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Please contact Claudia Stachowiak at FosteReprints at 866.879.9144 ext. 121 or cstachowiak@fostereprints.com


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Fast, Functional Prototypes

Tim Humphrey and his partner Jim Ventress spend lots of time developing new products, but they never get to market any of them. They leave that to the companies that hire their firm, designsUNLIMITED, for its engineering and development expertise. The firm is typically engaged when a client lacks specific mechanical engineering expertise or when the development workload overtaxes existing resources.

"In product development, time is your enemy," says Ventress. "Cost may or may not be an issue, but time always is. That's especially true now with product life getting shorter and shorter. Cell phones are a perfect example. People often replace them yearly, not because they no longer work, but because new phones offer useful new functions. In that kind of environment, innovation isn't enough. You have to be early to market just to maintain market share, let alone increase it."

Trimming Development Time

One critical discipline at designsUNLIMITED is speeding up development in every way possible. "We've spoiled our customers," Ventress says. "They know we're committed to moving the project forward and that they can call us anytime, evenings and weekends included." But being available 24/7 is just one part of what designsUNLIMITED does to speed the client's job toward completion. Another is seeking out and embracing any new technology that will help move projects forward, faster and more effectively.

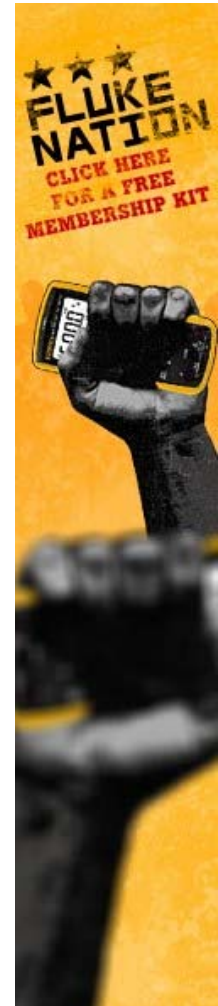


The group's work with plastic typifies the company's development process. A design typically begins on a whiteboard or as a "back of the napkin" sketch, and progresses to software prototyping.

"Top of the line programs like Pro/ENGINEER or SolidWorks let us begin testing a part before it even exists in solid form," says Ventress. "The software lets us do motion studies and preliminary stress analyses, and even generate photorealistic images the customer can use for preliminary marketing of the product. The software is fast, flexible, and inexpensive, and it lets us do as many preliminary iterations as we need to, as quickly as the computer can render them."

The next step is a solid model, typically using stereolithography (SLA), which produces a model in between an hour and a day. These models, made directly from 3D CAD designs using a specialized laser-cured resin, accurately reflect the shape and size of a part but are rarely suitable for functional testing. That's where Protomold comes in.

"We need to know exactly how a finished part will perform," Ventress says. "We have to understand how it will handle stresses, shocks, and vibration. We have



to predict its response to heat and cold, electromagnetism, and other aspects of its environment. For example, we recently developed a plastic clamshell enclosure for a wireless access device that contained a lot of tightly packed equipment and had to be as small as possible. It presented a significant thermal challenge, since there was no room for a fan or other heat-dissipating device. To make matters more complicated, the device was designed for use in environments like warehouses, where there could be significant heat and humidity, so we had to make sure that the material we specified could handle both external and internally generated heat. As we often do in situations like that, we turned to Protomold for prototypes that don't just look like the real thing, but function like it as well."



Real Parts Real Fast

designsUNLIMITED uses Protomold regularly for production of functional prototypes.

"The resin in SLA prototypes isn't suitable for thermal, electrical, or mechanical analysis," Ventress says. "Protomold, on the other hand, makes real injection molded parts and can usually mold them in the same resin we specify for production. The resulting prototypes are functional duplicates of production parts, making them ideal for testing. Protomold stocks a robust selection of resins, so we not only get real parts, but we can get them in a matter of days. The only other way to produce real injection molded parts would be traditional injection molding, but that would take weeks or months and cost many times what Protomold charges."

Ventress considers speedy prototyping critical for several reasons. The most obvious, of course, is speed to market of the finished product. But at the same time, early availability of functional prototypes lets developers get sample product out to users and suppliers and begin collecting feedback that can be incorporated into the development process.



"We can begin addressing issues without waiting until the end of the process," he says. "At that point it would either be too late to incorporate the information or it would significantly delay product introduction. With Protomold's rapid injection molding, we not only get a faster product, but a better product as well. You need real parts for that, not carved up models. Typical rapid prototypes may be pretty pictures, but they don't work like real parts."

Quick, Comprehensive Quotes

In addition to fast turnaround on the prototypes themselves, Ventress likes the speedy turnaround of Protomold's ProtoQuote automated online quoting system.

"When you're going out for multiple proposals, waiting for pricing can slow you down as much as waiting for parts can. But ProtoQuotes are typically back in a day with all the information we need. They'll even let you know if there are any design or moldability issues with the design you submit, so you can correct it before proceeding."

With an approved design, ProtoQuote allows real-time user interaction, with immediate updates in pricing. Adjusting factors like resin, finish, and delivery time, the designer can see the impact on pricing, approve the quote, and confirm the order with a PO. Information from ProtoQuote can be fed directly to Protomold's automated milling equipment to begin moldmaking.

Prepping for Production

In keeping with his "fast to market" philosophy, Ventress often uses Protomold for bridge tooling while final hard tooling is being developed.

"You can get tooling from China fairly quickly," he says, "but not nearly as quickly as from Protomold. We often work with Chinese production companies, but it's not a simple process. There are language barriers and distance barriers. It's not for everybody.

"Experience makes a difference in working with overseas producers, but having your design fully proven here makes it a lot easier to get exactly what you need," elaborates Ventress. "It's a lot easier to adjust a design at the prototyping stage than during production. That's another reason we believe so strongly in Protomold's process. Quick turnaround on real injection molded parts lets us reiterate the design and tweak it as many times as necessary without overrunning our deadlines. When we send a design to production, we know it works, we know it's moldable, and we know that the kinks have been worked out."

Teaming up with Protomold has helped make designs UNLIMITED successful. "Lots of people can get you what you need when time is not an issue; Protomold does it when every minute counts," says Ventress. "We do many different kinds of work, and every customer gets our best. But when a project lets us work with Protomold, we know it's going to be a good experience."

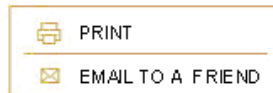
Protomold Co. Inc. Maple Plain, Minnesota
Maple Plain, MN
763-479-3680

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