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Automation Brings New Opportunities to Injection Molding

Executive Summary

After years of watching U.S. manufacturing move overseas to countries with low labor costs and seemingly endless capacity, the reshoring movement has officially begun. No longer content to suffer the faulty production, miscommunication, and long lead times often associated with outsourced production, today's product developers are looking for ways to keep manufacturing at home while still remaining competitive in the global marketplace. Automation may hold the key, and is increasingly being utilized by injection molding companies.

But where do you get started with automation? And how can you know if automation is the right choice for your products? In the following pages, we'll explore the ins and outs of automation in plastic injection molding as well as identify new opportunities for product developers to harness the power of automation to reduce their costs while improving the quality and value of their products.

Off the Shelf or Custom?

Many of the tasks that automation addresses use either modular or custom designed tooling. Robotic End of Arm Tooling, for example, can handle very simple operations but may need custom specifications to address more complex operations.

Bottom line: the more complex the operation, the more complex your End of Arm Tooling design will be.

This must be considered when your manufacturer creates their bid.

Introduction to the Global Marketplace

Offshoring manufacturing took off in the U.S. in the late 1970s. Frustrated by the economic turmoil of the decade (largely believed to have been caused by unstable fuel prices) the U.S. began to tear down many of the barriers to trade previously set. Suddenly businesses on the hunt for new methods to stay competitive had access to abundant cheap labor and manufacturing capacity. The only catch? It was overseas.

Many businesses remained optimistic. They had a new way to keep costs low and hoped the lower cost of production would be enough to maintain a competitive edge in the marketplace. Of course over time what they found was that those lower costs often came with higher risks and the tell-tale headaches of a long distance relationship.

These manufacturers found out the hard way that offshoring runs the risk of:

- Poor product quality
- Miscommunication
- High travel and shipping costs
- Long delivery times
- A greater chance of counterfeit parts
- Illegal copying of product designs!

Today, businesses must weigh both the pros and cons of offshore manufacturing with the benefits of bringing production back home. These benefits include:

- Faster access to finished parts
- Better control over the quality of those parts
- More opportunities for innovation

The United States is one of the most technologically advanced countries in the world, and today's manufacturers have gotten the message loud and clear:

Innovation is the key to staying competitive, and staying competitive is the key to success.

**Is your manufacturer up
to the task of automation?
Here are some questions
to ask before you get
started.**

Have you included automation
on other projects?

How is automation part of your
workflow today?

Who is in charge of automation
projects?

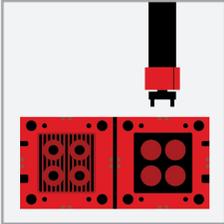
What is their knowledge and
experience level?

That innovation, however, comes with challenges of its own. Here in the U.S., a shortage of skilled workers threatens to keep manufacturing companies from reaching their full potential for success. Less workers mean less productivity, unless manufacturers can find a way to keep production moving.

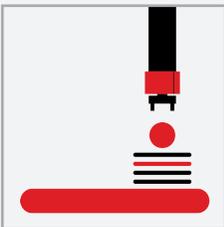
Automation is one powerful tool that is helping businesses improve the competitiveness of their products by speeding up production times and reducing manufacturing costs. And perhaps even more importantly, automation can take on many of the repetitive tasks performed by employees, freeing them up to take on some of the more challenging aspects of production like inspection and testing.

Automation in Injection Molding

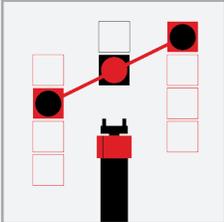
No manufacturing process is free from some level of automation; however, there are certain tasks that have proven to be an excellent fit for injection molding automation:



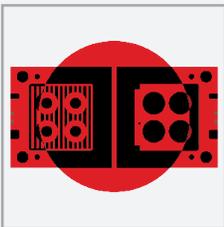
- Removing parts from the mold - Removing parts from the injection mold is a frequently utilized automation task in injection molding. The process employs End of Arm Tooling that connects to the end of a 3-axis robot to remove parts from the mold, degate from the runner, and place parts on the production conveyor.



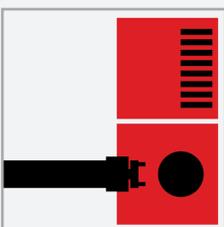
- Placing inserts or metal components - For overmolding and insert molding applications, automation can be used to place internal components prior to injection molding, providing a high level of accuracy for component placement. At KASO Plastics, the technique is often used to place and stabilize metal components prior to injection molding.



- Secondary Operations - Automation can be used to assist with many secondary operations, including assembly, sorting, and even packaging.



- Visual Inspection Systems - By automating the visual inspection process, injection molders increase part accuracy and consistency while simultaneously speeding up the inspection process.



- In-Mold Decorating and Labeling - Automation of in-mold decorating or labeling creates more consistent cycles, greater accuracy of placement, and less waste. It also improves operator safety.

Benefits of Automation in Injection Molding

There are many important benefits of automating your injection mold production. From reducing cycle times to improving part quality and consistency, automation on the whole can help create a more efficient manufacturing process. Add to that reduced labor costs and less waste during manufacturing, and automation is almost a slam dunk. Manufacturers like automation because it allows them to increase their machine utilization and create more consistent cycle times, so they can plan production more efficiently and profitably.

Ah, but you noticed the “almost” there, didn’t you? That’s because even today, automation is a great fit for many, but not all, injection molding projects. That’s due in large part to the upfront investment involved to prepare for automation. This is why historically, automation was most often reserved for high-volume products that could ensure a return on investment within a reasonable timeframe.

The good news? As technology improves, those higher volumes are becoming less of a requirement for automation. Today, many manufacturers are looking for ways to incorporate automation in order to meet their customers’ budgets. In fact, automation can often be a tool that helps manufacturers meet target budgets and lower the per-part price enough to counteract the investment in automation setup.

Considerations for Automation Include:

- Part complexity - Generally, the simpler the injection mold is, the easier it is to automate around. More complex parts may still be a fit, but you'll want to consider this upfront so you can work with your manufacturer's engineering team to find ways to update your product designs for easier automation.
- Part volumes - Higher volume projects make a strong case for automation, as the upfront costs associated are more easily offset by additional runs and per-part savings.
- Project Timeframe - As counterintuitive as it sounds, automation can save you a great deal of time, but only if you've got time on your side. That's because time is necessary to prepare for automation in your project's workflow. Tight on time? Then perhaps it's best to skip automation until your next project, when you are better able to plan for it.
- Technical Skill - Not all manufacturers have the personnel and knowledge base to properly incorporate automation into their production. Do your homework and ask questions!

The Challenges of Automation

While automation has many benefits, there are also challenges associated with the process. The biggest issue, at least for smaller projects, is the upfront investment. This is why traditionally, only large-scale projects were considered good candidates for automation.

Set-up time is another important consideration. The more complex the task being automated is, the more time it will require to set up prior to every production run. This is one important reason why typically larger production runs are considered a better match for complex automation.

Today, however, new advancements and more flexible programming are making automation a relevant choice for large and small production alike. End of arm tooling, for example, can now offer modular solutions to a variety of repetitive tasks. In addition, great strides have been made to improve user interfaces, making programming more intuitive and therefore faster.

Flexibility is actually another often-cited challenge of automation. Originally, automation worked best for single tasks - in other words, robots could do a lot less than a pair of human hands. Today, automated work cells are meeting this challenge by automating whole series of tasks in order to tackle larger portions of the manufacturing process.

When is the right time to consider automation?

Many manufacturers will want you to consider automation as a tool to help you save money, improve your product quality and reduce your time to market. As a customer, take the opportunity during the quoting process to ask if automation can help you save. Manufacturers will be looking for ways to provide a more competitive quote and find ways to best utilize their resources. Automation can help you get a more competitive quote. Modifications may happen at any time during the production process, but generally it's best to start as early as possible to add the most value to your production.

By starting early, you may also consider design modifications that will make your product designs easier to manufacture using automation. If you are working with a manufacturing partner with in-house engineering and design resources, we suggest you work with them to discover modifications that can be made to your product designs to improve their manufacturability.

The bottom line? Automation is here to stay. And that is great news for those who are ready to harness its power in order to find new ways to innovate their production.