

# Advancements in 3D Modelling Engineering Components



3D modelling helps in creating products that sell. To be precise, it advantages the manufacturing process and also in the advertising of items by reducing the working hours and costs.

Here are the reasons why 3D modelling is necessary before manufacturing a part.

- 3D modelling is an excellent way to prototype products
- 3D modelling is budget-friendly
- A 3D model shows the physical properties of a product
- 3D models are suitable for multiple usages
- 3D models can be used in an advertisement as it doesn't require physical prototypes

What's more, the manufacturers can smoothen out their production and satisfy their customers at the same time.

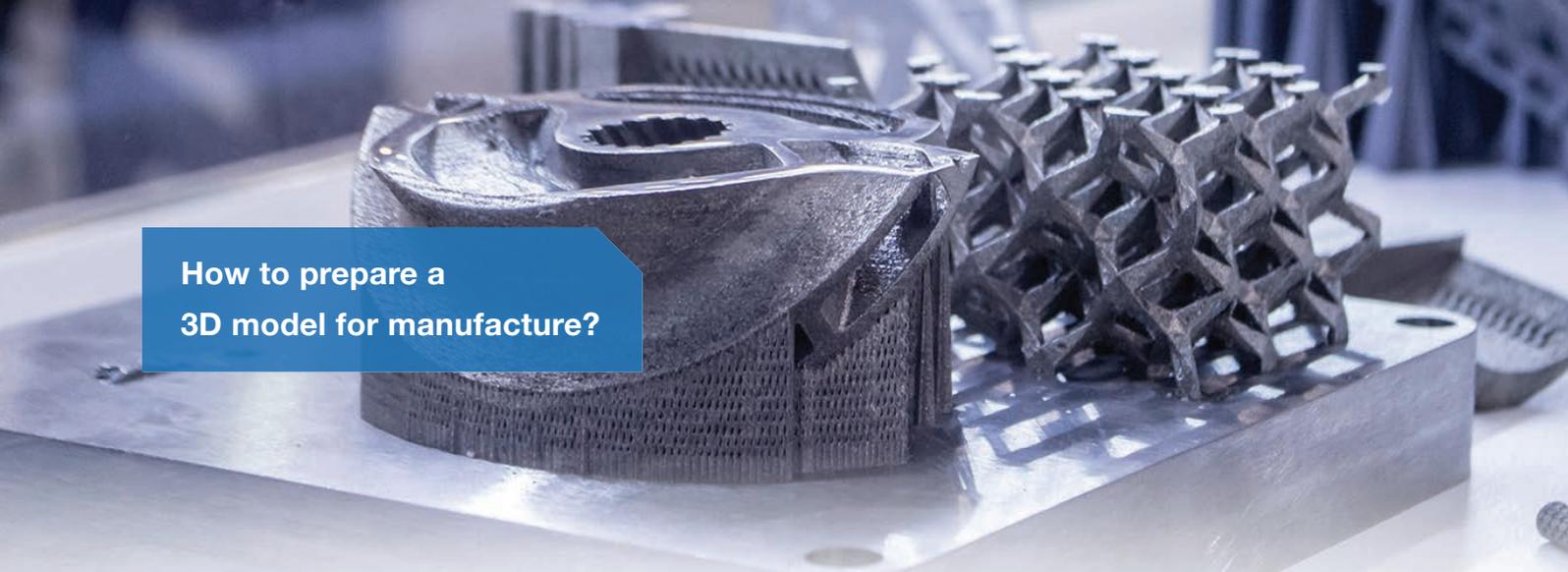
### Different 3D modelling software available in the market:

3D design software is a combination of **CAD (Computer-Aided Design)** and 3D modelling software. CAD is used while creating industrial objects. Meanwhile, 3D modelling software allows more freedom as the designers need not work mechanically. It is a technical tool with functionalities in industrial design, mechanical design, architecture and fields like aerospace and defense.



Here is a list of software that assists in building a 3D model that is ready for manufacturing:

<b>TinkerCAD</b>	This is an online 3D design app with software that features a block-building concept that helps you develop models from a group of basic shapes.
<b>FreeCAD</b>	This is a free open-source parametric 3D modelling tool that assists with designing real-life objects of various sizes.
<b>BlocksCAD</b>	This software is created specifically for educational purposes. This software is equipped in such a way that anyone can later use OpenSCAD, which is a professional CAD software.
<b>Creo</b>	This is CAD software that is one of the leaders in the market in product designing. The latest version of this software, Creo 5.0 was released in 2018 and has improved features like an upgraded user interface that facilitates better handling.
<b>Fusion 360</b>	This is a cloud-based 3D CAD program. One of the biggest advantages of this model is that it stores the history of all the changes in the model. It also runs on various platforms and the designers can access their information at any point in time.
<b>SolidWorks</b>	This is a parametric feature-based model. This software has various features like design validation tools otherwise called reverse engineering.
<b>AutoCAD</b>	This was one of the first CAD software which was released in the year 1982. Many designers have stated that this software is more suitable for 2D drafting and not very convenient for 3D modelling.
<b>CATIA</b>	This is a multi-platform software suite for CAD, CAM, CAE and more.
<b>OpenSCAD</b>	This open-source software is suitable for making solid 3D models. This software is best designed for coders or programmers as it has Constructive Solid Geometry (CSG) and the extrusion of 2D outlines.
<b>Rhino</b>	This is a commercial 3D computer graphics and CAD software. Rhino3D has a wide range of design features. It uses a mathematical model known as NURB that allows working around curves, meshes, points, surfaces, & solids in many ways.



## How to prepare a 3D model for manufacture?

Here is a step-by-step guide on how to break down the different steps involved in creating a 3D model.

### **Step 1: Nuts, bolts, and fixing**

The first step is to ensure that the model is complete and an exact representation of what you want to produce. Most CAD packages have several ways to add quick fixes. Still, your model must have all the finishing touches while it is being designed.

### **Step 2: Feature tree structure**

When you're building the assembly, it is important to structure the feature tree with sub-assemblies. It can become increasingly difficult while going through a long feature tree as you may be wasting a lot of time going up and down. Further, you may not be the only one using this feature tree.

So, it is important to ensure that the tree looks less complex at one glance and also fits into one screen. It is necessary to see what each sub-assembly or component is.

### **Step 3: Preparing your parts and fabrications**

As a designer it is crucial to ensure that all your parts fit together as it's supposed to be. You will have to check your design during the assembly level using processes like interference detection, hole alignment, clearance verification as well as the measuring functions.

### **Step 4: Know your production limits**

Keeping the parts and the assemblies in a manufacturable state are important while designing your product. It would be advantageous if you could do a quick research on whether the materials that you're working with are available in the sizes that you need to work with. This is called Lean Manufacturing. It is also necessary to know the limits of the machinery which you have at your disposal, especially during circumstances when there is an air bending request or to create a bend table.

## The Effects of Technological Advancements in 3D modelling

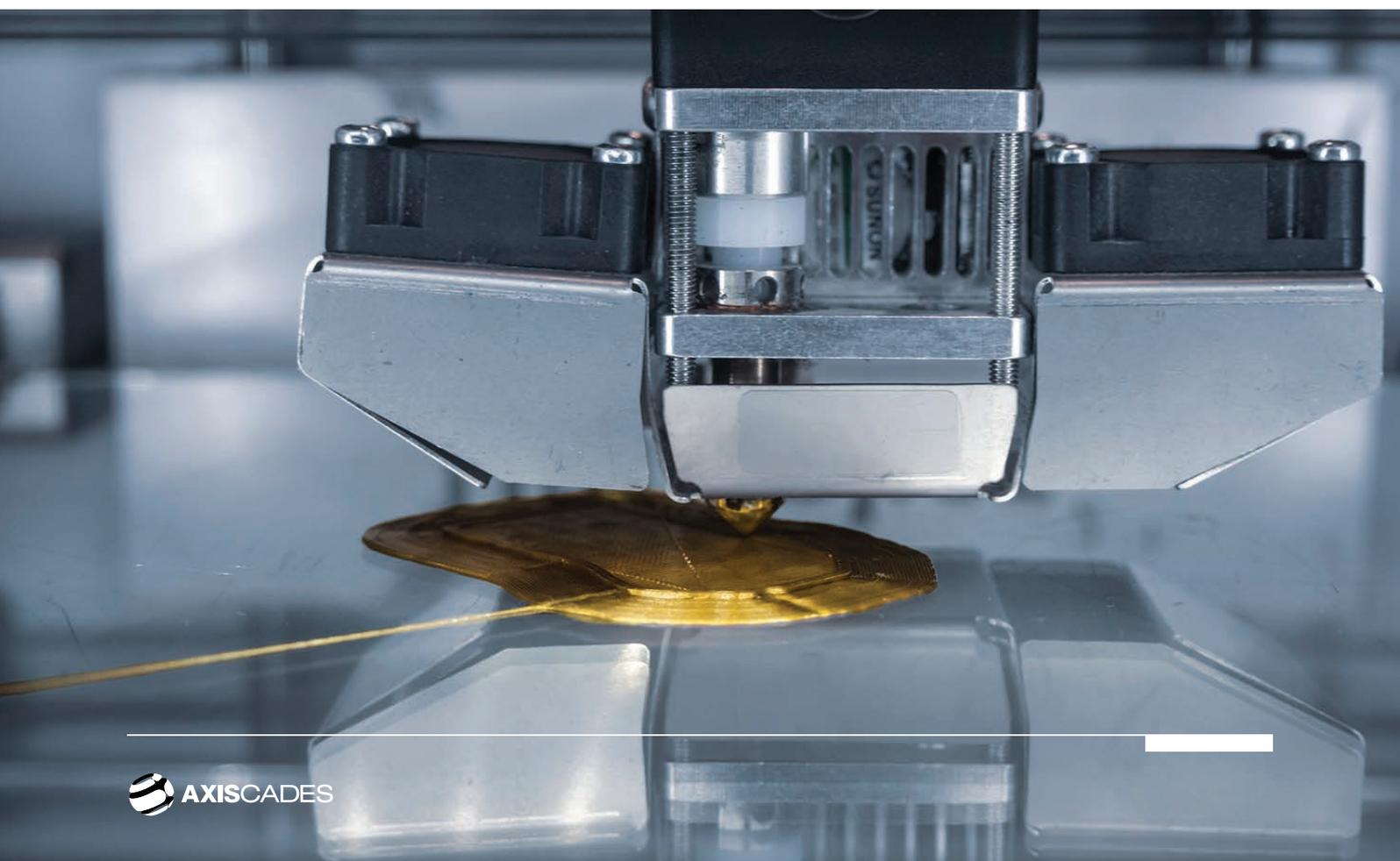
3D modelling is a technology that is constantly developing and is becoming accessible to the masses. Starting from the movie industry to engineering fields, professionals needed to visualize their creation before proceeding to the prototype construction. This allows them to analyze their work and make the necessary changes before incurring the high-costs associated with the trial and error methods of its construction.

- Since its inception, 3D modelling has been a major driving force for technological advancement. Now it is possible to design and interact with realistic models of futuristic projects.
- Not only has 3D modelling completely nulled the use of pencil and drawing board, which consumed a lot of time before a model can be produced. It has also cut down the wastage that would occur with the conventional trial and error method and also the hours that would be spent drawing.
- Today, with 3D modelling you can simulate different scenarios depending on the project. Certain design software will allow you to use multiple materials for design and test them separately.
- Nowadays, it is also possible to analyze extruded drawings from all the angles closely. Corrections can now be made in an easy as we can draw on all planes of observations. Unlike before, when the designs had to undergo complete remodelling whenever a mistake was made.
- 3D designs also help when Scale and measurements are the topics of discussion. With your planned measurements modelled out, the concept of scale is no longer an unanswered question.
- Not just manufacturing companies, real estates have joined the bandwagon of using 3D modelling for their projects now. Earlier, 3D designs were used to render a realistic model of an architectural design. Today, it also assists interior and exterior decorators to show a customized vision of how the design would turn out to be before getting to work on it.
- In the past, an idea was materialized through a manual process of construction after the

3D model was built. This was accomplished with the use of drilling tools, manual cutting machines and so on and incurred a huge loss of resources. Sometimes, with the availability of these machines, the process can marginally be improved with CNC tools that can automate the process of creation. This could be done by using 3D modelling software with CAD tools.

Nowadays, the idea of materializing is achieved with the use of **additive manufacturing technology** also known as **3D printing**. This technology consists of adding certain materials to the final piece by making use of specialized machines that would serve this purpose. The software's requirement is the same as that of 3D modelling, i.e. a combination of 3D modelling software with CAD software.

It turns out that the future of 3D modelling technology is still bright. Earlier, this technology was built on individual software for individual systems. Now, there has been a development in cloud-based software that helps with the faster exchange of information and an improved teamwork efficiency when compared to the earlier technique. In the future, we can look forward to more improvements in this technology and there is constant work going on in this field to ensure the quality and its efficiency.



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