

Pitfalls in Choosing a Rapid Tooling Supplier ... and How to Avoid Them

CHOOSING THE RIGHT RT SUPPLIER
TO OPTIMIZE PRODUCT DESIGN.

By Jack Lawson

YOU KNOW THE DRILL—THE PROJECT IS GOING SWIMMINGLY AND IS RIGHT ON SCHEDULE, WHEN ...

the big cheese pops into your office with an “opportunity.” Apparently the marketing guys were at a trade show in Vegas and they saw that the competition was going to introduce their version of your design in five months. Problem is that your product is not going to be ready for six. So, the obvious solution is to simply take two months out of the schedule. It's just like a Dilbert cartoon.

In the midst of the hurry-up offense, it is not unusual for even the best designers to begin to think not at the product level, but at the component level. That is to say, they focus more on their aspect of the design cycle and less about the project as a whole. Collaborative effort tends to break down when timelines must suddenly be compressed and, unfortunately, it is at these times that collaboration and communication between project members (both internal and external) is most crucial.

In terms of plastic component design where rapid bridge tooling is to be used as a means to help compress the design cycle, part designs are often hurried to release. The result is often multiple engineering changes in which the design is validated on the run. Additionally, many rapid tooling vendors do not offer high-level engineering or design optimization services and will usually build a tool that will produce the design submitted—

regardless of how complicated or production unfriendly it may have to be.

Methods used by rapid tool vendors, while appropriate for quickly producing parts, often do not translate well into the full-production world. In some situations, parts can be produced with a rapid tool, but are not suitable for a production mold expected to run thousands or millions of pieces. The main reason for this is that rapid tools tend to be very manual and simplistic in the interest of saving time, while production tools are built for the long haul, meant to produce low-cost volumes. For example, it is possible to create a plastic component with “trapped” plastic in a rapid tool using interlocking hand-loads or pick-outs, but in a production situation this would possibly be deemed unmoldable.

Speeding up the development process is a challenge in and of itself. When considering rapid or bridge tooling to save time, the last thing you need to worry about is overcoming avoidable obstacles. When choosing a rapid tooling supplier, consider the following important items.

Ask the Right Questions

Simply inquiring about leadtime may not produce the optimum results. Some good questions to ask are:

Can the supplier assist with the development of your design to help ensure your tooling is cost-effective and easily made? One of the most frustrating moments in an engineering project is realizing the design cannot be manufactured cost-effectively, or that it could have been easier to run with only a few simple changes. Your supplier should understand the goals you are trying to achieve with rapid tooling and the manufacturing details associated with it well enough to ensure getting it right the first time—as cost-effectively as possible. Every penny you spend reworking a design or that is wasted in an ineffective manufacturing process is a penny stolen from your project budget and your company's bottom line, not to mention the loss of valuable time!

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Is the supplier able to produce parts in the material you plan to use for production or do they understand plastic resin specs well enough to assist in material selection? With the progress of technology, there are multitudes of processes that will produce prototype parts very quickly and inexpensively. Unfortunately, many of these prototyping processes do not produce parts in the material that will be specified for production. This usually means that these components work well for verifying form and fit, but may not work for functional or destructive testing. Look for a supplier that can cost-effectively provide your design in the material you specify and offer material options if there might be a better material available for your project. This will ultimately save you time and money because you will be able to use the same part for fit, finish, product testing, and executive sign off. With today's technology, there is no reason to create an inexpensive rapid prototype only to make a working prototype before tooling. What you see in your prototype should reflect what you will get in manufacturing.

Can the supplier produce parts based on your original design or will they require you to change it in order to use their processes? This is a very important question to ask potential suppliers before you send your design out for a quote. In the zeal to save time, it is often assumed that all rapid tooling methods are the same and will produce an "as designed" component. However, some suppliers have very specific guidelines when quoting rapid tooling. Although the quote you receive may be cost-effective, you may have to invest valuable time redesigning your part and resending the data files in order to use a specific tooling process. Many design engineers have very specific reasons for the geometry of their parts and should not settle for compromises when sourcing rapid tooling. If the part design is important, make sure the supplier you choose can produce your parts "as designed" the first time.

How is quality control managed internally? Quality control is essential in this fast paced, competitive world. Make sure the supplier you choose has a quality process in place from receiving the project to sending it out the door. Each step of the process should be documented; checks and balances should be in place so you get the parts that are not only cost-effective but are of the highest quality. Sacrificing quality in the interest of saving leadtime is never a good idea.

Optimize Your Design for Tooling

Once you have chosen the best supplier, make sure you work together to optimize your design for tooling. Simple changes can often be made in the design that can save thousands of dollars and numerous headaches in production. For example, if the original design makes it difficult to remove the part from the tool, it will slow production, robbing valuable time and driving up part prices. Making a slight change to an angle or undercut could easily solve the problem without risking the integrity of the design.

Think ahead to manufacturing. At every step in the project, you and your supplier should work together to determine how the design will be manufactured. Some rapid tooling vendors not only offer rapid tooling services but full-service design and development as well. Many times, these suppliers deal with different designs and materials from a wide cross section of industries. Use this knowledge base to your advantage by discussing your design and its potential applications. Consider processes, material selection, design parameters, testing, assembly criteria, environmental issues, application, etc. Your supplier may be able to offer valuable recommendations, especially when it comes to material type and availability.

Consider short-run molding and manufacturing. As you think ahead to manufacturing, you may realize that some projects do not have the required volume to justify an investment in hard (production) tooling. Make sure your rapid tooling partner not only understands how to build the tool, but how it should be processed, molded, tested, and possibly assembled. If your project requires quick turnaround, has low volume, and the need to reduce manufacturing leadtime, consider using short-run molding and manufacturing.

Rapid tooling should not only be about getting parts quickly, but about learning as much as possible about how the part can be quickly tooled and produced cost-effectively when it is time for mass production. When sourcing a rapid tooling partner, the best situation is to find a vendor that not only understands rapid tooling, but part design, material selection, optimization for production, and molding/manufacturing. Make sure to include your rapid tooling vendor as a member of your project team, especially if they understand the entire design and development cycle. It may not only save time and money getting ready for production, but in actual production, as well. **TCT**

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