ELIMINATING HANDLING

Collaborative robots take over manual handling of glass tubes in CNC glass lathe, increase capacity 50%

Family-owned Hofmann Glastechnik faced a challenge in hiring skilled workers for its glass manufacture and wanted to make better use of existing employees' potential by freeing them from repetitive tasks. Looking into automation, the company chose two collaborative robot arms from Universal Robots (UR) to feed highly sensitive glass tubes into a CNC glass lathe. The UR robots stabilized the production process, improved quality and increased capacity by 50 percent.

For more than five decades, the family business Hofmann Glastechnik GmbH has been producing technical glasses for laboratories, the medical field, and industrial appliances. The company is one of the largest industrial glassblowing companies in the German market. With over 20 employees, Hofmann is an experienced specialist in the traditional craft of glassblowing and also a pioneer in the use of modern production technologies. The company produces glass items as both standard components and customer-specific tailor-made products for more than 350 regular customers and is an established supplier for companies such as Philipps and Siemens.

COLLABORATIVE LIGHTWEIGHT ROBOTS ADDRESS SKILLS SHORTAGES

In order to meet market demands, the traditional manufacturer has always focused on continual quality controls as well as a constant optimization of its manufacturing process. Hofmann considered using robots for some time but suspected that automation with traditional industrial robots would be too expensive, too complex and too difficult to implement. As the skills shortage increased, and the family business struggled to fulfill orders, the collaborative lightweight robots from Universal Robots was the chosen solution.

"We were aware of how important it was to make full use of our existing employees' potential – that's when we got the idea of automating repetitive tasks such as the machine tending," explains

Robert Hofmann, Managing Director of Hofmann Glastechnik GmbH. "Using the Universal Robots for this task was ideal."

In contrast to traditional industrial robots, the collaborative robots from Universal Robots can be used right beside human operators without or with just a minimum of safety guarding after a successful risk assessment. This creates new opportunities for automating a wide range of different processes particularly for small and medium-sized businesses such as Hofmann. The company is now one year into its deployment of the two robot arms UR5 and UR10, named by their payload capacity in kilograms. The UR robots are deployed in a machine tending application, automatically feeding highly sensitive glass tubes into a forming machine.

In the course of this procedure, the robots handle a precise pick and place task, picking up the delicate glass components, placing them into a CNC glass lathe, removing them after the further processing and putting them down again.

HUMAN AND ROBOT COMBINED TO INCREASED PRODUCT QUALITY

Glass is a particularly difficult material to shape. Robert Hofmann, who leads the company in its second generation, is well aware of the challenges.

"Glass products are extremely delicate. Even the tiniest fluctuation in temperature of the instruments has an effect on the outcome." The production process must thus be accurate and consistent so that the quality of the glass components remains permanently high. And the temperature of the machines must also be kept as constant as possible. "In the past, our workers tended the glass lathes themselves. Interruptions in the process, even for a short time, meant that the machines cooled down repeatedly," he explains. "The collaborative UR robots delivered excellent results. It was a quantum leap forward. The quality of our glass components has been hugely improved."

The UR robots tend the machines for up to 11 hours each day. As a result, cycle times can be observed with greater accuracy, downtimes are reduced, and the production process has been stabilized, resulting in Hofmann being able to increase its production capacities in the specific application area by 50 percent. Results that meant the two UR robots were able to pay themselves back in just about 6 months.

FLEXIBLE AND INTUITIVE DEPLOYMENT IN THE PRODUCTION

Depending on the application, the UR robots at Hofmann produce between 200 and 400 glass cuvettes every day. If required, the company can flexibly implement the collaborative colleagues at separate glass lathes.

"'Redocking' the robots is very easy. We have developed a facility

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which allows us to switch the UR robots between the different machines with no problems at all," explains Björn Uthe, department manager of the machine park at Hofmann Glastechnik. The robots are immediately ready for operation after the set-up has been changed in this way. Björn Uthe also emphasizes the usability of Universal Robots. "Handling the UR robots is very intuitive. Once you have understood the procedures and functions involved, literally anyone can operate the robots." By using the robot's intuitive touchscreen tablet, movement sequences can easily be defined. When the robot is in the "Freedrive Mode", the user can teach it new tasks by simply moving the robot arm to the desired waypoints.

The flexible robot arms also lighten the work load for the skilled workers at Hofmann, who used to carry out the monotonous and tiring machine tending. Björn Uthe has been working for the company for 15 years. Initially, he was a little skeptical about the collaborative robots but within a short time their value won him over.

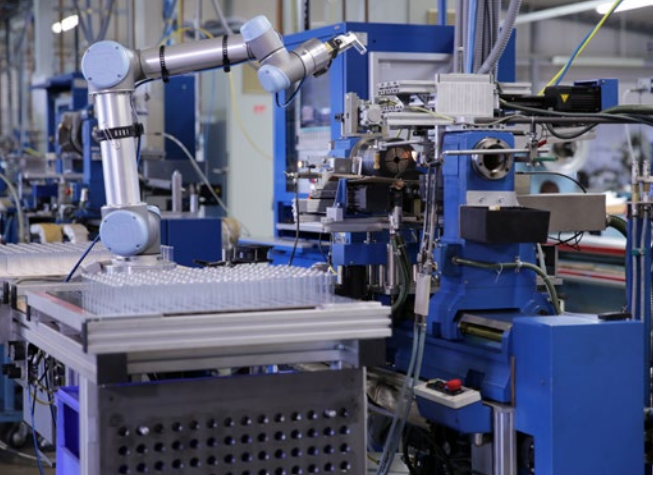
"The UR robots have made our work so much easier. Our employees used to move back and forth between the glass lathes, parallelly feeding them all day long. We could hardly keep up with the production," he says. "With the UR5 and UR10 working with us now, I can spend more time on setting up the machines. And there are always plenty of peripheral logistics tasks to deal with."

The robots allow Hofmann to deploy its skilled workers in more sophisticated and complex jobs, such as making customized glass components by way of traditional methods.

A BLESSING FOR MANUFACTURING

TFollowing the positive evaluation of the automation solution, Hofmann is already working on implementing more robots from Universal Robots with a second UR5 already on order. In a few months, the robot will work at another shaping machine where it will automate an even more complex machine tending task with the aid of two end effectors; a gripper and a suction tool. Robert Hofmann looks forward to the collaborative future.

"The robots from UR are a blessing for every manufacturing company. In the medium-term, we intend to use lightweight robots for all the production processes that can be automated," he says. "At the moment, the robot colleagues are giving our workers just a helping hand. In the future, we want the robots to also help our staff with the manual glass shaping process." IMD



About Universal Robots

Universal Robots was co-founded in 2005 by the company's CTO, Esben Østergaard, who wanted to make robot technology accessible to all by developing small, user-friendly, reasonably priced, flexible industrial robots that are safe to work with. Since the first robot was launched in 2008, the company has experienced considerable growth with the user-friendly robots now sold in more than 50 countries worldwide. The company, which is a part of Teradyne Inc., is headquartered in Odense, Denmark, and has subsidiaries and regional offices in the USA, Spain, Germany, Italy, Czech Republic, China, Singapore, India, Japan, Taiwan and South Korea.

For more information, visit universal-robots.com

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For more information, visit hofmann-glas.com/en/