SAFETY SYSTEMS OF NUCLEAR POWER PLANTS

Belarusian State University of Informatics and Radioelectronics
Minsk, Republic of Belarus

Piskizhev I. V.

Perevishko A. I. - Senior Lecturer

The purpose of this paper is to disclose the topic of the relevance of the introduction of 3D printing technology in the modern world.

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file.

The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

3D printing is the opposite of subtractive manufacturing which is cutting out / hollowing out a piece of metal or plastic with for instance a milling machine.

3D printing enables you to produce complex (functional) shapes using less material than traditional manufacturing methods.

It all starts with the creation of a 3D model in your computer. This digital design is for instance a CAD (Computer Aided Design) file. A 3D model is either created from the ground up with 3D modeling software or based on data generated with a 3D scanner. With a 3D scanner you're able to create a digital copy of an object.

The 3D printing industry encompasses many forms of technologies and materials. When most people think of 3D printing they are thinking of a simple desktop FDM printer but that's not the entire picture. 3D printing can be divided into metal, fabrics, bio and a whole host of other industries. For this reason, it's important to see it as a cluster of diverse industries with a myriad of different applications.

In the first half of 2017, Sculpteo's state of 3D printing reported its uses in industrial sectors as :

– Consumer Goods (17%)

– Industrial Goods (17%)

– High Tech (13%)

– Services (9%)

– Healthcare sectors (7%)

The last and most important stage of my research was to explorethe 3D printer device. The most common of these is binder jetting. With binder jetting two materials are used: powder base material and a liquid binder. In the build chamber, powder is spread in equal layers and binder is applied through jet nozzles that "glue" the powder particles in the shape of a programmed 3D object. The finished object is "glued together" by binder remains in the container with the powder base material. After the print is finished, the remaining powder is cleaned off and used for 3D printing the next object.

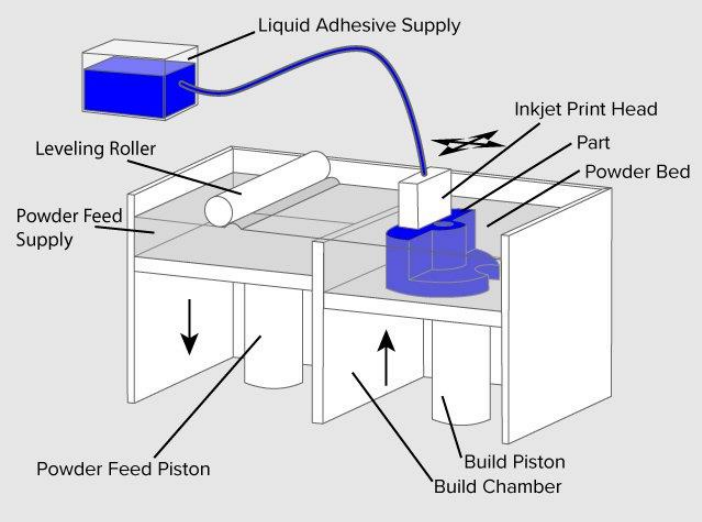

Figure 1. "Binder jetting "

References:

1. https://3dprinting.com/what-is-3d-printing/