Short Run Molding for Long Term Success

Molding is a critical process in the manufacture of medical devices. However, long molding runs are not always the ideal option for the fabrication of components for a device. Short run molding provides numerous advantages to medical device designers that would not be otherwise realized. Combined with up-front engineering, this method can lead to a tremendous success for the product design and manufacturing team.

By Ron Kirscht

Ron Kirscht is the president of Donnelly Custom Manufacturing Co. The company is dedicated to short-run manufacturing, enabling it to overcome the challenges that are inherent to this process like compressed lead-times, fast changeovers, and the demands of JIT inventory management. Kirscht can be reached at 320-762-6402 or rkirscht@donnmfg.com [1].

What's the difference between molding parts for a week and molding parts for a few hours? There is actually a considerable difference. Further, any designer and manufacturing professional in the growing medical sector will benefit from understanding that difference.

Short run can be defined as any run that, including the set-up and tear-down times, lasts less than 48 hours (this is not defined by number of parts, as cycle time and mold cavitation depends on many factors). It's a niche competency, but in the U.S. medical plastics market—estimated at $5.6 billion and rising—it's an increasing need. The rising demand creates better molding practices and more efficient product design imperatives.

Short Run vs. Long Run

The intricacies and differences between short-run and standard—or long-run—molding are not universally known. However, determining which process will be used is fairly straight forward; it is based on how many parts need to be made. The area where a difference can be made is in understanding the specialty of short-run molding. Once the challenge is better understood, it is easy to see why it pays

to find a molding partner who specializes in short run to make low-volume parts, rather than continuing to rely on a standard molder.

Separating short-run from long-run jobs when outsourcing the molding may even come as a relief to the everyday injection molding partner. Traditional molders often see the task of short runs as more of a hassle and a drain on time and resources than as profitable work. Their money is in the longer run jobs that are more suited to their business model, and thus, more lucrative as well as less troublesome and labor-intensive.

There are manufacturing facilities that actually specialize in the nuances of dozens of mold change-overs in a day and have the processes in place to handle such low-volume driven volatility. Short-run partners are not only a good choice when a manufacturer has several low-volume parts to run, but also when there are parts that include multiple plastic components. This is because the short-run molder is more adept in dealing with that many active molds in the shop at one time and can better manage the workflow as part of daily operations.

Time Is Money

When running parts only for a short time, every minute spent setting up a machine and getting it to produce good parts is critical. Overcoming these time and quality challenges takes a great deal of focus and expertise. While the definition of short run means a run lasting up to 48 hours, there are many times that a run lasts less than one hour or has an output of as few as 25 parts. This means daily, multiple mold changes involving different materials on each machine.

Every new part launched in short run is critical because the capital investment is larger relative to the number of parts produced per year. When facing higher per-piece costs, every detail must be carefully considered up front. OEMs should look for ways to take costs out of the process elsewhere by speeding up the cycle time or time to market and ensuring every part is designed for optimum manufacturability from the start. Time spent in running bad parts and going back and adjusting the mold can quickly take the profit out of a part.

Design Considerations and Up-Front Engineering

Design is a key consideration regardless of what type of process being used to manufacture a part. However, it’s all the more critical in short run.

Up-front engineering ensures robust part manufacturability, minimizes tooling costs, optimizes material selection, increases processing speeds, and generally leads to better, more cost-effective medical parts. Designers and OEMs that include molders on their up-front collaboration team realize a distinct competitive advantage in the marketplace.

Designers are uniquely wired with unlimited creativity and a desire for continuous innovation. Capitalizing on the expertise of a capable and committed molder ensures that a designer’s creativity is maximized while keeping it grounded in the realistic constraints of efficient molding.

When a molder engages in the process after the design is complete, these valuable opportunities are typically lost. When modifications are made later in the manufacturing cycle to one part, it can have implications for other parts in the final product. Making design changes this late in the game can be costly and time consuming. For products that require FDA approval, the implications can be especially dreadful.

One steadfast rule that applies to many aspects of design and manufacturing is “keep it simple.” When analyzing a part prior to mold construction, the biggest cost-saving opportunities derive from simplifying the part design. The elimination of complicated surfaces is one of the best ways to reduce tooling costs. When a molder fully understands a business and the part being designed from the outset, it can recommend changes that simplify the design while maintaining its functionality and aesthetic or physical property requirements.

Simpler part design may also allow for more parts to be made within a single mold. If this can be accomplished without losing imperative properties or sacrificing quality, both time and money can be saved in the overall molding process. In addition, the parts get to market faster with a lower investment in tooling and at a much lower per-piece cost.

Resin selection comes into play during the design process as well. Medical industry designers must continuously keep up on the latest trends in medical devices,

market needs, design tips, software, and much more. However, keeping track of the literally thousands of resins available isn't a reasonable expectation for even the best designers. Working alongside an experienced molder when determining part materials will significantly help in identifying cost effective alternatives that can both meet design requirements and reduce part costs.

The Importance of Plastic

Plastic resins have recently sparked another discussion among designers, manufacturers, and molders. As a predominantly petroleum based material, the rise in oil costs is having a direct impact on the cost of resin for medical manufacturers worldwide.

Plastics have been instrumental in medical breakthroughs and procedures for decades and the benefits of plastic as a material of choice have been well established. From orthopedics to cardiovascular uses and permanent implants to disposable products, plastics have truly played a key role in revolutionizing the industry. Plastics are lightweight and flexible, and provide a number of benefits including transparency (allowing visual monitoring of IV bags) and resistance to high temperature ranges and fluctuations. Additionally, many resins have been proven to be tolerated by the body when used in implants.

To maintain these great benefits without passing along rising costs to end-users, designers are continuously challenged to optimize the use of materials in a part's design. One way is to be aware of the part's wall thicknesses. This actually has two benefits. First, thinner nominal wall sections promote a faster cooling time for the plastic when it is in the mold, leading to faster cycle times. Secondly, it removes unneeded material from the part, saving on the volume—and cost—of the material used.

Getting Started

Using these guidelines and incorporating early collaboration with an experienced and committed molder are great ways to help ensure the part is optimally designed, successfully launched, easy to manufacture, and performs well in the market over it's lifecycle.

Designers need to “raise the red flag” if all parties—themselves, OEM, and molder—are not involved from the very beginning of a project.

Educating all involved stakeholders on the benefits of upfront collaboration should help to make a strong case such that the end result will be a win-win-win situation for all involved. If a molder is not willing to put in the time up-front to work with a designer, that designer should seek one out that is truly interested in partnering and becoming a critical piece of the design process and team.

By fully adopting the practice of up-front engineering, the benefits are realized by OEMs, designers, molders, and—most importantly—end-users.

Online

For additional information on the technologies and products discussed in this article, see *MDT* online at www.mdtmag.com [2] or Donnelly Custom Manufacturing Co. at www.donnmfg.com [3].

Links:
[1] mailto:rkirscht@donnmfg.com
[2] http://www.mdtmag.com
[3] http://www.donnmfg.com