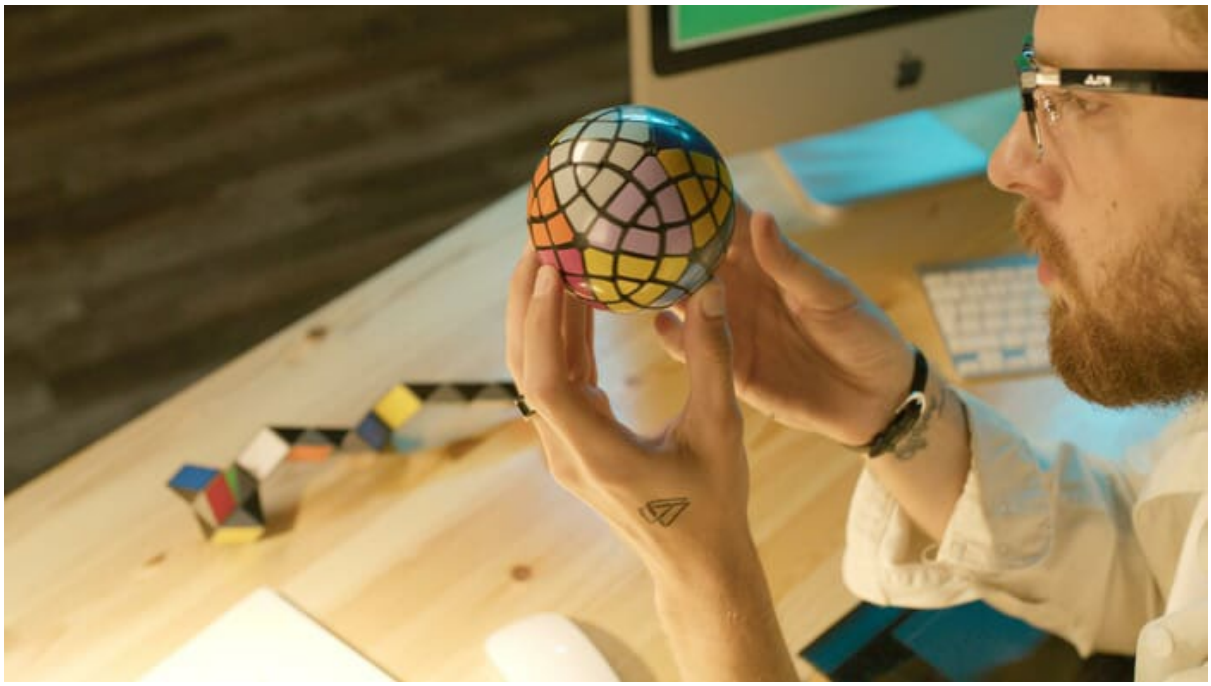
Press Release

Rapid Prototyping – Everything you need to know

The modern manufacturing sector moves pretty fast. Fortunately, speed is where the latest 3D printing technology excels – and that's particularly true when it comes to rapid prototyping.



Additive manufacturing produces some of the most ambitious end-use parts in sectors spanning from aerospace to medical. But when the clock is ticking and a component demands to be developed, refined and rolled out fast, AM rapid prototyping is the answer. Read our introduction to the concepts and advantages of rapid prototyping – and remember that the Tri-Tech 3D team is always on-hand to advise you.

What is Rapid Prototyping?

Developed in the mid-'80s by Chuck Hull – who revolutionised the prototyping process with his pioneering use of Stereolithography – rapid prototyping refers to fast computer aided design (CAD) and fabrication of a physical component.

Prototypes have always existed, of course, but Hull's masterstroke massively sped up the process, allowing organisations to progress faster through the product's timeline and ultimately slash their time-to-market over competitors.

In modern times, many different AM technologies play a role in the process, while the types of rapid prototypes span from early Proof Of Concept models to Works-Like prototypes that can be put under real-world stresses and strains.

Advantages of Rapid Prototyping

As the name suggests, a key purpose of rapid prototyping is to turn a digital design into a physical object with a quick turnaround. But speed is not the only criteria. By using AM

processes – as opposed to traditional manufacturing methods – companies can easily and cheaply produce multiple iterations of a proposed part, with a level of detail and quality comparable to the final product.

With rapid prototyping using AM, feedback can be given, fit, form & functionality tested, issues identified, changes made and fresh prototypes produced – sometimes within the same day. The upshot is that the final product is far more carefully evaluated and will likely enjoy a smoother transition to the marketplace.

Here are some advantages of rapid prototyping at a glance:

Speed

A business that uses AM rapid prototyping will be lighter on its feet at every stage, not only bringing products to market faster but reacting in real-time to changing consumer demands.

Cost

When design issues are spotted, they can be quickly fixed at negligible cost – and without the disruptive tooling changes of traditional manufacturing.

Design

With multiple prototypes created, evaluated and refined, the design is sharpened at every stage, resulting in a higher-quality final product.

Innovation

While the cost and commitment involved in traditional manufacturing prevents designers from taking risks, AM rapid prototyping promotes blue-sky thinking.

Customisation

As we've already seen in patient-specific products for the medical industry, AM allows parts to be customised for the end user.

Evaluation

The quality of AM rapid prototypes means test units are so realistic they can be put through functional testing and even presented to stakeholders.

Waste

The material-efficient nature of AM processes means the rapid prototyping process is more environmentally friendly than the traditional equivalent.

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Rapid prototyping using additive manufacturing

Regardless of which AM technology is employed, the rapid prototyping process typically flows through five distinct stages.

Design

A designer creates a digital 3D model of the proposed part with CAD software.

Data Processing

With the initial design complete, the CAD model is converted into a format compatible with the 3D printer (this is often an STL file).

Machine Preparation

The 3D printer is prepared, with settings carefully calibrated and appropriate materials loaded ready for use.

Prototype building

The 3D printer creates the prototype one layer at a time, based on the instructions and specifications of the CAD file.

Post-processing

Following the build process itself, various post-processing steps – such as sanding and/or painting – may be required to complete the prototype.

3D printing and rapid prototyping

From Chuck Hull's early use of Stereolithography in the 1980s, rapid prototyping now runs the gamut of AM disciplines. Here's a rundown of the different 3D printing technologies and their key benefits for rapid prototyping.

Stereolithography (SLA)

Pros: Excellent precision and surface finish.

Cons: Relatively high material costs and size of machines means SLA is generally limited to smaller objects.

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PolyJet

Pros: Parts with complex details, vivid colour options and smooth finishes, using multiple materials.

Cons: Less strength and durability, better for visual than functional prototypes.

Fused Deposition Modelling (FDM)

Pros: Wide choice of materials and easy to master.

Cons: Surface finish and resolution are typically lower-quality than SLA.

Programmable PhotoPolymerisation (P3)

Pros: Very fast with enviable resolution and surface finish.

Cons: Smaller build size relative to other AM technologies.

Direct Metal Laser Sintering (DMLS)

Pros: Strong and precise, ideal for ambitious designs and functional models.

Cons: Relatively high material and operating costs.

Rapid prototyping services – and more – from Tri-Tech 3D

Tri-Tech 3D is the UK's most trusted voice in AM, having helped some of the world's leading businesses unlock the true potential of 3D printing. From our unparalleled range of Stratasys 3D printers to honest advice on materials, software and 3D printer training, Tri-Tech 3D is your all-in-one AM solution.

To learn more about rapid prototyping or any other aspect of AM, simply get in touch with the **Tri-Tech 3D team. We're ready to help you on 01782 814551 or info@tritech3d.co.uk**

~ENDS~

For further information contact:

Hayley Giles, Marketing Executive,

Tri-Tech 3D Ltd, 3-4 Innovation Way,

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North Staffs Business Park, Stoke on Trent, ST6 4BF

Telephone: 01782 814551
e-mail: Hayley.Giles@stanfordmarsh.co.uk

www: www.tritech3d.co.uk

About Tri-Tech 3D:

Tri-Tech 3D is a premier provider of 3D printing and additive manufacturing solutions in the UK.

Known for its engineering excellence and commitment to customer success, Tri-Tech 3D offers a comprehensive range of products and services designed to meet the needs of a variety of different industries, including Automotive, Aerospace, Defence, Manufacturing, and much more.

Tri-Tech 3D provides a comprehensive service from advice on initial specification and supply of 3D printing hardware to on-site installation, staff training, and on-going product support. Founded in 2007, Tri-Tech 3D was acquired by the Stanford Marsh Group in January 2017. This resulted in doubling our 3D business with SMG3D and become part of a broader group offering CAD software solutions, CAD training, and wide-format printing.