CUSTOMER

CNC WÜRFEL

COMPANY INTRODUCTION

The company CNC-Automation is a medium-sized company located in Singen, southern Germany, that offers its customers a personalized all-round service when it comes to manufacturing and process automation and their optimization. They specialize in robot automation.

The company specialises in process and manufacturing automation, with a focus on robotic automation; they offer customers everything they need from A to Z. For example, say a customer has part X that they would like picked, cleaned, polished etc. automatically, we go to them and create a system layout. Then, where required, we can build it, put it into operation and carry out final inspections here in house. And of course, we can also put it into operation at the customer's site, and potentially carry out maintenance on the robots after that.

3D PRINTING ADOPTION

They started using the 3D printer back in 2017. Initially we did a lot with it, to see how it could be used in our own systems as well. They print components that were previously made using a milling cutter or lathe, which meant high costs and long lead times. This means they can be faster and more agile. They also print prototypes to carry out testing for the operation of our systems. In the meantime, our contract printing business has grown steadily. From originally getting one to two orders a month, we now get between 10 and 20. And this trend is continuing, so at the moment they are really focusing on making progress here on the external side of things.

WHY 3D PRINT

“We are able to now to print parts that weren’t possible before. What else could we make? Whatever our resources allow. I'm thinking now ... Well, the things that we've printed, they could also be made using other procedures. It would be more costly, and perhaps only possible in multiple parts, but they could be made. Maybe it would be good to say that some could only be made in multiple parts. And with the printer, we were able to manufacture them as one part.”

WHY MJF

“HP 3D MJF is better and more optimal for our needs, uses a better material, and doesn't require as much maintenance as the Keyence Agilista we had until now”

INDUSTRY SEGMENT: Industrial & Services

INDUSTRY SUB-SEGMENT: CNC Machining

FINAL PART APPLICATION

ROBOT ARM GRIPPER

Their robots generally don't just pick up from one conveyor belt or location, but from many other locations and/or conveyor belts. So they sometimes need several gripping systems on our robots. They achieve this with either a multi-gripper or a changeover station. But in this instance, the customer wanted everything to be done using a single multi-direction gripper. So they now have three pairs of gripping fingers at the front of the robot so that it can grip the items properly. The problem with these parts is: producing a gripper adapter with a milling cutter or lathe is extremely difficult because you need an awful lot of knowledge in this area.

- How can I design this component so that it can also be milled?
- What does the component need to tolerate?
- How does the tubing need to be positioned, and what are the pneumatics like?

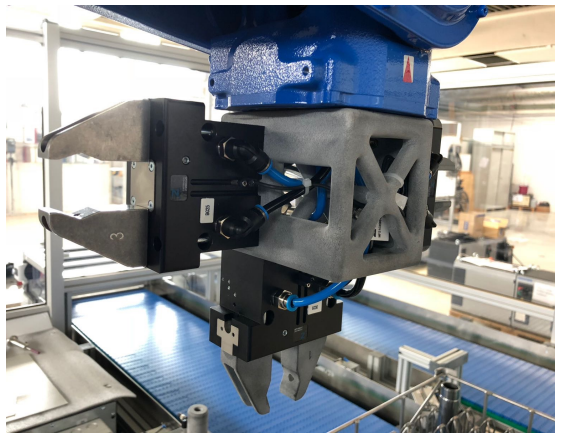
Often, they were only able to position these on the outside of the component or on this gripper adapter. Which means they needed tubing add-ons so that it didn't snap or tear. There were other factors that also came into play. For example, to make the entire process shorter and more straightforward, maybe even make it less complex from a design perspective, they said, 'Okay, let's make this gripper adapter using a 3D printer.' Ultimately it came down to three models, from round to angled. This is then strutted to the final product, which is now used on three of our automation systems. This gripper adapter looks like a strutted box section that has the screw connections, bores for pneumatic connections and blow-off valves in it, and that is so flexibly designed that they almost certainly wouldn't have been able to make it with milling. It simply wouldn't work. They have now designed a simple component in line with their needs and produced it in less than two days.

TIME REDUCTION

The original entire process from design to the finished component used to be at least of 8 to 10 weeks. Using HP 3D Multi Jet Fusion technology, that process has been reduced to only 2 days, what implies a time reduction of aproximately 2 months.

COST SAVINGS

The 3D printed part costs around 200€. Plus design process cost it would be around 1.500 - 2.000€ in total. The original part made with traditional processes used to cost 3 times more. So at the end there is a 66% of cost reduction using HP 3D MJF technology and the other design processes needed to get the final part 3D printed.



TOOLING APPLICATION

MASTER PART REPOSITORY

CIMQUEST
3D Printer Sales and Prototyping Services

866-277-8778
cimquest-inc.com

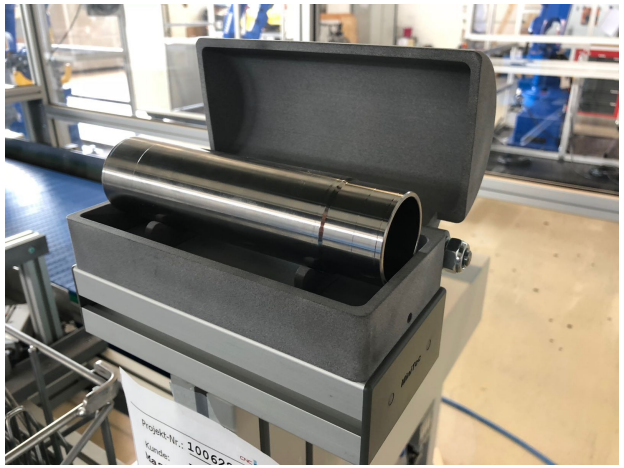
CNC AUTOMATION Würfel GmbH

THE CHALLENGE

Related to the master part: in the automation that they have there, a milling process takes place that is assessed in a follow-up. We are talking about tolerances to the one hundredth that have to be right after milling. So, the issue they had was that there can always be atmospheric factors, temperature variations, movements in the system or the entire plant that can of course lead to a deviation in this tolerance range, which has to be checked during automation. Otherwise they can continue with production all day long and then have to throw away half of what they produced because the tolerances no longer match up once production has ended. So they need to find a way to integrate a master part into the system that can be easily accessed by the customer or that is integrated in the process and carries out the entire inspection. Of course, the issue here is, where do they put this part? The part has to be protected against external influences, both human and weather-related. And how can they do this in a cost-effective way? The first idea was to build a box out of metal, stainless steel, weather resistant, etc. that can house the entire thing. Then they need to bend, trim, weld and somehow assemble the metal box to create a moulded barrier that protects the part inside it. Altogether, with lead times and everything else involved, this would have incurred extremely high costs that the customer wasn't prepared to accept.

THE SOLUTION

Each case would have come to around 4500 euros. There are only three cases, a small order. Everyone's willing to pay a good price for these at the moment. The order books of metal manufacturers, whether they work in turning, milling or are some kind of metal processor, are completely full at the moment. So they started the design for printing, and designed their little case. They already had an idea of what they wanted from their initial discussions. They then simply created a more high-quality visual of the component so they would be able to print it. The component, or the master part case, ultimately consisted of four individual parts: the cover, the base and two brackets to hold it in place.



TIME REDUCTION

The component itself was printed and cooled in three days. They also used a single design space with all three cases. There were just three days in total until the part could be mounted. So, 1 week.
And normally that would have probably taken between 8 and 10 weeks due to the low capacity of the market right now. So the time reduction for this application, is again of aprox. 2 months.

COST SAVINGS

The 3D part cost is between 150 and 250 euros. Just the printed part. Not including the design, because that had already been done. That cost used to be around 4.500€ working with traditional manufacturing processes, so the cost reduction in this case is about a 95%.

WEIGHT REDUCTION

They also cut down on weight. If they had started with the metal box, it would definitely have weighed six to eight kilograms, not including the master part. With the case from the printer, it's maximum two kilos. A weight reduction from 12Kg to 2Kg. it implies a 84% of weight reduction.

UTILIZATION

This application is integrated in their automation system and is part of the automation process. So after X number of units, the robot removes the master part from this case, places it in the testing station, takes the measurements and compares the values with the last set of measured parts. This can also be done manually. There's a manual request on our systems, which theoretically means this test can be carried out at any time.