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A Review of Additive Manufacturing

- Additive manufacturing takes the information from a computer-aided design (CAD) file that is later converted to a stereolithography (STL) file. The drawing made in the CAD software is approximated by triangles and sliced containing the information of each layer that is going to be printed.
- Still a lot of work before additive manufacturing can be become a standard in the manufacturing industry. Not every commonly used manufacturing material can be handled in additive manufacturing. The accuracy also needs improvement to eliminate the necessity of a finishing process. The continuous and increasing growth experienced since the early days and the successful results up to the present time allow for optimism that additive manufacturing has a significant place in the future of manufacturing.
- The first form of creating layer by layer 3D objects using CAD was called Rapid Prototyping developed in the 1980's. Nowadays, there are many kinds of technologies with different names and are either liquid, solid or powder based processes. However, they all have the origins of rapid prototyping.
- Stereolithography was the first and is the most widely used process of rapid prototyping. It is a liquid based process that involves the solidification of a photosensitive polymer when an ultraviolet laser contacts the resin. The basic principle applied here is the process of photopolymerization (AKA ultraviolet curing), which is a process where a liquid monomer/polymer converts into a solidified polymer by applying ultraviolet light which acts as a catalyst for the reactions.
- The STL file (stereolithography) is the standard for every additive manufacturing process. The STL file creation process converts the continuous geometry in the CAD file into a header, small triangles, or coordinates triplet list of x, y, and z coordinates and the normal vector to the triangles. This process is rather inaccurate and the smaller the triangles, the closer to reality we are.
- There are several other additive manufacturing techniques that follow the same basic principles: 3DP, Fused Deposition Modeling, Selective Laser Sintering, Electron Beam Melting, Laminated Object Manufacturing and Polyjet.
- One of the biggest advantages of additive manufacturing is that it makes it possible to manufacturing not just lightweight parts but also highly complex parts that are normally difficult to machine.
- There is still a lot of work and research to be accomplished before additive manufacturing processes become the standard in the manufacturing industry. There are still a lot of commonly used materials that additive manufacturing cannot handle. Furthermore, the accuracy of the finished product needs improvement in order to

eliminate the necessity of a finishing process and to be able to produce parts that require the highest levels of precision.

https://bootsindustries.com/heat-bed-3d-printing/

Heat Beds in 3D Printing – Advantages and Equipment

- Heat beds are used because they improve print quality by keeping the extruded plastic warm and so prevents warping. Warping is a common condition caused by plastic on the edges of the part cooling down at an uneven rate when compared to the plastic inside of the part. The result is that the corners wrap up and deform your model. So heat beds ensure the part remains flat on the print bed.
- Heat beds should be set at the Heat Deflection Temperature. Heat deflection temperature is the temperature at which the material is malleable (soft). Recommended heat deflection temperature for PLA is 50-60 °C.
- Glues are also frequently used to make sure that the print “sticks” to the bed.