

THE FUTURE IN LOW-VOLUME PRODUCTION

Dan Mishek of Vista Technologies (Part 3 of 3)

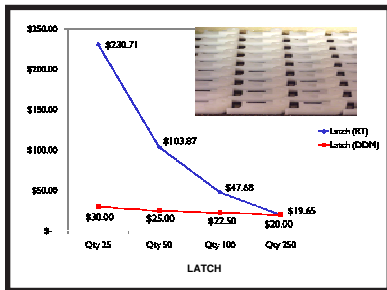
This is the third and final installment of this low-volume production series. We have defined what the range of low-volume production is. We have discussed current trends in production along with identifying the technologies that are the top performers to get plastic parts to market.

In this finale, parts will be identified and compared between Direct Digital Manufacturing (DDM) and Rapid Tooling (RT) using aluminum molds. Again, as described in the previous articles, you will need to decide what is important in the plastic part to you and your project. Is it tolerance, speed, surface finish, material, etc? These charts are going to make the assumption that you have already considered your requirements and now it is strictly up to cost.

To recap, DDM is defined as a direct production of finished goods from additive manufacturing technologies. The additive manufacturing technology that we are using in our comparison is Fused Deposition Manufacturing (FDM). FDM is the process of extruding plastic to build a part layer upon layer. Commonly used materials are ABS, PC and PPSF.

Before you see the price comparisons here is how we came up with the pricing to make sure the comparisons are accurate.

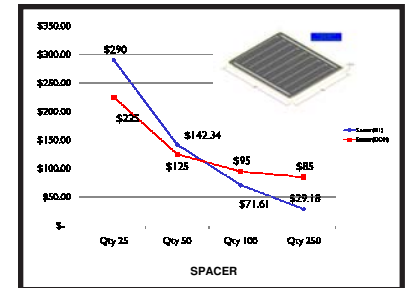
The cost of Rapid Tooling Unit Pricing has the cost of unit pricing and the cost of the tooling. Direct Digital Manufacturing Unit Pricing has the cost of programming, build time, and post processing to make the parts.



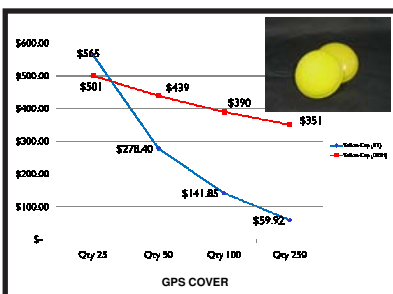
PART #1 LATCH

This latch is 3" x 1 1/2" x 1/2" made from a white ABS. With aluminum tooling this design is a straight pull with no undercuts. This part would be considered a simple part with no complex geometry. In showing the data, the breakeven point would be at the quantity of 250 units. To buy less than 250 units, it is more cost effective to use DDM and after 250 units, an aluminum tool is more beneficial.

PART #2 SPACER



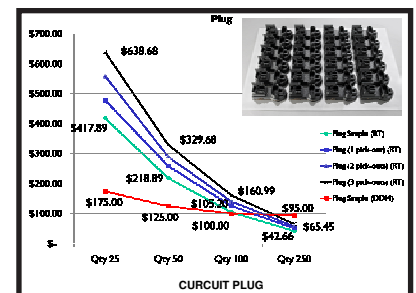
This Spacer is made of a black ABS and has the dimensions of 7.21" x 5.95" x .57". The breakeven number would be at a quantity of 75 units. Again, this part is a simple part with no complex geometry. This product life was only meant to be 60 units and DDM was the perfect fit. The parts were completed in 3-4 days without any tooling cost.



PART #3 GPS COVER

The top cover dimensions are 9" x 9" x 2" made from a yellow ABS. The breakeven area is around 30 parts. This customer ended up needing thousands of parts to fulfill their low-volume production needs so the aluminum tool was very beneficial. The tools were completed in 2-3 weeks and used for over 10,000 parts. The matrix shows that you need to understand the quantities for your product to best choose your manufacturing method.

PART #4 | CIRCUIT PLUG



This circuit plug has complex geometries. We made assumptions in this matrix to show data with this part having one, two and three undercuts to show how different the breakeven points can be based on geometry. DDM has no biases to complexity, because it builds layer upon layer. Rapid Tooling needs to capture these features with a hand pick-out. The plug is 3 " x 2" x 1" made from black polycarbonate. Depending on the complexity, the breakeven point floats between 100 and 220 parts.

Choosing your manufacturing method greatly depends on the size and the complexity of your part. Use these matrixes to better understand where the value add is in each of these technologies. Be sure to always evaluate and re-evaluate your projects because each of these methods may not be niche specific. *Continued on page 9*

Low Volume Production (part 3 of 3) continued from page 5

FINAL THOUGHTS

As we see our trends hold true to produce lower-volume products with higher margins, overseas suppliers are less competitive. The need for speed is at a premium along with quality. Commodity buyers are being asked to evaluate best ways to produce new products. My suggestion is that it begins before that. Engineers and designers need to be aware of these options. Imagine if you are designing your next product knowing you will be using DDM. Using this method of production, you can design without draft, radii and design parts with trapped volume or reverse undercuts. Without deciding this upfront, the design must be designed in a traditional fashion.

As we come to an end in our 3-part low-volume production discussion, I hope that you have had the courage and the foresight to look to the future of your design and your method of manufacturing. Our country is only as strong as our schools and our manufacturing. Use these technologies and their advantages to keep manufacturing alive and well in the United States. You and your products will benefit for tomorrow.



Dan Mishek is the Sales Manager and part owner of Vista Technologies. Dan has been published in *Moldmaking Technology*, *Injection Molding*, *Manufacturing Engineering*, and *Time Compression*. He has also presented at the RP&M Show ('07) in Chicago and Mold Making Expo ('07-'08) in Chicago and Detroit. Dan Mishek graduated from Mount Mercy College in 1997 with a double major in Marketing and Public Relations. He started at Vista Technologies in 1998. Dan manages Vista's direct sales people and directs the marketing efforts to better assist Vista's 1600+ customers.

Vista Technologies was founded in 1996. Vista is a full-service Rapid Prototyping, Rapid Tooling and Injection Molding Service Bureau. Today, this privately held company has in-house capabilities of SLA, Polyjet, FDM, High Speed Milling, Mold Making, and Injection Molding.

Continued - Spotlight on the Board "Ajay Gupta"

resins for injection molding applications with Professor Bhattacharya. And, now for the last eight years, I've been working at Boston Scientific in Maple Grove where I design and develop polymer components and new manufacturing processes for the production of catheters. Rounding out my understanding on the business side of the plastics, I burned some mid-night oil to also complete an MBA from the Carlson School of Management.

A few years back I reached a stage in my career where I felt the urge to give something back to the Society which had nurtured me so well through my formative years. I found myself giving talks, mentoring others, etc., but most importantly working with the SPE Upper Midwest Section board which I joined in 2006. I think my most significant contribution as a board member has been organizing a full day of presentations at the Design for Medical Devices Conference (DMD 2007) in collaboration with Dr. Erdman at the University of Minnesota. Being on our board has been a very rewarding experience and an opportunity for me to contribute and develop in a fun-filled, low pressure, but still challenging milieu. I look forward to continuing my support of the local plastics industry, particularly entrepreneurs starting new businesses in the medical device field. Please feel free to get in touch with me with any ideas, problems or suggestions you may have on how we can make SPE more meaningful for you or your business...or even just to say, "Hi!"