INNOVATIVE USES OF 3D PRINTING

CUSTOMIZATION IN PRODUCTION

Due to increased competitions, companies are continuing to pursue efforts that allow them to differentiate their products, services or get a leg up on the competition. Customized production is a great way to accomplish this, and it's becoming increasingly viable thanks to improvements in 3D printing technology. Already some companies are able to quickly deliver on-demand custom products in a range of sizes, colors, materials, and shapes. Its 3D printing continues to mature, more and more customization will occur.

McLaren, partnered with Stratasys additive manufacturing to deploy race parts for the MCL32. Some parts include the Hydraulic Line Bracket, Steering Rack, flexible radio harness location boot, carbon fibre brake cooling ducts. Using additive manufacturing, McLaren can actually produce parts at the racetrack, in real-time when racing or testing.

April 7th, 2017
Adidas created a new sneaker made with a 3D-printed sole that it plans to make producing starting in 2018. These shoes will offer complete customization in the color and pattern, allowing individuals to select a shoe that is made to match their desires. The shoes, called "Futurecraft 4D" are powered by technologies created by Carbon, a research firm founded by General Electric and Google. Innovations offered by Carbon's solution are just starting to reach the mass market, with many more companies sure to follow in Adidas' footsteps.

May 2016
Unveiled its new Multi Jet Fusion 3D Printer. This marks the first entrance by any tech giant into the 3D printing space, and the ramifications of this new piece of technology could be huge. The technology marks a new era of mass customization as it delivers superior printing speed, part quality, precision, and is competitive with mass production techniques. Its more and more evident that 3D printing is a tool, the market will become saturated with highly customized and affordable mass-market products.

PROTOTYPING

Fender Musical Instruments, a manufacturer of amplifiers and instruments brought their prototyping in-house when their purchased Stratasys industrial 3d printers. Using these 3D printers, Fender is able to create new product designs, prototype specific parts of an instrument and much more. Using 3D printing to prototype, and bringing the process in-house allows Fender to lower manufacturing costs and bring products to market faster.

SURGERY PREPARATION

3D printing technologies are now allowing incredible innovations in the healthcare market. Each patient is different, and these differences can mean the difference between a successful or failed surgery, especially for procedures that are exceedingly complex. By 3D printing models based on patient's scans, surgeons can identify problem areas and troubleshoot solutions, without risk to the patient. This means that when they do perform surgery, it's far more likely to be successful.

January 2017
Before working on the six-month-old patient's heart, doctors in Toronto used a 3D-printed replica of the heart to practice the surgical procedure. This allowed the doctors to determine the best for the implantation device, in what was one of the first cases of its kind. Surgeons say they'd been able to treat. Because of their preparation through the use of 3D printing, the surgery was a complete success.

September 28th
September 28th, 2017 - Over a year of planning culminated in the first of its kind spinal surgery for a six-year-old boy who was suffering from a variety of conditions that causes weak muscles. It was so severe in his case that the boy couldn't even sit. The surgeons were able to model the spine in the size of the boy's spine as a reference and created a 3D printed model that was implanted into a dummy of the boy's size. This allowed the surgeons to simulate the surgery and resulted in the successful surgery.

REPLACEMENT BODY PARTS

While medically viable organic body parts are still a ways off for humans, there have been successes when printing and implementing various tissues into animals. This means that, now the practice has been refined sufficiently, people will be able to get bespoke replacements for injured or damaged body parts. As a result, quality of life for anyone with damaged bodies can be drastically improved and viable treatment plans can be made for existing conditions that are currently untreatable.

June 2011
June 2011 - 91 3D printer-created lower jaw was successfully implanted in a 83-year-old woman's face that has been described as the first operation of its kind. The woman had contracted a chronic bone infection. Her condition was deemed to be too risky to risk reconstructive surgery, so this method was used. Shortly after the completion of the surgery, the patient awoke and was able to speak a few words. The next day, she was even able to swallow.

2015
A patient in his 60s contracted a tumour in two vertebrae near the top of the neck. Without treatment, his quality of life would drastically fall and he'd have passed away quite painfully. However, thanks to advances in 3D printing, Ralph Hobbs, a neurosurgeon at the Royal Perth Hospital in Perth, Sydney, was able to create the perfect fit solution, which resulted in a successful surgery.

2014
The world's first complete skull transplant was completed using a 3D printed replacement piece made out of plastic. The patient, a 22-year-old woman who suffered from a condition that increases skull bone thickness, needed treatment or she would have eventually passed away. Before 3D printing technology, treatment using this kind of treatment didn't work very well. However, now that exact fits can be created, the surgery was able to be successful.

CUSTOMIZED PROSTHETICS

As soon as 3D printing took off, people were quick to create prosthetics for those that they suffered from injuries. More recently, many people have sought out custom prosthetics created by 3D printing because they're better able to address their needs than a mass produced model. In the future, it's likely that factory-made prosthetics will be completely obsolete as patients entirely move to solutions that are built with their specific needs in mind.

October 28th, 2017
A seven-year-old girl with a custom 3D-printed hand opened the first pitch of Game 4 of the World Series in Houston. For children like her, the possibility of having a traditional prosthetic was out of the question as they were pricey and insurance wouldn't cover them as they were deemed to be "unnecessary". Her parents looked for a solution and found one in UNLV. Innovations in additive manufacturing techniques have made it easy, quick, and cheap to produce customized prosthetics pieces like this.

2017
An 11-year-old boy who loved to listen to classical music was born with only one arm. He dreamed of playing the cello but his prosthetic wasn't advanced enough to allow him to use the instrument. A team at the Human-Computer Interaction Institute (HCI) designed a customized prosthetic arm that was created specifically to allow him to play the cello and, as a result, he was able to play for his grade school recital.

IMPROVED MASS PRODUCTION

Many companies all over the world have seen value in using 3D printing for more than just prototyping. They've included 3D printed objects into the final product their factories create. This allows them to carefully design the objects internal structure in a way that would be impossible otherwise. Additionally, they can use materials in newer and innovative ways. All of this results in the potential for improved efficiency, cheaper production, and a better end product.

2017
Typically, industries like Aerospace rely on economies of scale to avoid bankrupting because they operate in a high profit-margin but low-volume industry. With advancements in 3D printing, this is no longer the case. Companies like GE Aviation are able to produce jet engine components roughly equivalent to producing multiple items, they're also able to adjust to changes quickly, easily, and without significant cost. Furthermore, they can create highly sophisticated designs and use less materials along the way. This means that the end result is lighter vehicle, for the Aerospace industry, is crucial. 3D printing clearly has a place in any low-volume industry, and will deliver success to organizations that adopt it.

JUST FOR FUN ...

Mattel, the world's largest toy manufacturer is no rookie when it comes to 3D printing in prototyping and mass production. They see 3D printing at some point in the production of essentially all their products. However, they have taken this relationship to the next level with the planned release of 'ThingMaker' which will allow kids to design and print their own toys at home.

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