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Materials in 3D Printing

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Stratasys 3D Printing and Legacy Effects Suit RoboCop

Courtesy of Leslie Langnau, *Design World* Managing Editor Featured on MakePartsFast.com (A Design World Resource)

Stratasys Ltd., a leading global provider of 3D printing and additive manufacturing solutions, announced that the company's multi-material Objet Connex 3D printing technology has played a leading role in the production of the iconic RoboCop suit created by Legacy Effects for the main character in last year's blockbuster movie.

Tasked with realizing the 3D designs from the RoboCop production designer for the ultra-sleek RoboCop suit was Hollywood special effects company, Legacy Effects. Their use of Stratasys 3D printing technology has helped bring to life a number of recognizable movie characters on the big screen.

Using Stratasys' high resolution Objet Connex multi-material 3D printing technology, Legacy Effects produced every aspect of the RoboCop suit – from helmet, to boots – as master mold patterns. These pieces were then molded and cast into other materials to create variants of the suit depending on the requirements of each scene.

In addition, some versions of the suit used in the movie were composed of as much as 90% Stratasys 3D printed parts. For example, the striking visor, which forms part of the helmet on the black version of the RoboCop suit, features a gleaming red strip; the entire visor used in the movie is 3D printed with Stratasys transparent (VeroClear) material.

Stratasys 3D printing technology the only option for reproducing fine detail

According to Jason Lopes, Lead Design Engineer, Legacy Effects, RoboCop's chest-armour piece perhaps best exemplifies how the use of 3D printing technology overcomes certain challenges that can affect production methods.

"First, in terms of the size of RoboCop's chest piece specifically, only Stratasys' 3D printing technology would allow us to print something at the actual size; the part virtually fills the entire build-tray," said Lopes.

"Second, the same part comprises a blend of smooth areas, as well as other areas that feature an extremely high

level of detail, such as the police badge and other logos, which we needed to retain for the molding process. There isn't a technology currently available beyond that provided by Stratasys that affords us this level of intricate detail, together with the hard surface modeling of the shells all together in one print."

In addition to creating the RoboCop suit, Legacy Effects was also involved in 3D printing both master molds and prototype parts for the 'Exo-suit' featured in the movie. These prototype pieces included fully functional spring-operated fingers that were printed in a single build using multi-materials on the company's Stratasys Objet Connex 3D Printers.

Smoother workflow and greater flexibility over traditional production methods

Using Stratasys' 3D printing technology the team at Legacy Effects is able to work much faster and more efficiently than it could in the days when it produced parts by hand.

"Doing everything by hand meant that we couldn't run tests as it would have taken forever," said Lopes. "Also, 3D printing allows us to work in symmetry, which enables us to build an entire left side of a suit, then mirror it and



Stratasys 3D Printing and Legacy Effects Suit RoboCop


(continued)

output the right side as well, all from one file with the click of a button. You can't do that by hand."

Despite the recent economic downturn still having an impact on studio budgets, high expectation from customers requires shorter production times, regardless of the all-too-commonplace eleventh-hour changes. For Lopes, 3D printing's ability to speed up processes, as well as the capability to make late changes has revolutionized the way Legacy Effects operates.

"This is where 3D printing comes to the fore by meeting such pressures head on," said Lopes. "If we see something's not working, or we're asked to make a design change, we can make another iteration, go to an open 3D printer and be

printing two simultaneous tests within an hour. We go to lunch, come back and it's done. It doesn't get better than that!"

"Legacy Effects' use of multi-material 3D printing as its solution of choice is indicative of how the technology is becoming increasingly integral to filmmaking," said Bruce Bradshaw, director of marketing, Stratasys North America. "The ability to rapidly 3D print all materials together in one single print run meets the film industry prerequisite to save time and money. But the real show-stealer is Stratasys' ultra-fine 16 micron-layer 3D printing. In the special effects world, fine detail and true-to-life models and parts are the industry standard and our Connex multi-material 3D printing technology continues to be a top performer among designers and engineers." 

Related Video:

Legacy Effects Dresses RoboCop with Stratasys 3D Printing

Ever wondered how today's heroes, villains, monsters and other life forms are created for the big screen? Well 3D printing is becoming one of Hollywood's star attractions for developing bigger than life blockbusters.

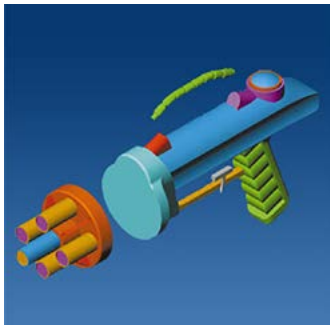
Filmed at the 3D PrintShow in NY, this exclusive interview with Jason Lopes, Lead Design Engineer from Legacy Effects, explains how the Objet Connex multi-material 3D printer was used to produce every aspect of the RoboCop suit -- from helmet to boots -- as master mold patterns. And you'll also see actual 3D printed parts that appear in the final film, like the gleaming red strip featured on the RoboCop helmet visor.



Rapid Models and Prototypes, Inc. (RM&P)

FDM Pumps Up Toy Modeler's Output

Courtesy of Stratasys



ON Target

Hewlett-Packard, Lucent Technologies, Johnson & Johnson, and Mattel are just a few of the clients that have regularly used the services of Rapid Models and Prototypes, Inc. (RM&P). The company is a fullservice product-development house, model shop and rapid prototyping service located in Runnemeade, New Jersey. For 41

years, the company has supplied model-making services to Fortune 500 and other high-profile companies.

RM&P creates models with end purposes ranging from the very serious – such as containing and transporting nuclear waste, to the more frivolous – such as toy water guns. The company has 17 full- and part-time employees, which include

rapid-prototyping and CNC milling machines. We create the CAD designs for probably 50 percent of our projects, and the other 50 percent we receive a CAD design from the client and just build the models and prototypes.

RM&P added FDM rapid prototyping to its services a few years ago, and Pizzo says it has greatly expanded the company's capabilities. "There are things we're doing on the RP machine now that are virtually impossible for a traditional model maker to do," he says. "Or if they did, it would take four times as long to get one-half the quality.

"The reason we added an RP (rapid prototyping) system a few years ago, is that customers were bringing me rapid prototypes from another RP manufacturer. They would ask for a casting of the parts because they were fragile, and they knew they would break.

"When I saw the Stratasys FDM systems demonstrated, and I realized the ABS-plastic models had the strength I needed to

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"I realized the ABS-plastic models had the strength I needed to do my own modeling work, not to mention service bureau work."

— Joe Pizzo, RM&P

8 model makers. The team includes talented designers, draftspersons, and model makers. It can handle a specific part of product development, or it can manage the entire project from initial thumbnails to drafting, to model making, prototype creation and testing, and even small production runs.

"Clients can give us a file, a drawing, or even just relate their concept to us, and we can create a model for them," says President, Joe Pizzo. "And we can turn around and do low production runs as well. We can do that in urethane, acrylic, polystyrene, or rubber." We do the full gamut of model and prototype making; we've got vacuum formers, lathes,

do my own modeling work, not to mention service bureau work, I jumped at the chance. We use a lot of ABS in our final products here, so it's an advantage to prototype with the same material.

"Besides having the part durability that I wanted, the FDM systems offer an environmentally clean process. Some of the other RP systems out there use chemicals that are toxic. I don't want to be anywhere near that kind of environment. And I'm in New Jersey; they really hit you with the EPA regulations."

Subcontracting for the North Pole

A significant portion of RM&P revenues come from the toy

Rapid Models and Prototypes, Inc. (RM&P)

FDM Pumps Up Toy Modeler's Output

(continued)

industry, and customers include companies such as Hasbro, K'nex, Mattel, and Laramie.

On any given day, a visitor to the shop will often see, in various stages of development, an assortment of models, such as the toy train, rubber football, or Star Wars action figures RM&P recently completed.

"Among other things, we're currently designing the holiday toy display for the Macy's Department Store window," Pizzo says. "It's September, and we've been working from 8:00 to 8:00. Christmas only comes on the 25th."

One of Laramie Toys' product lines, well known by kids, is the Super Soaker line of water guns. RM&P has designed,

"Some other rapid prototypes can get soft when exposed to moisture, but with the FDM system, I constructed a vessel that actually holds water without absorbing any! That capability was a real plus."

modeled, and prototyped some 12 models in this line, which ranges from a pistol that appears to be something from Star Trek, to a pressurized, pump-action rifle, to various sneak-attack models, which are designed to look like real cell phones or cameras but, to the dismay of the unsuspecting, are capable of delivering a good dowsing.

Pizzo recently completed the PowerPack BackPack model water pistol. The model comprises six components and includes a water-tight body. The components include left- and right-hand sections of the body; a solid trigger; a decorative, segmented

top piece, which resembles a carrying handle; an endpiece with five pretend revolving barrels; and a pretend dial on the top.

"Some other rapid prototypes can get soft when exposed to moisture," says Pizzo, "but with the FDM system, I constructed a vessel that actually holds water without absorbing any! That capability was a real plus.

"These people with the [laser-based RP] system have a new polymer: They're saying it's as good as the Stratasys ABS parts. They have improved, but I don't think they're as dimensionally stable as the ABS. I think they still absorb moisture and they still shrink.

"When we get toy design work, the client usually gives us a 2-D drawing. And the majority of the time, they don't supply us with any dimensions, so we're pretty much on our own. So our designers will turn that drawing into a 3-D CAD drawing that we then send to the rapid prototyping system. Toy making is a unique craft. Believe me – not every CAD draftsman is able to sit down and design a toy well. Over the years, we've learned a lot of tricks that make our toy projects go better and faster without any problems."

RP System or Machining Center?

Some of the Super Soaker models have 'carved' figures, characters, and fancy fake pipes. In the past, Pizzo says, "a model maker would have taken a piece of wood and cut it out, shaped it, sculpted it, take it to a vacuum former and form it.



Rapid Models and Prototypes, Inc. (RM&P)

FDM Pumps Up Toy Modeler's Output

(continued)



Then he would shape out a pipe and vacuum form that. After vacuum forming, he would cut out some sections and add other pieces. He would maybe epoxy it to the vacuum-formed part. Five or six components later, he would have himself an assembly. It would continue being built up and built up until it was finished. The FDM system

does that all in one setting. It saves me considerable time and labor costs by eliminating all those side steps.”

Pizzo likes to think of the RP system as a machining center, he says. “I’ve said this many times – I really believe this machine is not so much a prototyping system as it is a machining center. Because if I can make two, three, four different brackets and holding devices and clamps within the same mechanism, then I don’t have to put it on the milling machine, I don’t have to turn it on a lathe. And I don’t have to order various raw materials and hope they arrive on time and within the right tolerance. I don’t have to weld or screw components together. I just design it all into one piece. No matter how difficult a design is, the machine builds it, no problem – that’s the beauty of it. For two mating components, I even made threads that held up under pressure. With the FDM system, I’ve made very fine threads that fit together well the first time.”


Water Soluble Material Automates the Process

This year RM&P retrofit its FDM system with the Stratasys WaterWorks soluble support system. The system saves users time by letting them dissolve temporary model-support material in a water-based solution.

Pizzo says that not only does WaterWorks free-up time that model makers once spent removing support material, but it has affected the way he designs toys and other products. “We used to design and orient parts, keeping in mind how we were going to remove the support material from intricate features or undercuts. Now we don’t even think about that. We just build the part for the best appearance. I just run the part and drop it in the solution. Just the other day we built a toy that had complex internal geometry. After using the soluble process, I didn’t have to clean up the part at all – I didn’t even have to sand it.”

Besides improving the process, the soluble-support retrofit has helped RM&P’s bottom line, according to Pizzo. “For quoting a job, I used to plan time for support removal. Now, because support removal is automatic, I can bid a lower price. So it has made me more competitive than in the past.” Pizzo says he hasn’t yet done a payback analysis on the soluble support retrofit, but he estimates payback at about 90 days.

As far as general time savings with the FDM system, Pizzo says he roughly cut his work in half. “With some longer and some shorter projects, on average, my jobs used to take eight weeks before we brought the FDM machine in-house. Now they normally take four weeks, so I’m seeing a time savings of 50 percent. That means a lot to me.”

Pizzo also says that because the machine operates constantly, it brings in solid revenues even when the shop is closed. “The machine is making money for me. It’s working from 8:00 to 8:00 – to 8:00. I doubled production with it – I get 200 percent out of my shop instead of 100 – I think that’s pretty good.” 

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Black and Decker

Dimension 3D Printer Powers Freedom of Design at Black & Decker

Courtesy of Stratasys

“Before using a 3D printer it would typically take three to five days to get a prototype back from the service bureau. Having the machine onsite has made a phenomenal difference to this procedure. Parts that previously took three days can now be ready in just a few hours.”

— **Steve Swaddle**
Manager of Technology,
Black and Decker

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Application Story

Black & Decker is a world leading name in DIY products used in and around the home. The company's Global Design Centre in Spennymoor, County Durham is using the Dimension 3D Printer from Stratasys to dramatically speed up product development time.

Black & Decker is the world's largest producer of power tools and accessories. The company has seen product development cycles in the UK decrease significantly over the past decade as global competition increases along with consumer demands. New product lines, for example in garden equipment, are expected to be launched yearly. The pressure to constantly launch



LOOKING FOR NEW WAYS TO SAVE ON END-OF-ARM TOOLING?

Plastics processors are discovering new ways to save on tooling by 3D printing with Fortus 3D Production Systems from Stratasys. Fortus Systems can create parts for end-of-arm tooling, right on-site. Accurate, durable thermoplastic parts can replace expensive alternatives such as aluminum mounting plates, and are significantly lighter, reducing machine wear and tear. Improve your tooling and your bottom line with a Fortus 3D Production System from Stratasys.



Find out more at stratasys.com

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Black and Decker

Dimension 3D Printer Powers Freedom of Design at Black & Decker

(continued)



new ranges means that the company is always looking for faster ways to get products developed and into stores.

Previously Black & Decker used a combination of in-house CNC milling for tooling while outsourcing stereolithography (SLA) and laser sintering (SLS) parts when designing new product ranges. However 18 months ago the company took the decision to purchase a 3D printer which would enable them to produce more prototypes in-house and shorten their development cycles.

The Dimension Solution



The company chose the Dimension 3D Printer from Stratasys which prints tough, durable, high-quality ABS models. Having the machine in-house has completely changed product development cycles by making the process shorter

and more efficient. Steve Swaddle, manager of technology at Black & Decker UK explains:

"Before using a 3D printer it would typically take three to five days to get a prototype back from the service bureau. Having the machine onsite has made a phenomenal difference to this procedure. Parts that previously took three days can now be ready in just a few hours".

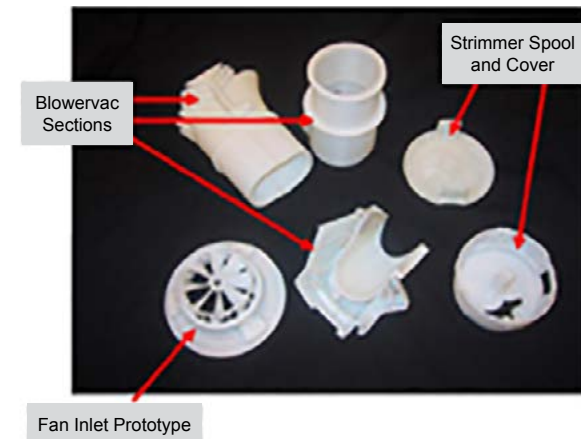
The Dimension 3D Printer enables designers to print parts directly from their CAD computers. The printer driver software installed on the network automatically imports STL files from the CAD software and builds highly durable, functional ABS models. Dimension 3D Printers can run unattended and provide system and build status updates via email, pager or online.

The design team at Black & Decker uses the 3D printer for evaluating and improving the form, fit and function of its models and to explore different design iterations such as for battery packs

or housing casements. "Our industry is highly regulated and all new products have to comply with international standards set by organizations such as TUV and Kema", he adds. "We recently had

an inspector onsite reviewing new parts. He wasn't happy with one particular aspect of a design. Our team was able to completely redesign it and present it to him again while he was still onsite. This would have been impossible previously.

"Another significant benefit is that the design team now



Black and Decker

Dimension 3D Printer Powers Freedom of Design at Black & Decker

(continued)

makes considerably more parts than they used to. The previous use of a bureau cost money each time a part was sent. Engineers often refrained from making too many parts or doing too many iterations of the same design in order to save money. Engineers can now make subtle or total design changes until they are completely satisfied, without having to worry about spiraling costs. This means that engineers are able to experiment and have much more freedom with designs.

Black & Decker saw the Dimension 3D Printer pay for itself within three months and the company has been impressed with the ease of installation and after sales support. The 3D printer is also simple to maintain. Swaddle notes that his team are able to fix minor technical difficulties themselves, although he admits these have been rare.

Swaddle concludes, "After the hoped-for benefits of speed, accuracy, reliability and durability were realized, it was the intangible benefits that really became noticeable. We always estimated that the 3D printer would enable us to make more parts. However it is the extent to which having the 3D printer in-house helps to remove any ambiguity and clarify our engineers thinking, thus expediting the decision making process that is really the greatest benefit. The Dimension 3D printer is an invaluable communications tool. That is what contributes to us being the best on the market and keeps us at the forefront of innovative design." DW

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The **Objet500 Connex3** from **Stratasys**, the world's only full-color and multi-material 3D printer. Select from incomparably brilliant and consistent colors, plus a full palette of transparent colors — the only 3D printer to offer such a wide array. And it's the only 3D printer that prints flexible materials in a broad range of shore values. All with ultra-fine detail creating the most true-to-life modeling possible. Stratasys is the proven leader in multi-material 3D printing. **For the power to 3D print the future, visit stratasys.com/Objet500Connex3.**

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CammPro

3D Printing for a Sustainable Business Model

Courtesy of Stratasys

One-Stop Service

The Camm Engineering Group is a leading Australian manufacturer of high-quality engineering plastics. These plastics are turned into end-use parts like sheets, tubes and rollers for clients in the steel coating, automotive, timber and mining industries in Sydney and other major cities. During its first 25 years of operation, the group has produced more than 2,000 products for its clients using wide range of materials, including but not limited to nylon, polycarbonate, [polypropylene](#) and [rubber](#).

In addition to producing end-use parts requested by customers, Camm Engineering Group created a new division, CammPro, to cater to the increasing demand for product design enhancement, CAD drawing and prototyping through 3D printing [technology](#).

not sustainable. The company needed a solution for accurate prototypes, but at a lower cost: both are critical success factors for long-term growth.

CammPro's management learned about the 3D printing technology and its benefits. Having witnessed the 3D printers in action and recommended by various users, CammPro invested in an Objet Connex 3D Printer from Stratasys to improve production efficiency.

"We wanted to minimize costs and time without compromising quality," said Zahra Shahbazian, CammPro's business development manager. "The Connex 3D Printer is an ideal solution for us. We save up to 75 percent in terms of cost and time when compared to traditional prototyping methods."

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"We save up to 75 percent in terms of cost and time when compared to traditional prototyping methods. Our customers are satisfied with both the quality and the price they pay."

— Zahra Shahbazian
CammPro business development manager

Sustainable Business Model

Camm Engineering Group manages the entire production process for customers, from visualizing a client's idea for a prototype and prototyping to sending the design for mass manufacturing. Camm Engineering Group relies on CammPro to satisfy these increasing demands for 3D printing.

Traditional methods of making prototypes by CNC, [tooling](#) and [injection molding](#) were far too costly, particularly for small quantity orders. Prices easily topped \$10,000 for one prototype. Since those incurred costs would be transferred to customers, CammPro realized that such a business model was

Shahbazian said the 3D printer's wide range of materials and quality prototypes were other benefits. "Our customers are satisfied with both the quality and the price they pay."

Customer Satisfaction

Equipped with the Connex 3D Printer, CammPro's design team can now simulate different types of materials like ABS, polypropylene and rubber. Even more, they 3D print a wide variety of materials on the same part to best reflect their intended end product. Clients now hold and feel the prototypes before any tooling is finalized. And, it reassures the client and

CammPro

3D Printing for a Sustainable Business Model

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design team that the finished product will meet their aesthetic and functional expectations.

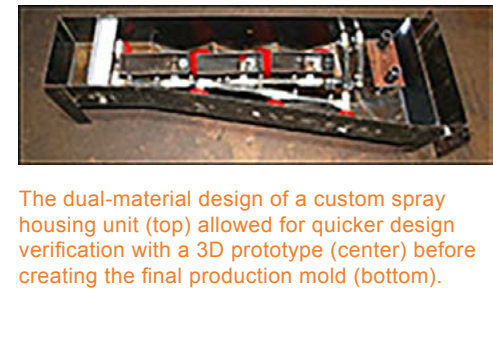
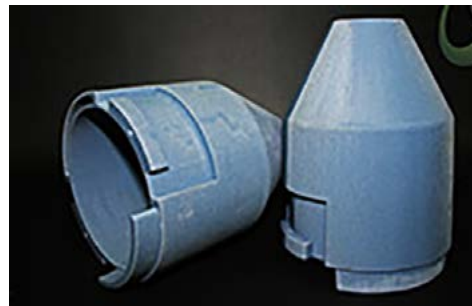
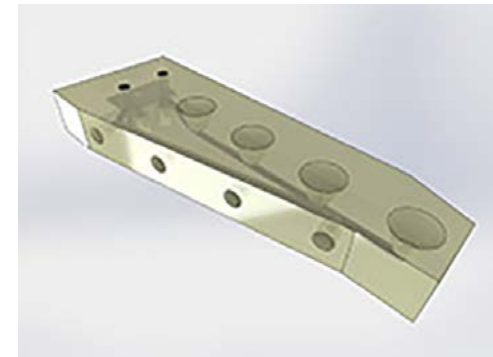
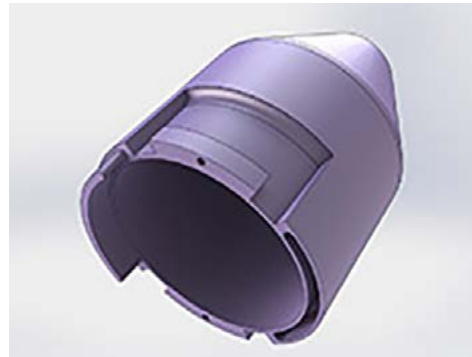
Recently, the team was asked by a mining industry client to create a dual-material custom spray housing unit for design verification. Using the Connex 3D Printer, designers printed a small-scale model of the spray unit in Transparent material and the inner tubes in black rubber-like. The different materials made clear where fluids would travel in the final product. This visualization allowed the customer to quickly verify the design and proceed to full-scale production and casting in polyurethane.

Simulating Final Product Properties with Digital Materials

CammPro also verified a separate customer's unique hose casing design using Digital Materials.

"We made use of Stratasys' Digital Materials to tailor the Shore A hardness of the part so that the model realistically mimics the actual properties of our parent company's engineering plastics polyurethane," said Shahbazian. "The first prototype proved to be an excellent development tool because we found a number of areas to streamline our assembly process."

CammPro continues to grow its business into serving universities and research institutes throughout Australia, and 3D printing plays an integral part in the design and prototyping process. Although 3D printing is a relatively new technology in Australia, Shahbazian said that she would not be surprised if 3D printing drives the third industrial revolution. "Stratasys' 3D printing technology has opened up business opportunities for our company, and I'm glad we made the investment," Shahbazian concluded. 



CammPro used its Connex 3D Printer to design a hose casing (top) and create a prototype (center) for its customer to verify, before creating the final metal mold (bottom).

The dual-material design of a custom spray housing unit (top) allowed for quicker design verification with a 3D prototype (center) before creating the final production mold (bottom).

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Western Tool & Mold

Western Tool & Mold Pairs Existing Resources With 3D Printing

Courtesy of Stratasys

The Perfect Complement

Hong Kong-based Western Tool & Mold specializes in engineering-grade tooling fabrication and injection molding, producing a wide range of products, including medical devices, drug containers and critical-use metal replacements. The company serves diverse industries, including aerospace, medicine, electronics and industrial services.

The need to provide its customers with new ways to meet urgent deadlines and make use of limited resources drove Western Tool & Mold to investigate 3D printing technology. Its customers often faced challenges in the manufacturing process.



Related Video:

Western Tool & Molding Uses 3D Printing for Injection Molding and More!

For example, an aerospace client urgently needed parts for an aircraft already on the assembly line. Only quick delivery could avoid the consequences associated with a delay.

Fast Reactions to Immediate Needs

Western Tool & Mold added advanced 3D printing capabilities with a Fortus 3D Production System, meaning its aerospace customer could manufacture the parts it needed on time. “Stratasys technology saves time, giving us the power to provide a quick answer to our customers’ problems,” said Collin Wilkerson, Managing Director of Western Tool & Mold. “We can provide fast reactions to immediate needs.”

Using the Fortus, Western Tool & Mold prints advanced functional prototypes in ULTEM 9085, a FDM thermoplastic that’s strong, lightweight, flame retardant, heat resistant up to 320°F (160°C), and that offers full flame, smoke and toxicity (FST) compliance with government regulations.

The system also allows Western Tool & Mold to test new products. “We can validate designs before they become a problem in the manufacturing process, making us more

“Stratasys technology saves time, giving us the power to provide a quick answer to our customers’ problems. Now with Stratasys 3D printing, we can provide fast reactions to immediate needs.”

— Collin Wilkerson, Western Tool & Mold

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Western Tool & Mold

Western Tool & Mold Pairs Existing Resources With 3D Printing

(continued)

integrated with the client's work flow and giving us the opportunity to value-add to our services."


The new 3D production system also evens out workload on big projects, eliminating the need to suddenly hire staff. With 3D printing technology, the number of workers needed on the project is greatly reduced. "In traditional manufacturing, you have to deal with quick spikes in the need for resources, but Stratasys 3D printing smoothes the spikes out," says Wilkerson. "Our clients can re-engineer resources to their greater benefit, resulting in a leaner manufacturing process, which includes a smaller workforce and less idle time."

Fortus Hurdles Concerns

Western Tool & Mold had two concerns with 3D printing technology, both of which the Fortus overcame. First, the company wanted to make sure its customers would use the machine again and again instead of only for one-off jobs. "We are in the repeat manufacturing industry, so we wanted to make sure that

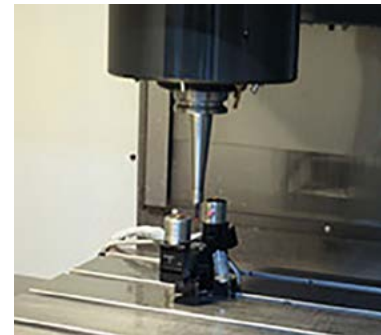
3D printing could fit into a sustainable business model," Wilkerson said. "We were looking for a manufacturing process that could be integrated into the scope of service for our customers."

The 3D printer proved popular with Western Tool & Mold's clients, with 100 percent of the customers returning to the company to manufacture parts using the Fortus 3D. "Our customers found that 3D printing saved them money," said Wilkerson.

The Fortus's performance also trumped Western Tool & Mold's other concern: that FDM Technology might cut into its injection molding revenue. Instead, the Fortus 3D provides a new revenue stream. "FDM is not cutting income from our tooling and injection molding business," said Wilkerson. "In fact, it frees up money for our customers to spend on tooling in the future. This enables us to become a better supplier. Stratasys 3D Printing extends and complements our manufacturing process, crossing over but not cannibalizing our income stream." 



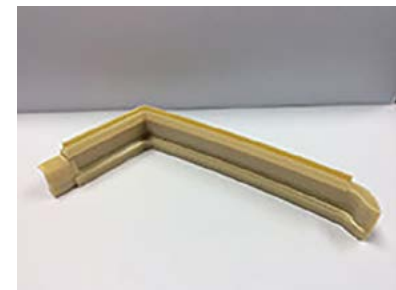
Western Tool & Mold's Fortus boosted the output of its existing injection molding operation.



In-house prototyping enabled Western Tool & Mold to provide fast reactions to immediate needs.



The Fortus' build tray size afforded Western Tool & Mold many part size options.



3D printed parts, such as these aerospace components, are helping to streamline Western Tool & Mold's manufacturing process.

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Two new multiple material 3D printers from Stratasys

Courtesy of Leslie Langnau, *Design World* Managing Editor Featured on MakePartsFast.com (A Design World Resource)



Related Video:

New Triple-Jetting Objet 500 Connex 1 and 2 Multi-material 3D Printers

Stratasys' new Objet500 Connex1 and Objet500 Connex2 Multi-material 3D Printers deliver high throughput 3D printing while combining multiple materials for prototyping and production tooling

Stratasys unique triple-jetting technology is designed to allow the user to build products with up to three different materials in a single run, or even mix multiple material droplets to form new digital materials such as tough Digital ABS.

Joining the Objet500 Connex3 Color Multi-material 3D Printer announced in January, the Objet500 Connex1 and Objet500 Connex2 offer designers and manufacturers superior versatility for materials, functionality and product realism capabilities.

At the IMTS show in Chicago, I had a chance to see [Stratasys Ltd.](#) new [Objet500 Connex1](#) and [Objet500 Connex2](#) Multi-material 3D Printers, which feature the company's triple-jetting technology. These two additions to the Stratasys lineup are the small and mid-range versions of the Objet500 Connex lineup, with the Connex3 being the top of the line. With triple-jetting technology you can build products with up to three different materials in a single run, or mix multiple material droplets to form new digital materials such as tough Digital ABS.

The Objet500 Connex1 has a large build envelope. You can build a part up to 19.3 in. x 15.4 in. x 7.9 in. (490 mm x 390 mm x 200 mm) or a mixed tray of small parts. It produces parts from three diverse materials in a single production run. Thus, you can create assemblies with components formed from three different materials, or produce components that contain both rigid and flexible materials,

such as rubber-like Tango and rigid Vero material. A larger material cabinet contains eight cartridges, which means longer unattended run time and fewer material changeovers. You can also "hot swap" cartridges—reload material and support cartridges while the [3D printer](#) is operating for continuous part production.

The Objet500 Connex2 Multi-material 3D Printer lets you combine transparency, durability and flexibility in one



Two new multiple material 3D printers from Stratasys

(continued)



part. It has all the capabilities of the Objet500 Connex1 plus the ability to combine droplets from two base materials to produce new materials or “Digital Materials.” Digital ABS, for example, is the most durable material available for the Stratasys PolyJet process and is often used to produce mold cores and cavities for short-run injection molding. With more than 100 material options for this printer, you can produce a variety of Shore A values in the same part with rigid or clear components, or combine Digital ABS with pure Tango for strong over-molded handles and grips. This printer’s versatility is useful for creating custom manufacturing tools such as jigs and fixtures.

“Following the launch of the Objet500 Connex3 earlier this year, we saw the demand for additional multi-material 3D printers that can address a variety of applications in prototyping and manufacturing, such as tooling and molding,” said Ron Ellenbogen, Stratasys’ Senior Product Marketing Manager. “We were able to build on the success of our triple-jetting technology and expand the Objet500 Connex family with two 3D production systems that we believe set new standards for 3D printing price performance.” 

Also seen on MakePartsFast

Stratasys extends flexible color digital materials

Stratasys Ltd. released a previously announced extension to its range of flexible and rigid material options for the Objet500 Connex3 Color Multi-material 3D Printer.

Stratasys introduces color multi-material 3D printer

A couple of years ago, I had quiet conversations about a possible color Connex 3Dprinter at an AMUG conference.

Stratasys introduces 3D printing curriculum for education

Stratasys Ltd. has introduced a new 3D printing curriculum for educators.

For more information about Stratasys:



Through two headquarters, six regional offices and a powerful global network of partners, Stratasys 3D Printing experts are here to welcome you to a 3D world. Tell us a little about yourself, and we'll connect you with the right person to answer your questions.



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