

A Research Paper on 3D Printing Innovations

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Abstract: *Digital fabrication technology, also referred to as 3D printing or additive manufacturing, creates physical objects from a geometrical representation by successive addition of materials. 3D printing technology is a fast-emerging technology. Nowadays, 3D Printing is widely used in the world. 3D printing technology increasingly used for the mass customization, production of any types of open source designs in the field of agriculture, in healthcare, automotive industry, locomotive industry and aviation industries. 3D printing technology can print an object layer by layer deposition of material directly from a computer aided design (CAD) model. This paper presents the overview of the types of 3D printing technologies, the application of 3D printing technology and lastly, the materials used for 3D printing technology in manufacturing industry. Long-jump is a vigorous athletic event with high speed. Due to so fast run-up and take-off velocities in horizontal and vertical directions, significantly large and varying impact loads often appear in the knee joint region so that the long-jumpers are often badly injured. Based on the physical conditions of an ordinary Chinese man long-jumper, a combination of finite element analysis (FEA) and multi-body dynamics analysis (MDA) approach was tried analyzing the real and detailed long-jump process. Research results show that the maximum resultant force does appear the second phase of the long-jump and that the most notable deformation, displacement and the maximum stresses are all located at the medial sides, especially at the lateral condyle of the articular cartilage*

Keywords: Digital Fabrication, 3D Printing, Additive Manufacturing, Applications, Materials, Long-Jump, Knee Injuries, Finite Element Analysis (FEA), Multi-Body Dynamics Analysis (MDA), Heat Transfer, Phase Change Materials (PCM), Energy Storage, Fluent Enthalpy Method, Simulation

I. INTRODUCTION

3D printing is a process where a digital model created using computer-aided design software (CAD) is turned into a physical three-dimensional object by adding material a layer at a time.

There are many methods of melting or softening the material to produce the layers. Whilst the technology has been around for 30 years it's only in the last 5 years, and the rise of desktop 3D printers, that people have become aware of its game changing potential across all industries.

It is also known as additive manufacturing and is changing the way in which we manufacture and create, but not just in industry.

Innovative designs are being used to develop machine parts, prosthetic limbs, sustainable housing and even 3D-printed medications.

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The 3D printing process turns an object into many, tiny little slices, then builds it from the bottom-up, slice by slice. The layers then build up to form a solid object. The process of building objects in this way is also referred to as Additive Manufacturing. Not all 3D printers use the same technology. There are several ways to print and all those available are additive, differing mainly in the way layers are built to create the final object.

Some methods use melting or softening material to produce the layers. Selective laser sintering (SLS) and fused deposition modeling (FDM) are the most common technologies using this way of 3D printing. Another method is when we talk about curing a photo-reactive resin with a UV laser or another similar power source one layer at a time. The most common technology using this method is called stereolithography (SLA)

Construction

3D construction printing (3DCP or 3DP) refers to the automated process of manufacturing construction elements or entire structures by means of a 3D printer.

However, instead of using ink like the traditional printers we're used to, construction materials are printed layer-upon-layer, which is also why 3DCP goes by the name additive manufacturing or additive construction. It can be carried out both onsite and offsite.

3D printing brings great benefits to the construction industry, being a solution that touches almost all areas of the value chain of the sector. From contributions to sustainability, increased productivity and support in challenges on the supply chain, this technology came to revolutionize the way we build.

II. CONCLUSION

3D printing, like modeling or three dimensional scanning, is a creation tool among other things, but what most distinguishes it is its potential to create an almost unlimited number of shapes. As with every tool, you need to master it, to take advantage of its abilities, but also know its limits. Prototyping is not the ultimate solution for every manufacturing need. Techniques that are hundreds, or even thousands, of years old such as casting, machining, and blowing, will still stay in our industrial landscape for a long time. The real revolution that these digital manufacturing and design tools provide is that of overall control of

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