A laser order with potential

toolcraft AG is an innovative company with a flair for trend-setting technologies. As early as 2011, toolcraft invested in a first system for 3D printing in a metal powder bed. The family-owned company based in Georgensgmünd is considered a pioneer in 3D printing and their machine fleet currently includes the following TRUMPF laser systems: five TruPrint 3000, one TruPrint 5000 and a TruPrint 1000 with a green laser. Christoph Hauck, Head of Technology and Sales at toolcraft AG, and Project Manager Laser Metal Deposition Florian Schlund have also been involved in the topic of laser deposition welding (LMD) for years. When a well-known international consumer goods corporation offered a development partnership, the two do not hesitate and agree to collaborate. The aim is to no longer produce a structured functional layer on a highly stressed tool by removing material, but to apply it using LMD. Without having a firm order in hand, Christoph Hauck turns to TRUMPF with a comprehensive specification for a special machine. Based on the TruLaser Cell 3000, the TRUMPF experts build a machine that even impresses experienced users such as Christoph Hauck and Florian Schlund.

toolcraft AG

www.toolcraft.de

toolcraft AG is a medium-sized family company based in Georgensgmünd and was founded in 1989 by Bernd Krebs. toolcraft has made a name for itself internationally with pioneering technologies and the construction of individual turnkey robot solutions. Customers include market leaders from semi-conductor technology, aviation and aerospace, medical technology, the optics industry, as well as the motorsports and automotive sectors. As a partner for complete solutions, the company provides the entire process chain - from the idea to production, right up to the manufacture of qualified precision parts for CNC machining, 3D printing as well as injection molding and mold-making.

INDUSTRY

Manufacturer of precision components along with automation solutions

NUMBER OF EMPLOYEES

Approx. 385

SITE

Georgensgmünd and Spalt (Germany)

TRUMPF PRODUCTS

- TruPrint 1000 Green Edition
- TruPrint 3000
- TruPrint 5000
- TruLaser Cell 3000
- Technology package DepositionLine
- TruMark Station 7000

APPLICATIONS

- 3D printing in metal (Laser Metal Fusion, Laser Metal Deposition)
- laser marking

Challenges

toolcraft works closely with the Institute for Laser Technology (ILT) in Aachen. The reason: as soon as a promising technology emerges from the research laboratory, Christoph Hauck, Chief Technology and Sales Officer at toolcraft AG, is ready to transfer it to everyday production. This was the case with metal 3D printing in 2011, and it was very similar with laser deposition welding (LMD) in 2019. But it was the ILT researchers who made a well-known international consumer goods manufacturer aware of toolcraft's expertise. "The people there are first-rate visionaries," was the recommendation. The customer's application was exactly the kind that Christoph Hauck had hoped for when it came to LMD. A tool with a structured functional layer - created by milling to date - needed to be produced more cost-effectively and sustainably using LMD. The idea: The base body is made from a cost-effective material and the structures are applied using LMD. At the same time, this has the advantage that the tool can be easily repaired if the structures wear out. Although Mr. Hauck does not receive a firm order for this, he still takes the full risk and commissions TRUMPF to design a special machine. The special machine should not only be able to manufacture the tool, but everything to do with the topic of LMD should be possible, from the development of process parameters and material tests to quality and wear measurements.

"We sometimes implement application ideas at our own expense. It can take a while before success comes; you have to tough it out."

CHRISTOPH HAUCK
CHIEF TECHNOLOGY AND SALES OFFICER AT TOOLCRAFT AG

Solutions

The heart of toolcraft's special machine is the TruLaser Cell 3000. TRUMPF developed the 5-axis laser machine as a compact machine for two- and three-dimensional welding and cutting as well as for laser deposition welding. In order to enable the rotationally symmetrical processing of large and heavy components, the special machine is equipped with a rotational unit and feed unit with a six meter long machine bed. It extends through the entire machine and is used for easy loading and unloading. The NC axis positions components securely in the work area. But only an additional rotary axis brings the

necessary speed and dynamics for processing heavy parts. Both rotary axes are equipped with synchronized drives. They can also be pushed together or apart to process parts of different lengths.

The development team docked a so-called option module to one side of the TruLaser Cell 3000. The work area has a 2D cutting support and a flexible fixture interface, which means that the option module can be set up in a modular way. A vertical rotary axis is used for processing components without rotational symmetry. Using a scanner with an interface to the Siemens NX environment at toolcraft, the quality of the LMD weld can be checked and, in the case of older components, the wear and tear of the job can be optically recorded. The integrated "High-speed Laser Metal Deposition (HS-LMD)" technology offers toolcraft the possibility of coating rotationally symmetrical components very quickly and with low layer thicknesses.

Implementation

toolcraft and TRUMPF have been linked by a close partnership for years. For this reason, Christoph Hauck and Florian Schlund are not surprised that the developers from Ditzingen view the extensive specification requirements as a challenge and an opportunity to design something quite extraordinary. "Our contact person at TRUMPF was the key to our success. He was just as passionate about the topic as we were and implemented all our wishes brilliantly," enthuses Christoph Hauck.

Forecast

toolcraft has now received the order from the consumer goods manufacturer. But that's not all: For toolcraft, this is just the beginning. "With hybrid processing, we can now also manufacture large parts," explains Mr. Hauck. "We construct smaller parts in the powder bed and join them together using LMD. We previously did this manually in a ten-hour process. With the TruLaser Cell 3000 we can do it automatically in six hours." There is no shortage of ideas – as the researchers at the ILT said: a visionary mindset is the driving force at toolcraft. Therefore it is not surprising that Christoph Hauck is already thinking about the possibilities that an additional ultra-short-pulse laser would offer. "It's quite possible that the machine will undergo further development," he says with a smile.