3D PRINTING EXHIBIT WOWS VISITORS

BplusU Uses 3D Printer To Create Real-Time Digital Fabrication For Museum Visitors

"Having our own 3D printer makes sense because of the complexity of the geometry we're working with. There is no other way to build some of our models than with 3D printing."

— Herwig Baumgartner, Principal/Partner, BplusU

Architectural models can incorporate complex geometry, requiring a 3D printer to create. "City Futura" was created real time during the Architecture + Design Museum exhibit.

The Architecture + Design Museum in Los Angeles is known for exhibiting progressive architecture and design. During the summer of 2010, it became a perfect venue for a real-time digital fabrication display by BplusU. This unique display showed museum visitors a digital assembly line creating "City Futura," architecture recently designed by the firm for a site in Milan, Italy.

BplusU, founded in 2000, is an emerging firm led by Herwig Baumgartner and Scott Uriu. Together, they have made a name for themselves as a firm that pushes the boundaries of architecture and design. With that reputation, it is not difficult to see how they found a place in the Architecture + Design Museum.

"We use 3D digitizing technology, rapid prototyping, laser cutters and computer numerically controlled routers along with casting, vacuum forming and traditional model building to visualize our design," according to the BplusU website. "We are on a continuous mission to research and experiment with new building materials and construction techniques using 3D technology and manufacturing techniques outside the architectural profession."

"The museum asked us to create an exhibition that was continuously changing over 40 days," said Baumgartner. "Since we have a Dimension 1200 3D printer in our office that we use quite a bit to prototype architectural designs, we thought it would be interesting to show the actual process of creating, modifying and improving a design digitally. This process is not usually public, but we took the process out of the office, including the 3D printer, and displayed it during the exhibition."

The display created by BplusU showed the different steps of production, from printing to dissolving, drying, gluing, finishing and assembling. "The whole process was documented and on display," said Baumgartner. "We created a product just for the exhibit, and the response was excellent."

How Did Dimension Compare to Traditional Prototyping Methods for BplusU?

Cost	Approximately 50% lower than sending job outside
Design	Able to print and experiment more with in-house equipment

At the Architecture + Design Museum exhibit, visitors saw a real-time digital fabrication display.

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The exhibit required minimal involvement from the BplusU staff. The project used fairly large parts that took three or four days to print. When the part was finished, someone from BplusU would remove it, but other than that there was no need for personal involvement, according to Baumgartner.

BplusU has had a Dimension 1200 3D printer in its office for two years. "We were looking for a 3D printer that would use ABS material, but be affordable and have enough resolution for the pieces we wanted to print," he said. "This was a good match."

The printer came from TekPro Group, supplier of 3D printers, rapid prototyping and laser equipment. Admitting he and his partner were skeptical at first, Baumgartner said the selling point was the resolution of the surface and how fine it is. "Before the purchase, TekPro offered to print a couple of chunks of our model so we could see on our own what our projects would look like," he said. "When we got the parts back, we knew the printer was exactly what we needed."

"TekPro has been excellent," he added. "Their representatives are very responsive and have helped us with technical issues. They are very professional."

"For us, there are two options for making physical prototypes," said Baumgartner. We can farm them out or make them in-house. Obviously, it is a lot cheaper in-house. The 3D printer has probably reduced our costs by 50 percent. If we farmed out the job, we would print a lot less and experiment a lot less. With our own printer, we like to optimize our designs."

Since most of the BplusU architectural models need to look finished, the ability to sand and finish the pieces was very important. "We rarely use the part straight out of the printer," said Baumgartner. "We usually do something to it, such as prime, paint or smooth the finish."

Prior to owning its own 3D printer, BplusU used conventional methods, such as casting, milling and vacuum forming. "These were very labor intensive processes," said Baumgartner, "and the end results were similar to what we're getting now."

BplusU creates two types of architectural models. Some are mounting models, which are solid. Others are surface geometry models, which are representations of the outer skin of a building. Most of the work is for commercial buildings. "Having our own 3D printer makes sense because of the complexity of the geometry we're working with," Baumgartner said. "There is no other way to build some of our models than with 3D printing."

One of the parts being created is shown on a monitor so visitors can follow the process.

Supports on the parts are dissolved away in a tank filled with an alkaline-based solution.

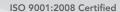*Completed parts are displayed on a drying rack.*

A photo of the finished product is shown behind the platform on which it will eventually rest.

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