

New Copiers Create 3D Plastic Models on Demand

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or metal screws and bolts. But products made by printers should be as sturdy as the originals once they're assembled. Mr. Boyer predicts this could aid cottage industries making jewelry or home furnishings like hooks and vases, or even lead to homemade cellphones or digital cameras. He expects a 3D printer that can print itself might be ready in a few years. As the self-replicating machine spreads, "It will evolve," he says, with the most successful changes being widely adopted.

Large 3D printers can build models 20 in. high and 24 in. wide. To make bigger parts—for example, engine blocks—users can produce two halves and glue them together.

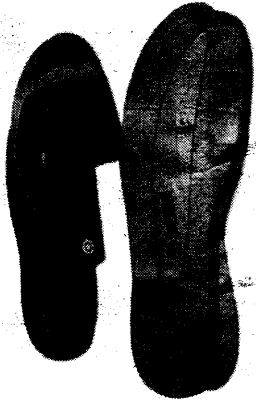
Industry leader 3D Systems, and No. 2 Strataysys Inc., of Eden Prairie, Minn., make some systems that are designed for rapid manufacturing of specialized parts. One system uses metal powder that is fused by a laser, layer by layer, to make parts with strength comparable to metal castings. The

model, "there's always a 'Wow' moment when they really get it," he says.

A number of U.S. companies say they use "3D faxing" to send designs to 3D printers at factories in Asia so manufacturing engineers have a clearer idea of what they're supposed to build.

Cheaper, simpler 3D printers are spawning new applications. Architects often design in two-dimensions, but model-makers like Alchemy Models Inc. in Phoenix are using 3D printers to make models to show architectural review boards what new buildings will look like. 3D printing companies say brain surgeons are using the machines to create models of patients' skulls to design protective metal plates.

At Walt Disney Co.'s Pixar Animation Studios, animators used a Z Corp. machine to make 250 models of "Toy Story" characters for a museum display. Warren Trezevant, an animator at Pixar, says his colleagues were so excited by the figures that the 3D printers produced that "We printed more for people's desks."



Timberland Co. shoe sole designs produced by a 3D printer from Z Corp.

Army is studying using such systems in war zones to create replacements for broken parts of planes and tanks.

Some designers use 3D printing as a communications tool. Eric Freitag, director of engineering services at Smart Design, a New York-based design firm that bought one of Strataysys's Dimension 3D printers, says "you like to think the client sees what you see" but that a drawing on a piece of paper doesn't always fully communicate a design concept. With a 3D

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