



Additive Manufacturing - TRUMPF at the Pro-AM 2018

Singapore, 30.05.2018 - The Pro-AM Conference was held in Singapore from 14 to 17 May 2018, presenting the latest commercial and scientific progress in Additive Manufacturing. TRUMPF participated at the conference informing visitors about technologies and applications in 3D metal printing.

Additive manufacturing and 3D printing are technologies that are both constantly advancing. The fields of application go far beyond just the manufacturing industry: 3D printing is used to create electronics and metal components for machinery or even for bioprinting, where lasers can be used to print tissue. The event overall saw a congregation of 3D printing users coming together to learn and share about the knowledge acquired from each of their respective fields and also gaining an in-depth understanding of the challenges for the current and potential applications for the technology.

TRUMPF displayed its solutions for 3D printing of metal components at the conference. With TRUMPF 3D printers, metal components can be created just by using metal powder and laser light. On the basis of a 3D model, a laser melts on the metal powder and solidifies it layer by layer to produce a high-quality workpiece. This method enables the production of geometrically complex objects and allows to freely design any desired shapes.

When it comes to additive manufacturing there exist two different methods: Laser Metal Deposition (LMD) and Laser Metal Fusion (LMF). TRUMPF is the only manufacturer in the world to offer both from a single source. But what exactly is the difference between laser metal fusion and laser metal deposition?

Laser metal deposition

Laser metal deposition is also referred to as LMD, direct energy deposition, or laser cladding. The process is quite simple: The laser first generates a weld pool on the component surface. A nozzle then automatically adds metal powder. This creates beads that are welded to one another, which then form structures on existing base bodies or entire components.

Laser metal deposition can be used for coating and repair purposes, to generate entire components, and for joining processes such as bridging gaps. In the field of additive manufacturing, it is also ideal for generating entire components and combining different manufacturing methods. As such, a conventionally cast or formed base body can be offered in a range of versions cost-effectively by using the additive method. LMD can also be combined with laser welding and cutting.

Benefits of LMD are the high build-up rates and therefore, the process speed in comparison to other generative processes. Several powder containers can be used



in the process, which enables the development of custom alloys to suit individual requirements. Sandwich structures can be created by combining different materials. There is a wide range of materials in powder form to choose from, including steels, base alloys made from nickel (Ni), cobalt (Co), aluminum (Al), copper (Cu), and titanium (Ti), as well as WC or TiC embedded in metal matrixes. Generative laser metal deposition is used in industries including aviation and aerospace, energy, petrochemicals, automotive, and medical technology.

Laser metal fusion

Laser metal fusion is often referred to as metal 3D printing, powder bed fusion, or selective laser melting. The laser builds up the workpiece from a powder bed, layer by layer. A CAD model provides the plan for doing so, and no tools are required. The powder is added to a build platform. Here, the laser beam accurately melts on the powder according to the CAD data and joins defined points to the layer underneath. The laser then repeats this process until the metal part is finished. The workpiece has the same properties as the metal powder which was used. A large variety of metal materials in powder form can be used, such as steel, aluminum, and titanium.

The components produced using this method meet stringent material requirements for demanding applications. As a result of the components' stability and low weight, the method is ideal for lightweight designs and bionic structures, such as those found in the aviation and aerospace, automotive, and medical technology sectors.

As a supplement to conventional production methods, the LMF method offers a number of advantages. There are virtually no limits on the design freedom, which enables complex forms and custom components to be produced quickly, cost-effectively, and with flexibility. When conventional production methods reach their limits, LMF can provide the answer. It enables cost-effective production, even for small lot sizes.



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About TRUMPF

The high-technology company TRUMPF offers production solutions in the machine tool and laser sectors. It is driving digital connectivity in manufacturing industry through consulting, platform and software offers. TRUMPF is the world technological and market leader for machine tools used in flexible sheet metal processing, and also for industrial lasers.

In 2016/17, the TRUMPF Group – which has about 12,000 employees – achieved sales of 3.11 billion euros. With over 70 subsidiaries, it is represented in nearly all the countries of Europe, North and South America, and Asia. It has production facilities in Germany, France, Great Britain, Italy, Austria, Switzerland, Poland, the Czech Republic, the USA, Mexico, China and Japan.

For more information about TRUMPF go to www.trumpf.com

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