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## On the Job: 3D Printing Gives Footwear Company Leg Up on Competition

**Timberland nets higher sales using Z Corp. technology to replace 2D drawings with 3D prototypes**

Feb 10, 2006  
Cadalyst



The Timberland Company has transcended its humble workboot origins to become one of the hottest lifestyle brands on the planet. Whether for work, recreation or dressing up, every Timberland product is a compelling blend of form and function tailored to the needs of every customer. That's why it's important for engineers and marketers in the \$1.5 billion New Hampshire-based company to collaborate closely in the development of every product, from initial concept to prototype to sample and, ultimately, volume production.

### Challenge: Getting Affordable Prototypes Quickly

A Timberland shoe must look good, feel good and perform well. While the upper is mostly fashion design, the intense engineering comes in where the foot meets the insole and where the outsole meets the street. Engineers continuously refine concepts for arch support, tread patterns, materials, heel stabilizers, orthotic devices and "lasts" (foot models) in CAD software.

As recently as 2002, Timberland hired professional model makers to turn 2D CAD drawings into 3D prototypes in wood or foam. These prototypes typically took a week or more to create and cost \$1,200 each. The lead time hamstrung the company's ability to refine its models to its satisfaction in a timely manner. As a result, the company regularly lengthened its design cycle or just lived without desired refinements.

"Time and money aside, the problem with the old approach is that a 2D CAD drawing left too much to the imagination," says Toby Ringdahl, computer-aided design manager in the company's footwear product development and engineering group. "When the prototype was finally ready, it wasn't exactly what people imagined. But a week is a long time to wait for a new iteration."

Timberland realized it needed more prototypes sooner. The company assigned Ringdahl's team to spend six months evaluating rapid prototyping options.

### Solution: 3D Printing In-House

After weighing alternatives, Timberland chose Z Corp.'s ZPrinter 310 System. The low cost of printing materials and the speed of the machine were deciding factors as Timberland evaluated the ZPrinter 310 over competing models, according to the company.

In 2005, Timberland took the next step by investing in Z Corp.'s Spectrum Z510 System, which offers 24-bit color and 600dpi resolution. Z Corp. has the only technology that can print parts in full color, it reports, which communicates design information far more effectively than monochrome. Color can be used not only to produce a lifelike object, but for stress analysis, product labeling or to highlight key parts or revisions.



The Spectrum Z510 3D printer from Z Corp.

### Results: Better Prototypes Faster, Cheaper

The Spectrum Z510 accepts CAD files from Timberland's SolidWorks 3D mechanical design software and produces physical models affordably and quickly. The performance has made a substantial impact on Timberland's efficiency and spending.

The prototype that used to cost Timberland \$1,200 now costs \$35. A prototype that once required a week to make now takes 90 minutes, enabling engineering and marketing employees to collaborate more often and more closely. And printing rapid color prototypes onsite has enabled Timberland to compress its typical design cycle from three weeks to two.

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#### SURVEY

Which file format do you use for drawing/model exchange?

- Native format
- PDF
- DWF
- JT
- TIFF
- Plot file
- Other

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Timberland prototypes produced with a 3D printer cost around \$35 each and are ready in around 90 minutes.

The Spectrum's large build area delivers additional time savings, Timberland reports. Because it is larger than the ZPrinter 310, engineers can print full-size prototypes flat on the build area instead of on an incline, saving three hours of printing time on such jobs.

Spectrum's speed and efficiency has directly resulted in continuous product quality improvement. In the weeks Timberland recoups by no longer waiting for prototypes, it can pump out dozens of iterations of a shoe design if needed. As a result, more designers, engineers and marketing personnel can see more products in a shorter amount of time, helping the company refine its footwear for fit, function and style. "We can now quickly do innumerable iterations and variations," Ringdahl says, "and the designers and marketing managers can really be sure the product is what Timberland is expecting and what people on the street are demanding."

The investment in Spectrum also eliminates major ancillary costs late in development, like time-consuming trips around the world to examine important shoe molds in overseas plants. Because Timberland can now reach consensus for designs on 3D physical models, there's no longer any need for a careful examination of the production shoe mold.

Finally, color is a key benefit. It better conveys design intent, and the Spectrum's high resolution enables details such as lugs on the sole, speed hooks on the upper and tiny print on the sole to show up perfectly. "The closer the prototype is to real life, the less you leave to the imagination," says Ringdahl. "Unfortunate surprises are eliminated."



The Z Corp. Spectrum Z510 produces multicolored, highly detailed prototypes such as this Timberland sole.

#### **Results: Higher Sales**

While 3D printing seems at first glance like an engineering tool, it's making a direct impact on company revenues in two ways, Timberland reports: One, close collaboration among designers, engineers and marketers brings to market a product that is exactly what the market demands. That means more sales. Two, Timberland sales people occasionally bring prototypes to sales calls with major retail chains, giving them a big advantage over competitors who come with only sketches. In these instances, sales people can land large sales earlier.

"Products that would have been dropped because of ho hum 2D drawings are being successfully adopted because customers can hold multicolor, real-life prototypes in their hands," Ringdahl says.

Timberland expects to reap additional benefits from 3D printing in the future. Engineers will use shape analysis software and the Spectrum Z510 System to print prototypes that call out pressure points and interference in the insole.

"In our industry, the pressure is always intense to quickly and affordably turn the marketer's vision and the consumer's taste into reality that performs well, feels good and looks great," says Ringdahl. "Z Corp. printers have done exactly that for us, compressing our design cycles, lowering our costs and helping us produce better products for our customers."