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RESULTS INC.

It's Time to Challenge Status Quo:

Scientific Molding
Improves Competitiveness

The North American manufacturing industry continues to face a myriad of challenges. Disruptions across the supply chain along with workforce and demand dynamics have created an everchanging marketplace and unprecedented challenges for plastic processors.

As a substantial portion of the workforce approaches retirement age, manufacturers are grappling with the loss of experienced workers and the shortage of skilled replacements. Decades of experience and institutional knowledge are at risk of being lost, creating a void that is difficult to fill. Furthermore, the manufacturing sector faces difficulties attracting younger generations and qualified candidates due to perceptions of manufacturing careers being outdated or undesirable.

Additionally, intense competition from overseas markets, particularly from countries with lower labor costs and less stringent regulations has led to increased price pressures. This makes it increasingly more difficult for small- to medium-sized manufactures to compete.

The reality is the North American industrial base is under attack and many companies are struggling. According to the 2023 Harbour Results Manufacturing Benchmarking Study, approximately one-third of those surveyed were "at risk" financially with extremely high debt-to-earnings ratios and lower than normal profitability.

Molding is not exempt to these difficulties. Parts are more complex, sustainable materials are harder to work with and quality expectations are on the rise. The marketplace expectations are moving fast, and molders are not responding quick enough.

We are at a tipping point for plastic processors. It can no longer be business as usual. Business leaders need to challenge the status quo and drive continuous improvement in their shops to excel and improve competitiveness.

What Does Success Look Like

The plastic processors rising to the top are those that exude flexibility and agility, match supply and demand the best they can and are profitable regardless of business conditions. They have built resiliency to weather the difficult times, excel during good times and are focused on driving operational improvement, doing more with less and reducing waste. Top shops also are embracing technology – automation and software – and data to improve throughput and profitability.

These are not easy tasks, and change doesn't not happen overnight. To be successful, companies need to be intentional, developing a plan and working the plan from the top down. The first challenge is determining where to start.

Key Takeaway:

Plastic processors who are satisfied with status quo will not be able to compete in the future. There are too many challenges to operate with a "business as usual" mentality. Leaders need to take action to make positive changes.

Eliminating the “Art” of Molding

All too often we hear molding is an art because there are many variables that change in real time – nothing is predictable and finding consistency is impossible. For years, companies have relied on their internal teams – who have extensive experience – to “know what’s best” and “follow some processes.” Today this approach is not good enough. It is not producing the quality and efficiency needed to be competitive – to address the challenges molders face.

Scientific molding, a highly precise and controlled manufacturing process for producing plastic parts, is a solution that is helping shops make perfect parts and eliminate waste. It involves the application of scientific principles, data analysis and advanced technologies to optimize the injection molding process. In short, scientific molding helps manage the variability in real time.

It focuses on optimizing every aspect of the injection molding process, including material selection, mold design, machine settings and process parameters. The principles rely heavily on data collection and analysis to make informed decisions. Advanced sensors and monitoring systems in the equipment and the mold are used to gather data on key process variables such as temperature, pressure and flow rate. By analyzing this data and applying them to the scientific mold methodology, shops can identify trends, optimize parameters and make real-time adjustments – helping to drive efficiency and quality.

Key Takeaway

Scientific molding is not just a methodology, to be successful it requires a culture change. Everyone within the company must embrace the principles and processes.

Key components to scientific molding include:

- Utilizing proven training programs to educate your workforce on the key principles and techniques of the process.
- Evaluating your current injection molding process to identify areas for improvement and which scientific molding principles can be applied.
- Developing standardized procedures and protocols for all aspects of the injection molding process.
- Establishing systems for collecting, recording and analyzing data from the injection molding process.

Training is imperative to successfully implementing scientific molding within a business. The scientific molding methodology has been proven to work, and by implementing the right education programs, it can be taught to molders, technicians, engineers or supervisors across an organization. Educational programs equip people with the knowledge, tools and confidence to define a proven process and then utilize data to determine what went wrong and what to adjust if, or when, an issue arises.

Additionally, various types of data are crucial for optimizing processes and ensuring consistent, high-quality part production. Having the right hardware, software and people in place to collect and analyze data from machine to material, to mold and beyond, allows molders to gain insights and make data-driven decisions to optimize production.

Finally, scientific molding delivers the best results when it is incorporated across the entire shop – when it becomes a mindset running from the operator to the C-suite and beyond. Yes, it is true that if you implement scientific molding on one or two “troubled” machines or parts you will see benefits – a gain in efficiency and quality – but the gain will be short lived and unsustainable because old habits inevitably sneak in.

Creating standard methodologies and data requirements across an entire operation and all shifts will deliver the greatest benefit, resulting in significant and sustainable improvements that will give you a competitive advantage.

Key Takeaway

Using Scientific molding practices delivers the most robust process window. It is proven and reliable, and when correctly implemented, produces the perfect part. The process and data help identify where the issues are and how to resolve them quickly.

Scientific Molding Optimizes the Shop Floor

Scientific molding delivers several tangible and non-tangible benefits to an organization. Businesses committed to it and implementing the process across the entire operation will see the greatest return on investment, as well as sustained benefits.

Key Benefits of Scientific Molding



Reduced Cycle Times: By optimizing process parameters and minimizing variability, scientific molding can often achieve shorter cycle times compared to traditional molding methods. This increased efficiency leads to higher productivity and lower production costs.



Improved Part Quality and Reduced Scrap: The precise control over process conditions and material flow in scientific molding results in parts with superior dimensional accuracy, surface finish and mechanical properties. This leads to reduced scrap rates and higher customer satisfaction.



Increased Flexibility: Plastics processors incorporating scientific molding throughout their entire facility will see increased team and machine flexibility from standard processes and the ability to apply scientific molding principals across the shop floor.



Improved Product Launch: Once a process has been established, the principles remain the same, so the only necessary modifications are the mold, material and equipment, which streamlines the launch process and reduces start-up time and cost.



Predictable Outcomes: Scientific molding takes the variability and "guesswork" out of molding. It creates trust and confidence in the molders, the molding process and the customer.

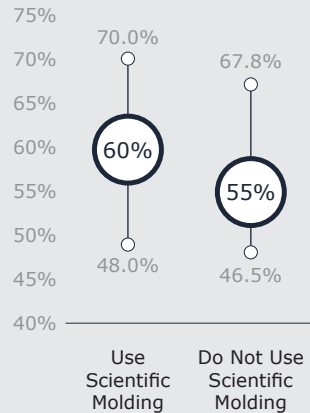


Cost Savings: While the initial setup and implementation of scientific molding may require investment in advanced equipment and training, the mid- and long-term benefits outweigh the costs. The improved part quality, reduced scrap rates and increased productivity lead to significant cost savings in as little as three months.

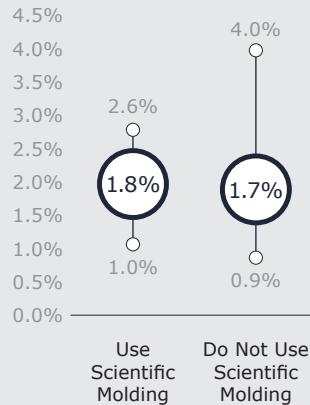
The Numbers Support Scientific Data

The numbers show scientific molding generates positive results for plastic processors. According to Harbour Results Manufacturing Benchmarking data, manufacturers using scientific molding experience 17% efficiency improvement, which translates to \$16,000 improved value added throughput per person annually – a significant boost in output. Additionally, processors see greater machine uptime and better cost of quality. And, most notably, median profitability of shops using scientific molding jumps from .8% to 6.5% EBIT (earnings before interest and tax) versus those not using it.

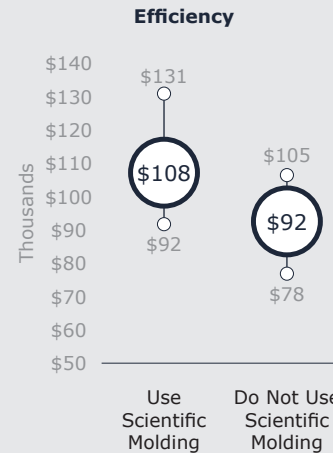
Scientific Molding vs. Molding Uptime %



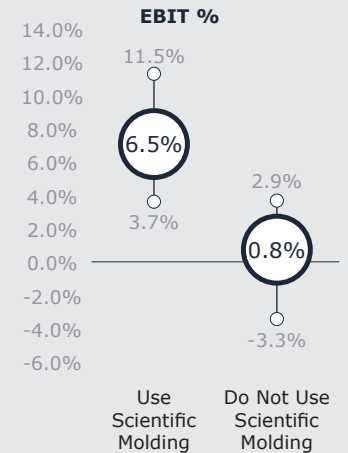
Scientific Molding vs. Molding Quality Cost



Scientific Molders See Higher Efficiency



Scientific Molding Leads To Profitability



○ High/Low Quartile — Median

Making the Transition

Scientific molding is not new to the mold industry. Some plastic processors may have tried implementing it in the past and found it didn't deliver benefits, or wasn't sustainable. The truth is – it does work, and it is sustainable – it is a proven methodology that drives consistency in an inconsistent business. However, for it to work, leadership must believe in it and have a vision that a standard methodology can, and will, work for their organization.

We live in a world of constant change. Rapid change is being led by a generation of new consumers, who one day will infiltrate the workforce with their ideas and reliance on technology. To be competitive in this ever-changing landscape, shop owners need to evolve their business approach, technology, products, partners and capabilities. It's important to remember that you don't have to go through it alone. Utilize resources and industry experts – vendors and partners, certified training programs, peers, etc. – to help you be more competitive.

Key Takeaway

There are many proven, well established scientific molding training programs. Reach out to your peers, reputable training programs, associations and partners learn more about the methodology and how it might work within your company or the benefits of expanding it throughout your entire operation.



For more information about scientific molding or how to stay competitive in the changing industry landscape, contact:

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