

The Denby Pottery Company

Denby Pottery Extracts Unanticipated Benefits from 3D Printing

- **Denby Pottery** – a two-centuries-old manufacturer of fine tableware in stoneware, china and porcelain
- **Challenge** – reducing the time it takes to create prototypes for design review
- **Solution** – Using 3D printing to quickly and affordably create prototypes of new designs

■ Results

- Designers reduce prototyping time from four weeks to two hours
- Company typically detects manufacturing problems four weeks earlier, resulting in shorter time to market
- New product lines launched in half the time – two years instead of four
- Prototypes enable the use of customer focus groups, resulting in more profitable design decisions reflecting true customer tastes
- Accurate models better communicate design intent internally, with customers, and with suppliers
- Production prototype time reduced from six weeks to two since properly scaled patterns are printed instead of hand-carved
- Customers are impressed by Denby's use of advanced technology like 3D printing, elevating the Denby brand

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– Gary Hawley
Designer
The Denby Pottery Co. Ltd.



Designers quickly move from idea to concept models often mistaken for the real thing

Every so often, the return on a business investment exceeds expectations.

Among the lucky few is The Denby Pottery Company Ltd., the venerable United Kingdom tableware manufacturer. The company invested in a 3D printer intending simply to prototype its design concepts on an “occasional” basis, but has found the machine surprisingly useful for time- and money-saving applications in marketing, manufacturing and stoneware casting.

Approaching its bicentennial year, the 600-employee company annually produces more than five million pieces of tableware, coveted by newlyweds, discriminating hosts and connoisseurs around the world.

Challenge

Time-Consuming Prototypes

Before any product is sold, Denby creates several prototypes for internal review. For the better part of two centuries, the company's designers hand-turned and hand-carved new design concepts in plaster. Despite the prodigious skills of the carvers, some having more than 25 years of experience, the process was time-consuming and never produced 100-percent accurate models. As a result, it was hard for clients to fully understand the concept being proposed. Additionally, the fact that a

prototype could take as long as four weeks to create made the company perhaps too careful about introducing new products.

Denby Pottery needed a way to reduce the time it took to produce a physical concept prototype, increase the accuracy and quality of those prototypes, and put designers back into the design studio where they could focus on generating new ideas.

The designers investigated various rapid prototyping systems, eventually requesting a demonstration of 3D printing technology from 3D Systems.

A 3D printer is an output device for 3D CAD data in the same way that a 2D printer is an output device for the words and pictures on a computer screen. The primary difference is that a 3D printer produces three-dimensional models and prototypes in composite material. 3D Systems is the maker of the fastest 3D printers and the only ones capable of printing objects in multiple colors.

Solution

3D Printing

Denby was quickly convinced that 3D Systems technology could save time, improve model accuracy and free designers to concentrate on designing new and better products. Just to make sure, Denby performed a cost comparison against contracting with a service bureau for



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prototypes. The analysis revealed that the service bureau’s cost for a typical model would be twice that of printing models in-house. Denby estimated a 3D Systems 3D printer would pay for itself in four years, in part because of its low operating costs: its printing materials, for example, cost one-tenth to one-third that of competitors.

On Sept. 25, 2003, Denby purchased the ZPrinter® 310 3D printer, the fastest 3D printer on the market, five to 10 times faster than other companies’ technologies. Initial expectations were high, but realistic.

Results

Time and Money Saved, Product Lines More Profitable

As expected, the printer has dramatically reduced Denby’s prototyping work. A concept model now takes two hours to print versus up to four weeks to hand carve. Designers now have the time they need to work in the studio and focus on new designs. They quickly and easily produce clear visual samples they can present to company directors, and it’s easy to duplicate samples for additional audiences.

Designers create prototypes in their DeskArtes 3D computer-aided design software, then transfer designs to the ZPrinter 310. “We then hit print and go make a cup of tea,” says Designer Gary Hawley. “It would take 10 full-time carvers to keep up with the machine.”

The printer cranks prototypes out all week and throughout the weekend, far busier than anticipated. In December 2006, the company purchased a second 3D Systems printer, the Spectrum Z™510, adding full 24-bit multicolor capability and a large build area. “Anything Denby Pottery makes, from the smallest espresso cup to the largest casserole, it can print,” says Hawley.

Unexpectedly, the company is saving time and money through its use of 3D printed prototypes in marketing and manufacturing. Marketers use 3D printed prototypes in customer focus groups, enabling the company to obtain high levels of broad-based customer feedback prior to committing to a new product line. “Customers enjoy handling the prototypes and usually think they’re real,” says Hawley. “We gently explain that they’re not for sale quite yet.”

Since tiny variations in designs can make the difference between a bestseller and a failed line, Denby often revises designs during focus group sessions based on customer requests. “3D printed prototypes in our focus groups give the company new levels of confidence in our product lines and benchmark data for our business decisions,” says Hawley. “We’re now

confidently backing the winners rather than rolling the dice.”

3D printing also allows Denby to freely share designs with large retailers that carry its product lines. In addition to the hard and fast design communication benefits, 3D printing impresses customers when they tour Denby’s offices. Seeing the device print accurate models reinforces the Denby brand as one that leverages the best technology and makes the most forward-looking business decisions.

3D printed prototypes have also reduced Denby’s manufacturing costs. As new designs approach final approval, designers and manufacturers meet to examine prototypes and identify any potential problems in manufacturing the designs as intended. The team now eliminates in one day problems that previously took three to four weeks to reveal themselves as costly downstream mistakes.

The accuracy of 3D printed prototypes saves additional time and money by enabling Denby to make molds for casting from properly scaled printed models instead of specially handcrafted mold patterns. As a result, production prototypes can now be cast and glazed in two weeks instead of six.

3D printing has streamlined partner interactions as well. Denby works with partners in Thailand who manufacture its china products and partners in Portugal who manufacture its porcelain products. Prior to obtaining 3D printing capabilities, Denby sent these partners flat, 2D technical drawings, which were easy to misconstrue. Denby now sends 3D digital files and 3D printed samples, eliminating mistakes and saving time and money. Costa Verde Porcelains, a partner in Portugal, has even purchased its own Spectrum Z510 to better serve Denby and other customers.

“Many investments yield surprises, but our investment in 3D Systems 3D printing technology has yielded most pleasant ones,” says Hawley. “We’ve found a host of unanticipated applications for 3D printing and myriad unanticipated benefits. The result is dramatic time savings and more successful product launches. In fact, we have shortened product launch time from four to two years, concept to availability. Much of that reduction is attributable to 3D printing and associated benefits.”



The Denby Pottery Company Ltd
Denby, Derbyshire, DE5 8NX England
www.denby.co.uk

www.printin3d.com



333 Three D Systems Circle
Rock Hill, SC 29730 USA
Telephone +1 (803) 326-3948
moreinfo@3dsystems.com

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