



3D Printed Fixtures for Laser Welding Machines

Primetall GmbH from Dillenburg in Hessen provide customer-specific solutions made of stainless steel and has many varied customers in different areas of industry. In addition to medical technology, laboratory technology and gastronomy, their customers also come from the aviation and packaging industry.

The core business is sheet metal processing, working as a contract manufacturer. They provide services in laser cutting, cnc punching, bending, high quality welding and the finishing of parts.

Challenge

Primetall GmbH were faced with the challenge of sourcing many different fixtures for a new laser welding system. Instead of making them out of aluminium, which was the traditional method they decided to look at what alternatives were available.

To achieve the high speed required of the rotary axis the devices had to be made as light as possible and was a major consideration.

They also needed to find a way to integrate a gas duct into the part, which hadn't been possible before. It should also be noted that the fixtures were very expensive to produce too.



The 3D printed parts consist of the Markforged base material ONYX, which is a nylon with small pieces of carbon fibre blended in to it, to make it really tough. It has then been additionally reinforced with a continuous fibre.

Also, the mounting points for the zero-point clamping system can be attached directly to the fixture, thus reducing machine set-up times down to a minimum.

Implementation

Primetall GmbH decided to invest in a Markforged Industrial series 3D printer.

The Markforged 3D printers were able to embed a continuous carbon fibre filament into the fixtures, for additional strength, via a second nozzle in the print head.

The fixtures produced were light, but nevertheless highly stable and performed well in the hot environment, making them in no way inferior to the original fixtures made of aluminium.

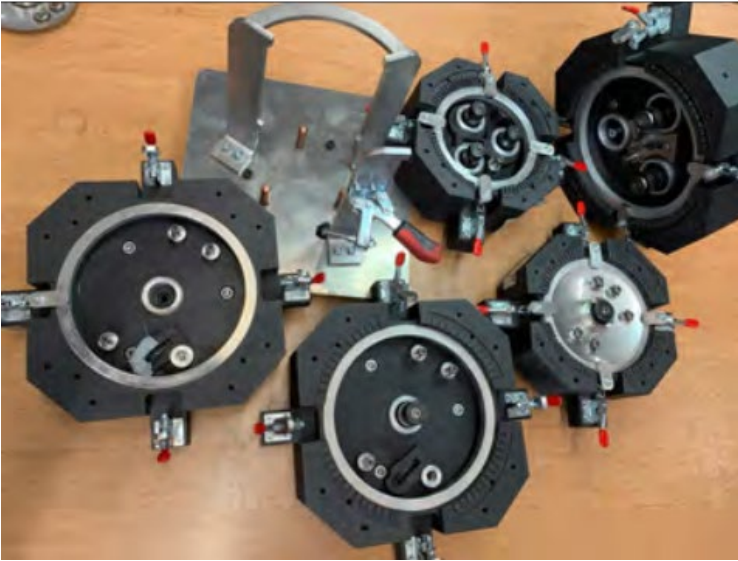
During the design phase, the fixtures were optimized to suit the additive manufacturing process and materials available, which is a common consideration when 3D printing.

A further advantage of additive manufacturing is that a gas duct can now be integrated into the fixtures, to guide a forming gas to the correct location.

Forming gas is an important factor for clean welding so being able to guide the forming gas exactly to where it's needed is an added bonus. Primetall only use one connection for the supply where previously this would have been made in a multiple of piece parts.

Raphael Willgenss Operations Manager at Primetall GmbH. claims "So we are quite literally "drilling around corners!"





Why Markforged?

Markforged offers a clever solution. Their easy to use software allows the engineer to prepare the parts ready for printing quickly. They can then send it directly to the machine, from their pc – so if they are at home it's not a problem. In fact, you can send a print from anywhere in the world because of the secure cloud infrastructure they have developed.

The 3D printers are of very high build quality and function reliably, which is just what we need, explains Raphael Willgenss. We rely on these machines every day now.

By implementing Markforged composite fibre technology into the manufacturing process, the fixtures we used to manufacture with conventional methods can now be 3D printed and still perform the same.

Thanks to the way Markforged have approached additive manufacturing, with their variable infill technology the fixtures can now be made much lighter and offer the same stability.

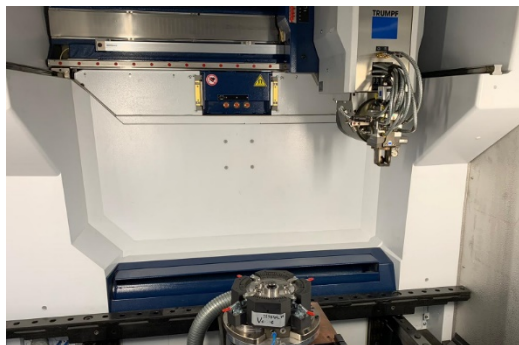
Payback?

How do the 3D printed fixtures compare with the conventionally manufactured aluminium fixtures?

The average cost of the aluminium fixture is around €1,200, however this does depend upon the design somewhat, complex fixtures are expensive to machine, but 3D printers find them easy and don't have to perform multiple ops!

The 3D printed fixtures costs about €150 which corresponds to a saving of over €1000 each time! The resulting savings have contributed to an immediate return on investment for the 3D printer. Primetall GmbH is now going through their other everyday processes to find further potential savings.

This is manufacturing redefined.



Cooperation with Mark3D

"We are very happy with the decision to invest in a Markforged 3D printer. We work very closely with the team at Mark3D.

If we have any questions, they help us readily. We would highly recommend the Markforged 3D printers and Mark3D as business partners.

Raphael Willgenss, Operations Manager Primetall GmbH

"Primetall have managed to save over 1000€ per fixture! "

You can find more pictures and videos of the fixtures here:
<https://bit.ly/3aKO4uE>