THE FUTURE IN LOW-VOLUME PRODUCTION

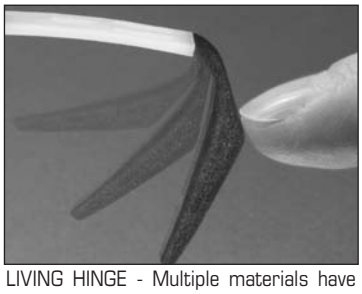
Dan Mishek of Vista Technologies

3M METER - This assembly was produced in a 1+1+1+1 family aluminum tool for low-volume production. Ony 1,000 assemblies are needed every 6 months.

Low-volume production is often overlooked by high-volume projects. Low-volume is rarely catered to or even acknowledged by suppliers or customers. In this three part series, I would like to discuss today's methods of manufacturing for low-volume production plastic parts. Times are changing and engineers and buyers are slow to make the adjustment.

Part one will talk about and identify today's methods of low-volume production. We will discuss new technologies and show how old technologies are being used in a new way. We will define low-volume production in the plastics world along with explaining why it needs to be dealt with differently than high-volume production. Part two of this series will discuss what you should look for when choosing your low-volume production application. We will break down components that will assist you in your decision making from complexity of the part to functional material options. Myths of Rapid Tooling will be dispelled along with showing real examples of successes. The third and final part of the series will show pricing comparisons between Direct Digital Manufacturing (DDM) and Rapid Tooling. We will show where the breakeven points are in quantity vs. cost and complexity. Real life projects will be shared with my closing thoughts on the future of low-volume production.

The Connex 500™ is the first 3-D printing system that jets multiple model materials simultaneously. Great for soft touch, living hinges and over-molded parts.



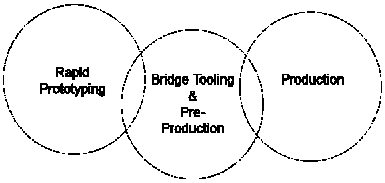
LIVING HINGE - Multiple materials have been laid simultaneously in an additive manufacturing method using the Connex 500™ from Object to mimic a living hinged feature without any form of tooling.

PART 1:

Before we look at today's manufacturing trends, we must first take a step back and identify today's product trends. The product trends from companies are to have more products and have them released faster than ever before. These products are more customized and are filling more niche markets. The products are quickly updated for the next iterations to keep "new" products in front of consumers. This new trend for products has made them lower in volume, but higher in margin.

Now let's look at the trends of prototyping these products. This is the first time in my 12 year experience in this industry that speed has **not** been the number one demand. There is a need for speed, but not a greed for speed. Function, function and function is where it is at. Engineers need their prototypes to work across the board. These parts need to fulfill the needs for engineering, packaging, focus groups and field tests. It does not matter how fast the prototypes are completed if they do not work for all purposes. These prototypes need to be made from a spec material for real testing and hold production like tolerances.

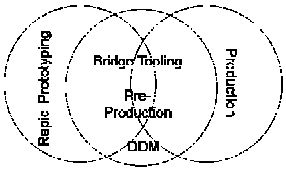
TRADITION MANUFACTURING FOR LOW-VOLUME PRODUCTION PLASTIC PARTS.



TRADITIONAL MANUFACTURING

Notice there have been three rings with very little overlap from one to another. Specific technology was used only for a specific ring of manufacturing. Technologies did not cross from rapid prototyping to production. With the advancement in technology and thought process, the rings have been redefined into Today's Manufacturing. Techniques, methods and technologies in Rapid Prototyping have crossed over into production. Many methods in Bridge Tooling or Rapid Tooling are successful in low-volume production. Along with the advancements comes a new terminology call Direct Digital Manufacturing (DDM).

These parts are made from an aluminum tool and ran over 20,000+ parts. It was used as a bridge tool until production got online.



TODAY'S MANUFACTURING

What is DDM

DDM is defined as a direct production of finished goods from additive manufacturing technologies. Or, DDM is the process of going directly from an electronic digital representation of a part to the final product via additive manufacturing.

DDM has joined the likes of Bridge Tooling and Pre-Production (Rapid Tooling) as a legitimate method of low-volume production. The most common technologies that are used in DDM are FDM (Fused Deposition Modeling) from Stratasys and SLS (Selective Laser Sintering) from 3D Systems and EOS. These parts are built using an additive process then are used as an end product in low-volume production. The materials have become rigid enough for true function. The FDM process is building plastic parts from materials such as ABS, Polycarbonate (PC) and Polyphenylsulfonen (PPSF).

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Defining low-volume

Low-volume is no longer black or white. It is a growing grey area with the demand for lower volumes and quicker deliveries being critical. In all reality, low-volume needs to be defined by overall quantities and/or the time of which it is being run. I have customers that have run 40,000 parts as a prototype run for field tests and other customers that run 50 to 150 parts every three months. Parts that are only running 5,000 at a time are deemed low-volume. Consider any quantities that can be run in an injection molding press in a single cavity mold under 48 hours should be low-volume. Also, a onetime run of 20,000 parts is also considered low-volume. It may be on the high side of low-volume production, but it still qualifies. Traditionally, low-volume runs would be parts ranging from 20 parts to 1,000 parts. When these are the quantities, DDM and Rapid Tooling are great methods for low-volume production. But, which method should you use? Why should low-volume production be dealt with differently than high-volume production? The answer lies in the suppliers. High-volume injection molding suppliers are not set up for quick sampling or making multiple tooling changes throughout the day. They want long runs that can run unattended. Low-volume runs need supervision at the press, less time to pay for the set-up and smaller batches of specified material. Everything in low-volume production works against how high-volume suppliers make their money.

I look forward to expanding on low-volume production and its methods in the next two parts.

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. 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.

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