Perfect manufacturing

Robot cell increases productivity by 30 %

The specialty of *Kern Microtechnik GmbH* in Germany are highly complex and precise parts. To further increase quality and productivity Kern also puts a focus on innovative automation. For example, one robot cell with four Kern machines.

Highest precision has always been an outstanding strength of the Upper Bavarian company Kern Microtechnik. Machining Centers are being developed at Kern in Eschenlohe and are then being tested in Kern's own manufacturing shop in Murnau. Meanwhile, the machining centers are a solid basis for Kern's machine shop.

Besides innovative machines plant manager *Sebastian Wühr* names more decisive factors. "Our staff is very well trained and very enthusiastic about the perfect solution for every challenge. Together with our customers they define the best possible manufacturing strategy. It is possible for us to already analyze the process even when it is still on a prototype status. This way we save a lot of time and it is easy to integrate the process into serial manufacturing."

A well-known challenge: there are never enough qualified employees. While discussing future strategies the idea came up to increase automation and have one robot working with four machines. *Patrick Ginzel,* head of technological management, became responsible for this project. He explains: "We decided to look for new ideas and also integrated external sources to come up with a great solution for our automation."

Process control system manages complex production cycles

The task of the robot cell is to manufacture demanding parts with accuracies in µm- and surfaces in the nanometer range around the clock. No staff is needed for night- or weekend shifts, the work piece infeed takes place with a pallet system. The complex control of the manufacturing cell is done by the process control system "WorkShopManager". The robot is an articulated robot with an extension length of more than three meters (9 feet). "Since the robot has to work with four manufacturing centers - two Kern Micros and two Kern Evos - the extension is relevant", says Ginzel and adds "Furthermore, there are two rotary magazines in use which supply 250 pallet pockets. This is where the pallets - marked with RFID chips - and the clamped parts are stored, ready to go! "

Patrick Ginzel, Head of technological management and Sebastian Wühr, plant manager at Kern Microtechnik, are convinced of their robot cell; with the robot cell it was possible to gain a double-digit increase in productivity compared to four stand-alone machining centers

Machining centers with operating times of more than 94 %

All four machining centers are always prepared for different workpieces. This means that a corresponding number of CNC programs and their manufacturing data are stored in the WSM, several tool sets are set up and blanks are stored in the rotary magazine for all the workpieces. As a result, even a broken tool does not slow down the system.

Kern Microtechnik integrated a robot cell in their shop; each of the four machining centers has a utilized capacity of 94 %

The complex control of the cell is done by the process control system "WorkShopManager"; among others, the system runs an articulated robot which loads and unloads four machining centers

If the worst comes to the worst, the PLS detects the problem and immediately switches to the second workpiece on the affected machine.

This becomes important when staff is not around. Of course, the machines recognize the tool failure also without the WorkShopManager. However, they stop the process until the failure is being resolved, usually by human beings. Work hours of these four machines are over 90 hours per workday with this new digitalized strategy. In theory, 96 hours are possible. So, with 90 hours, the machining center is over 94 % utilized capacity.

Another advantage is, as Sebatian Wühr explains, that he needs less employees for the reliable operation of this robot cell: "Usually we need one qualified staff member for the operation of each of our machines. Since it is challenging at the moment to find more highly qualified team members, this situation has improved with the robot cell." Patrick Ginzel confirms: "It is easy to work with the PLS and the touch screen. One qualified team member with the support of one or two team members in training can easily operate the robot cell."

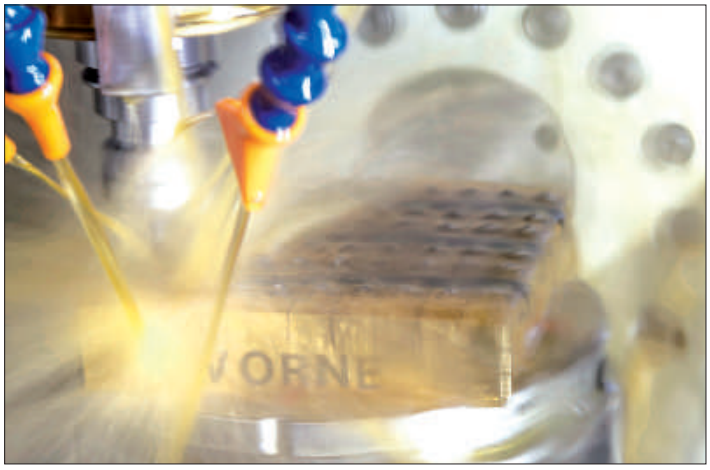
How to save precious capacities of a highly skilled workforce

The qualified technician is responsible for complex tasks like setting up new products analyzing tool life. In addition, he eliminates any malfunctions, optimizes the process and organizes the cycles. His or her colleagues support the process with blanks, change the tools when their lifetime - according to PLS - is coming to an end measure the parts with the help of a quality control chart and bring the finished parts to the cleaning station.

Kern Microtechnik GmbH

Kern Microtechnik GmbH, Eschenlohe, Bavaria, employs 200 people and operates successfully in more than thirty countries worldwide. The focus is on two business areas: the development and manufacturing of high-precision machining centers and the contract manufacturing of milled parts in the micro and nano range.
Milling centers from Kern are used in Kern's contract manufacturing series production. This enables Kern to not only manufacture high-precision machines, but also to support their customers with the necessary process know-how. Customers become technology partners and are a part of the *"Kern family"*. Advice for ideal operation and process integration are always included - from an idea to the finished part.
This enables Kern customers to increase their profit and competitiveness.
The product portfolio of contract manufacturing includes prototype, single part and series production as well as mounting assemblies and support in the construction phase. The parts are machined by milling, drilling, eroding and grinding.

With a touch screen the WorkShopManager makes working with the robot cell easy; one qualified technician and one or two assistants are enough to run the robot cell and the four machining centers



Four highly precise machining centers - two Kern Micros and two Kern Evos - are integrated in the Kern robot cell; they produce very demanding parts with accuracies in the µm- and surfaces in the nanometer range 24/7

What was to be expected by both engineers Patrick Ginzel and Sebastian Wühr became true. The investment in a robot cell pays off. The nonproductive times decreased tremendously and a double-digit increase in productivity are the result. Ginzel explains: "With these measurements we even exceeded our goal of 25 %."

The technology manager thinks ahead and sees additional potential which he would like to use. Ginzel explains: "Working with correct tool- and cutting-data is very important and is one of our core competences. There is a lot of our know-how in this robot cell. As a result, we get a lot of feedback about the tools, especially about tool life and stability." This information will go back into the system and this way it is possible to organize the tool management for every single order even better. Ginzel is certain: "This will bring another boost of productivity into the system."

further information: ***www.kern-microtechnik.com***