



3D printing industry in Korea

Jeong Eun Ha, Officer for innovation, Technology and Science, April 11, 2018

Introduction

Korean government is trying to find new growth engines for economy through the fourth industrial revolution. One of the key technologies for the fourth industrial revolution is the development of 3D printing technologies. As the country is still heavily relied on manufacturing sector for its economic growth, it is very important for Koreans to innovate in the manufacturing process in order to be competitive in the world market. 3D printing technology will enable shorter, simpler and more efficient manufacturing process. It will also reduce waste and save time, energy and other cost of production. With these advantages, 3D printing technology will change the paradigm of conventional manufacturing sector. For this reason, Koreans expect that the development of 3D printing technologies will bring a positive impact on the country's economy.

3D printing in marine and manufacturing

The marine industry in Korea has been suffering from the financial crisis for long time. In order to overcome the depression, the Korean government encouraged companies to innovate themselves by developing molding technologies using 3D printer. For five consecutive years, Ministry of Trade, Industry and Energy (MOTIE) has funded approximately 10.4 million EURO to Ulsan, a city which is one of the centers of the ship building industry. This fund will used to develop 3D printing technologies to print two meter size large components for the ship building. The technology is jointly developed by Korea Institute of Industrial Technology (KITECH), Korea Electronics Technology Institute (KETI), and Hyundai Heavy Industry, which will be the final user of this technology.

Development of 3D printing materials is also very important in the manufacturing sector. Innovative materials enable high functional smart molding 3D printing technology. For instance, Korea Electro Technology Research Institute (KERI) has developed 3D printing of highly conductive carbon nanotube microarchitectures with fluid ink. Its development can produce various 3D microstructures and will enhance the freedom of integration for advanced conceptual devices. Thus, the technology will bring innovation to the electronics sectors as it can produce micro size and ultralight 3D complex structure for drone and other wearable devices.

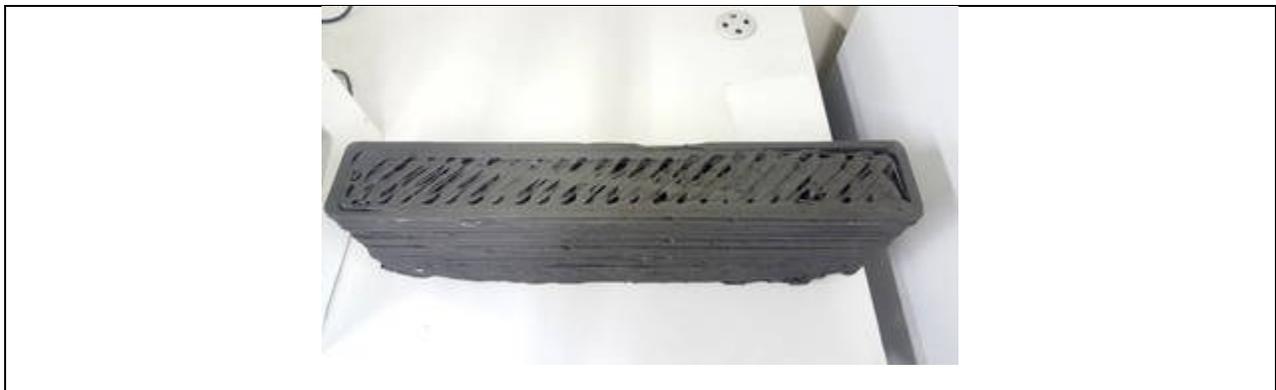


< KERI's development, Source: NEWSIS >



3D printing in the moon construction

Korea Institute of Construction Technology (KICT) is pioneering in the 3D printing of the construction side. Last year, NASA organized a 3D Printed Habitat Challenge competition called Centennial Challenge in the United States. The goal of this event was to foster the development of technologies to manufacture a habitat using local indigenous materials with or without recyclable materials. A Korean team called Moon X Construction which was led by KICT and Hanyang University one the first place. The 3D printing technology that they developed utilized the Martian soil and the recyclable plastics called LDPE to build the habitats. While other teams can make 10 ~ 15 cm size structure, the Korean made structures of 60 cm. The result of this structure had much higher performance in the compression and tensile strength, so the jury evaluated that this technology had the highest possibilities of application in the moon.



<A beam 3-D printed by team MoonX , Source: NASA gov >

3D printing in Medical and Bio sector

Among all other sectors in 3D printing industries, Korea stands out in the medical and bio sector. Pohang University of Science and Technology (POSTECH) has developed the 3D cell printing technology for regeneration of large volume complex tissue. Korea Polytechnic University also has developed implantable type bio-degradable for medical use. In addition, several research organizations and companies are also developing software solutions to design an implant for dental and joint treatment. For instance, a Korean company called Ray is specialized in providing reliable and innovative X-ray imaging solutions in dental and medical industry. They provide 3D printing solution for digital dentistry. It can produce dental/ortho model much faster than it used to be. Traditionally the entire treatment process took 2 weeks, but it has been shortened dramatically to 2 hours after the development of this 3D printing software. Now patients are able to receive treatment much faster and more accurately.



Conclusion

Korea is actively investing in research and development of advanced 3D printing technologies which can create added value in the future market. However, the stage of development is still in early stage as the technology is developed mostly by the knowledge institutes. It still needs some time for commercialization in the market.

Source

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