

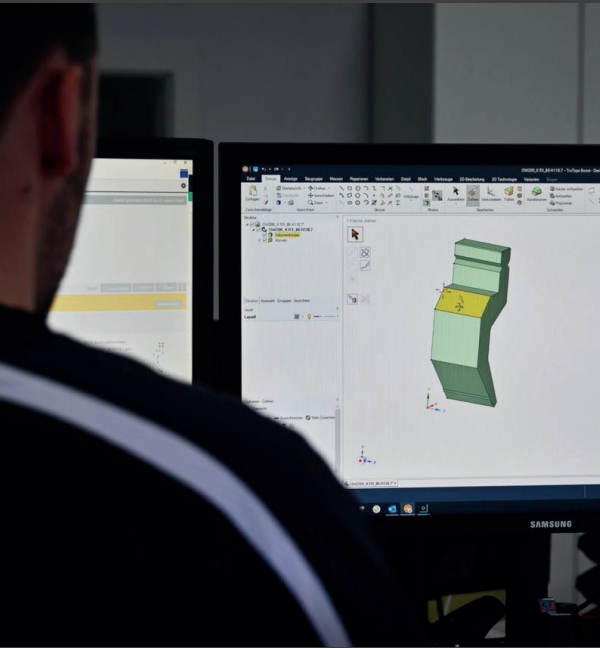


Case Study

Edging tool for bending machine

In 2011 BAM GmbH was founded by the current managing director Marco Bauer in Weiden in the Oberpfalz. Starting as a classic contract manufacturer with eight employees, it is now a multi-award-winning digital company.

BAM GmbH offers precision manufacturing, special machine construction and digital services. In the field of additive manufacturing, BAM relies on the Metal X metal 3D printer system and the Mark Two carbon fiber 3D printer from Markforged, among other technologies.



The Challenge

Many possible applications in the service sector

BAM GmbH offers a wide range of products for the manufacture of metal and plastic components of the highest quality and with the narrowest tolerances for numerous different industries. For these applications, additive manufacturing is the best choice, especially in the field of weight optimisation.

Up to now, most parts have been manufactured by machining, which is complex and cost-intensive, especially in prototyping. Managing Director Marco Bauer also prints individual parts for his own state-of-the-art machinery.

Implementation

Easy entry into Additive Manufacturing due to the closed overall system

While searching for a metal 3D printer, founder and managing director Marco Bauer got to know the production technology of Markforged. He was particularly convinced by the easy handling of the material change by simply replacing the material rolls.

Markforged's all-in-one system connects all components with each other: from the cloud-based software to the 3D printer and the post-process (washing and sintering). This gives a quick and easy overview of the complete process chain. The individual components are matched to each part accordingly, so that the best possible result can be achieved from the very first print! Thanks to the cloud-based software, print jobs can even be started conveniently from on the road.

The Solution

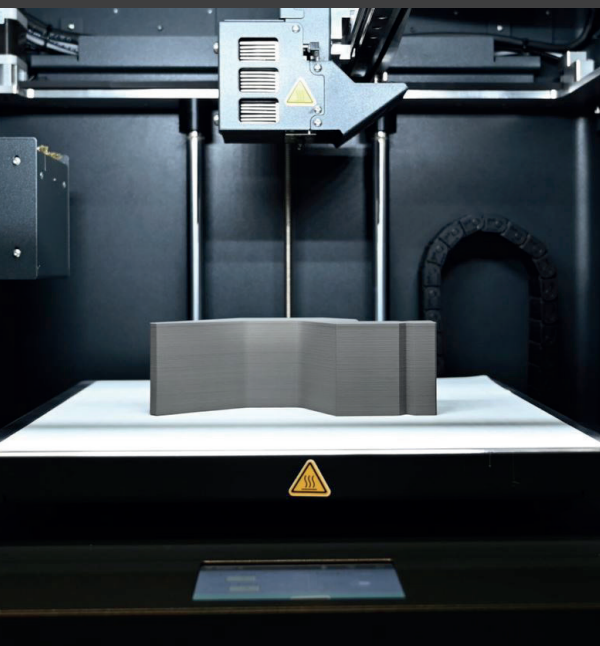
Design freedom for component optimization

Due to the additive manufacturing there are almost no restrictions in the geometric complexity of a component. This is advantageous for making components lighter and optimizing them for their intended use.

By processing continuous fibres, the components are given more performance in terms of strength with an excellent surface quality.

At a glance

- ✓ All-in-One System
- ✓ easy entry into Additive Manufacturing
- ✓ excellent surface quality



Materials:

- ✓ 17-4 PH Stainless Steel
- ✓ H13 Tool Steel
- ✓ A2 Tool Steel
- ✓ D2 Tool Steel
- ✓ Inconel 625
- ✓ Copper
- ✓ Titanium Ti-6Al-4V – beta
- ✓ 316L Stainless Steel – beta

The Metal X



Edging Tool

Simple production of functional prototypes

Marco Bauer shows the use of the Markforged Metal X on an A2 tool steel edging tool. After the design, an STL file of the part is created to be imported into the EIGER software. There the tool can be prepared for printing (wall thickness, internal structure etc.). Afterwards the printing can be started with a simple click!

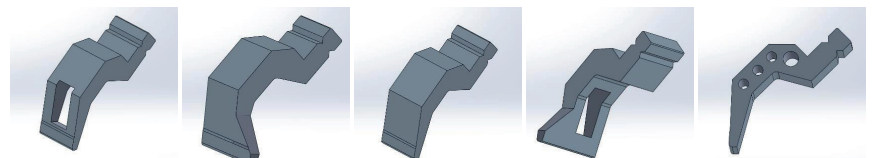
Thanks to a honeycomb structure inside the component, weight can already be saved with the same geometry and stability. After printing, the washing and sintering processes follow, whose optimum temperatures and times for the component are calculated by the EIGER software and sent to the machines. So here too the post-process can be started with a simple click. The component is ready for use immediately after sintering. For an even better surface quality or lower tolerances the component can be polished, ground or CNC reworked.

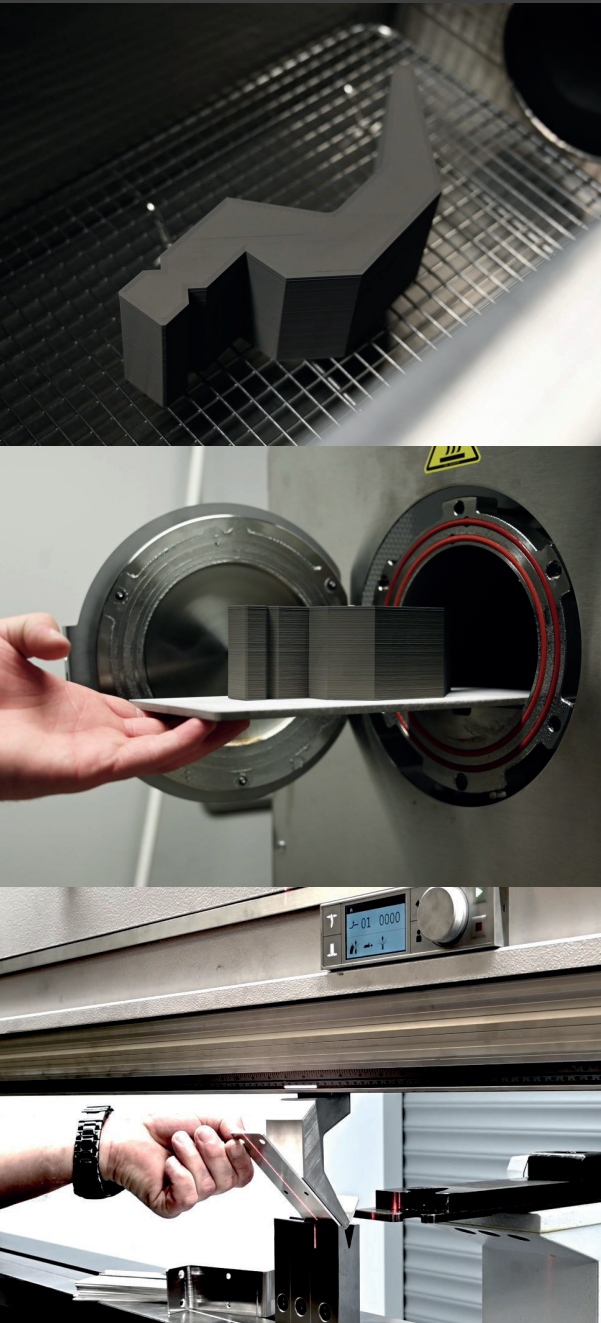
Data of the edging tool:

Dimensions	155,7 mm x 55,0 mm x 50,0 mm
Material	A2 Tool Steel
Printing time	48 h
Washing time	25 h
Drying time	4 h
Sintering time	27 h
Process time	104 h (4,5 days)
Material costs	150 €

The advantages of 3D printing compared to CNC production can be seen in this component:

Increasing the complexity of a component leads to additional costs and longer delivery times in machining production. In additive manufacturing, weight-reducing measures lead to cost reduction and the generation of added value.





The Future

Trust in Markforged Technology and Mark3D

For the future, the state-of-the-art machinery is to be expanded with additional 3D printers and the technological progress of the company is to be driven forward.

As the next functional prototype for its machinery, BAM GmbH is already planning a sink electrode for a sink erosion machine made of pure copper. This will also be printed on the Markforged Metal X system.

99.8 % pure copper with very high thermal and electrical conductivities can now be printed with significant design freedom.

Webinar on demand and free

There is a (german) webinar with Dominik Kraus from BAM GmbH about this report on our website:

▶ <https://www.mark3d.com/de/funktionsprototypen-mit-dem-metall-3d-druck-fertigen/>

„Additive manufacturing means that there are almost no restrictions in the geometric complexity of a component. This is an advantage when it comes to making components lighter and optimizing them for their intended use.

So far, our Markforged 3D printers (Mark Two and Metal X) have been running flawlessly and without malfunction. We feel well looked after by Mark3D and the service is very good,” says Marco Bauer, Managing Director of BAM GmbH.

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