually no operator intervention is required.

In a similar application, an RMO has been hot stamping parts of a popular brand of coffee maker continuously for more than 2 years straight.

02. Gate Clipping

The global pandemic hit plastics manufacturers extremely hard, forcing many to reconfigure work cells to allow social distancing. This example comes from one that got hit even harder because of what they make: PCR chips for Covid tests. Faced with orders that skyrocketed by a factor of five, the company decided to automate a process that was previously handled by a human operator. In this case, the robot grabs the injection molded chips from a four-cavity injection molding fixture, moves them into a gate clipper where the extraneous material is removed, then places the clipped chips onto a conveyor belt for automatic bagging.

Post-processing of injection molded plastic parts is a prime opportunity for robotic automation. Using a robot eliminates the need for a human operator to act as the go-between from the mold and the machines responsible for removing runners, clipping gates, and other processes, so the human operator can be reassigned to other tasks.

03. Machine Tending

Machine tending is ideal for robots because they excel at handling repetitive tasks that require a degree of precision. Here, two robots handle large-scale printed circuit boards (PCBs) used in very large servers. The boards can be large (up to 18 x 24 in.) and vary in size. And they can only be loaded on the laminator belt in a single layer—any error would damage the machine.

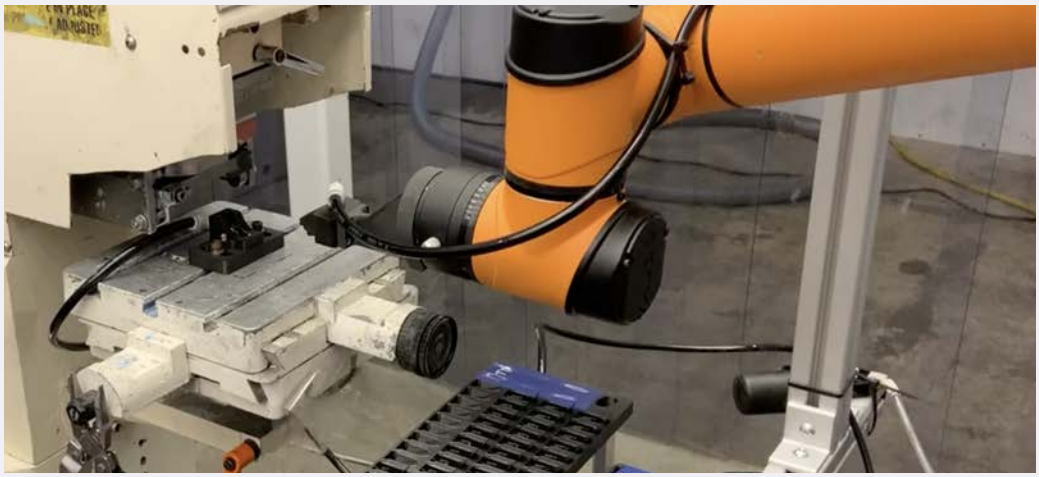
The first robot takes a single board from a feeder fixture and places it on the belt. An ultrasonic sensor ensures only one board is placed on the belt at a time. A second robot then puts the laminated board in a stack for collection. Depending on the size and quantity of materials, robots can help minimize total human supervision time as well as intervention for refilling the feeder.

04. Pad Printing

Pad printing is a perfect example of an operation that is both easy to automate, and becomes substantially more consistent and efficient when handled by a robot. Robots can quickly move parts through a multistage printing operation, with minimal variation in quality from piece to piece.

After these small medical device components are ejected from the injection molder, a human operator places them into a fixture where a cobot grabs a pair of parts and places them into a pad printer for a two-sided process where “lock” and “unlock” logos are applied.

Next, the cobot places the printed parts into an inspection booth where cameras examine the print job and issue a pass/fail rating. Depending on the rating, the cobot either drops the parts into a bin as rejects or places the finished parts on a conveyor belt for final drying.



05. 3D Printing

Additive manufacturing, or 3D printing, is often used for rapid prototyping to accelerate product development as well as enable mass customization of devices like hearing aids and teeth aligners.

Here, a cobot is responsible for moving the tray that holds the print bed, or build plate, in and out of the 3D printer. After the print process finishes, the cobot can place the tray onto a conveyor belt to move to the next stage in the process, or even place it directly into a second machine that dissolves the support material around the printed objects.

"Rapid Machine Operators are easy to set up and integrate seamlessly with our staff."

— Matthew Alley,
Head of Fulfillment and Supply Chain, Truepill

06. Inkjet Tending

Inkjet printing is a common step in post-processing for plastic parts. Parts can be ganged into large fixtures and batch printed with quick-drying inks. **In this high-speed operation, a cobot can be installed to load the fixtures into the inkjet printer, remove the empty fixture after the parts are taken up, and replace it with a full fixture for the next round.**

"Smart Setup is shaping up to be an absolute game-changer for busy high-mix environments like ours. We can't pay systems integrators to come in every time we want a robot working on a different task. We'd lose more money than we'd save. With Smart Setup, we'll be able to do everything ourselves, with practically no downtime. That means we'll spend less, get more work done and bring in more revenue overall."

— Tammy Barras,
President, Westec Plastics Corporation

07. Ultrasonic Welding

Many plastics manufacturing applications require post-injection molding ultrasonic welding to join pieces that are too large or complicated to be extruded as one unit.

In this example, there are two halves of a larger finished good that the robot brings together so they can be joined with a quick weld. **The robot triggers the welding process after the left and right halves are successfully situated, then removes the finished product and carefully drops it into a waiting container below.**

08. Heat Staking

Heat staking joins plastic with other materials through pulsed heat compression, deforming the plastic just enough to allow it to be affixed to metal or another material. Previously, a human operator would complete this step with a soldering iron. **But a cobot can easily be equipped with a heat stake to perform any number of tasks that are common in high-volume, low-cost manufacturing applications. Not only does the cobot run on an uninterrupted shift, it allows the human operator to supervise multiple cobot applications or handle more complex tasks.**

"With integrators, we've experienced all kinds of design delays and miscalculations. We literally just received a piece of equipment [from an integrator] that has been in the works for two and a half years, and was supposed to be in-house a year-and-a-half-plus ago. With the RMO, there was none of that hassle."

— Philip Haseltine,
VP Manufacturing Operations, Delphon

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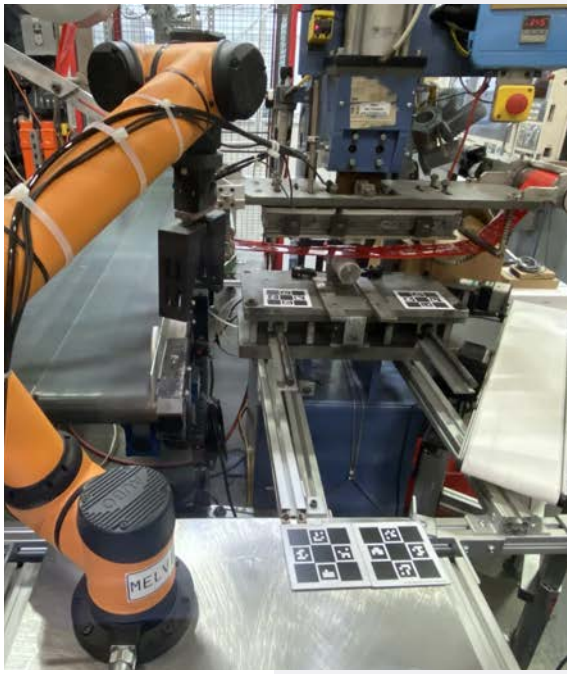
Take a closer look at **robotic automation**

The technology that makes on-demand automation possible is a combination of artificial intelligence (AI), advanced vision systems, a versatile articulated arm, and an intuitive user interface that does not require any programming or robotics expertise. After an initial consultation, the Rapid Robotics team pre-programs the RMO to operate your machines, allowing them to be up and running in days or weeks—not months. In fact, the RMO can be pre-trained on multiple tasks and moved between jobs without reprogramming, providing exceptional task flexibility. Plus, the low monthly cost means you'll see ROI from the moment your RMO starts working.



"We looked at automating machine operator tasks before, but as a custom injection molder, the costs were prohibitive. This solution was the first we'd seen that just worked, at a price that made sense for our business."

WESTEC Plastics Corporation

— Tammy Barras,
President, Westec Plastics Corporation

Get started right now

Automate your plastics operations now, and see ROI instantly. Bid new business at rates as low as $4/hour.

Learn how in 30 minutes. Schedule a free automation consultation at rapidrobotics.com/contact-us

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