



SPEED to the FUTURE of DESIGN

In the popular economics book *The Power of Moments*, author Matt Mason muses about the day when kids can download and print out their very own customised sneakers from a 3D printer.

That certainly sounds like something out of *Star Trek*, but the possibility of it happening is becoming increasingly real.

Rapid prototyping technologies like 3D printing, which involve the creation of a three-dimensional object from a Computer-Aided Design (CAD) file, have progressed from the niche to encompass manufacturing today. While it has often been used in engineering and the production of fixtures and parts, it seems like design products may also have its time of day as designers are exploring the growing possibilities of this technology.

Finished, the powder bed is then lowered one layer, a new powder layer is applied and the process is repeated till the object is created.

SHAPING THE IMPOSSIBLE

With the help of SLS, the whimsical freehand strokes of Swedish design group FRONT were able to become tangible pieces of furniture. The four members used Motion Capture, commonly used in movies and computer games, to capture the movement of the tips of their pens while they drew pieces of furniture directly in space. The chosen sketches were then converted to 3D files and laser sintered, eventually becoming Sketch Furniture – real pieces of tables, chairs and lamps.

“We do not see what we are drawing until we look at the screen. Our project Sketch Furniture is a work where we question ourselves as designers, and if it’s possible to make the first sketch the final object,” says FRONT member Charlotte von der Laueken.

Rapid manufacturing is able to produce complex geometries because of the fact that you can model virtually any kind of structure on the digital software and reproduce it almost accurately with improving technology, especially laser-based ones such as SLS.

Not only does that leave plenty of room for experimentation and manipulation, there is no need to manufacture separate components to be joined together, since objects are created layer by layer as a single entity.

TEXT BY MELISSA TAN
IMAGES COURTESY OF CHINA, DESIGN INCUBATION CENTRE, FREEDOM OF CREATION, FRONT AND FUTURFACTORIES

Rapid manufacturing or direct digital manufacturing, is an extension of rapid prototyping, using essentially the same methodologies to generate products in greater quantities, and in some cases, better quality.

The object is first modelled on a computer using programs ranging from 2D applications like Adobe Illustrator to 3D modelling software like Rhinoceros. Then the file is converted to a format that is usable by the rapid manufacturing machine of choice, and is produced using additive fabrication techniques – that is, forming the object layer by layer (as opposed to subtractive methods such as carving out the object from a block of material).

In 3D printing, for instance, the printer is retrofitted with a photopolymer liquid or plaster in powder form on one printer head, and a bonding agent on another. The object is then printed out in layers and sections together with a waxy supporting structure, which can be broken away once printing is complete.

But when it comes to manufacturing, selective laser sintering (SLS) seems to be the prime choice, as a wider range of materials from plastics to metal can be created, and the end product is more durable and requires less post-processing. In SLS, a thin layer of powder material is laid on the machine’s work surface, and a high-powered laser beam “sketches” out the digitally submitted cross-section of the model by selectively melting and fusing the powder particles. Once the cross-section is

Lionel Theodorus Deon from Futurfactories, a digital design and manufacturing concept, says, “Multi-component assemblies can be replaced by single components and by merely ‘stitching together’ conventional components but by building the functionality of one component into another. Components can become multi-layered, addressing aesthetic, structural and multi-functional requirements.”

Creepers, which Deon designed for Materialise, MGK, the design product arm of Materialise, a Belgian provider of rapid prototyping services, does just that. It features a modular system that divides space with decorative lights, using a seemingly chaotic structure that consists of different-sized leaf-like reflectors, stems and sections, all made by SLS.

LESS WASTE, MORE FLEXIBILITY

With rapid manufacturing, products can also be made in a fraction of the time, given the efficiency of the process as well as the elimination of aspects such as setting up and retooling. Depending on the size of production, savings on time could range from 50 to 90 per cent, according to research done by Associate Professor C. K. Chua from the School of Mechanical & Aerospace Engineering at Nanyang Technological University, Singapore. This means that there is a reduction of time to market and less risk when it comes to projecting consumer’s needs and market dynamics. There can also be an elimination of waste, since only what’s needed is produced.

Jaime Kyttinen, founder of design and research company Freedom of Creation and creator of acclaimed rapid-manufactured design pieces, said in a previous interview with *Eureka Magazine* that most of his design projects can be completed in a single day. The only “sacrifice” he has had to make is spending a lot of time behind the computer, whether he is on the bus or train.

And given that everything is in digital data, a factory of the future can get customers to customise their own product online before manufacture –

Laser sintered black dress, Freedom of Creation

Rendering of generated form in crystal glass-like material, Design Incubation Centre



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