**Closely analysing processes and involving employees early on**

**Incorporating cobots   
into industrial assembly processes**

**Collaborative robots (cobots) are growing in popularity. Working closely with their human colleagues, they can be used in a variety of industrial applications. Cobots are intended to enhance the work experience by helping out staff where appropriate. item and its Cobra20 solution at the Piepersberg storage and production centre in Solingen show how it’s done.**

Cobots have a whole host of benefits. Versatile and flexible, they can quickly adapt to different work requirements. Collaborative robots don’t take up much space either. Unlike traditional industrial robots, they can work alongside staff and don’t need to be cordoned off by guards or similar structures. Made of steel, designed to resemble an arm and primarily taking over monotonous, energy-sapping work, they are highly effective in easing the strain on their human colleagues. The question remains of how best to integrate a cobot into existing processes and convince staff that using it makes sense, without causing them to fear for their jobs. Having introduced a cobot in its own assembly area and small-parts warehouse, item is well placed to explain how a project of this kind can be implemented.

**Making assembly processes leaner**

“The lean concept is firmly established at our company,” says Przemyslaw Krzysztyniak, a project and innovation manager at item. “Besides our products, it’s also applied to work and production processes at the company,” he adds. As part of the continuous improvement process, item took the decision to make its [assembly processes](https://blog.item24.com/en/robotics-applications/robotics-applications-assembly-and-sorting/) leaner and partially automate them at the lowest cost possible. The focus was on small parts assembly, an area where manual operations predominate. So how exactly did item approach this task? It started by testing and analysing machining, picking and assembly processes in-house. This involved forming a dedicated team to examine the entire process chain, the individual products and the systems being used. Once it had looked at what was available on the market and considered the best way of optimising selected processes, item opted for a lightweight robot from Universal Robots. The new solution was primarily intended for the production of small batch sizes, so the team selected as its project the manual assembly of a roller made up of several [components](https://de.item24.com/en/theme-world/robotics-applications/). These components needed to be fitted together one by one – extremely energy-sapping and monotonous work. The aim was to optimise this process and use the cobot to ease the strain on staff. item was able to utilise its own products when implementing the project. Thanks to the modular building kit principle, it was easy to integrate the lightweight robot into the existing working environment, which included item products such as ergonomic work benches and material supply trolleys. In a subsequent step, item attached a workpiece carrier system in a separate functional cell.

**Tasks assigned to the cobot**

Previously, the individual roller components were unpacked, placed in a number of trays and then joined together in a pneumatic assembly device to assemble the roller, but the cobot now does a large part of this work. Staff simply fill several magazines with the individual parts. The cobot takes the necessary components and inserts them into the assembly device. The actual assembly process is automated. Next, the robot arranges the finished products in the workpiece carrier. Three different rollers can be produced in this way. The collaboration in this process is sporadic, with the robot doing 90 percent of the work and its human colleague the remaining 10 percent. While the cobot is working away, the employee can get on with other tasks. Since the number of rollers in the magazines before work starts should be the same as the number in the workpiece carrier afterwards, a simple visual check immediately indicates whether the entire process has been completed properly without any errors.

**Reduced workload for staff and greener production**

Using the cobot has reduced the workload for staff by 90 percent, because their only input now is to top up supplies and refill the magazines. The time gained can be used for other value-adding work. “Before the cobot was introduced, an employee had to operate the press manually up to 700 times each day, which caused physical discomfort after a certain amount of time,” says Nasim Mahek, a control station operator from the small parts assembly team. “This work is now far more ergonomic and conducive to good health,” he adds. Another benefit is that item saves on packaging material, because the finished rollers are stored together on the workpiece carrier. Before the cobot was introduced, a specific number would be packed in boxes. The cobot now also takes care of counting – once a predefined number of rollers have been assembled and the workpiece carrier is full, it signals this using an optical aid. The full workpiece carriers are stacked in a crate, covered and placed in storage in the automated small-parts warehouse. This eliminates a number of steps and makes production more sustainable.

**Direct staff participation creates acceptance**

Getting staff from across the various departments involved early on is vitally important if the introduction of cobots is to be a success. At item, their wishes and ideas were taken on board, results were made transparent and employees were kept up to date on project developments. “Full transparency from the outset and during implementation is an absolute must if you want to gain acceptance rather than face rejection. After all, the application works for staff, not against them,” emphasises Krzysztyniak. The fitters still have an important role to play – the semi-automated process won’t work without them. Staff use the cobot just like any normal tool or resource and set their own pace. Since the aim is for a large number of staff to be able to operate the cobot independently, item considers easy, intuitive operation to be vitally important. “The introduction of the new technology completely wowed everyone. We created a better working atmosphere and the cobot became part of the team,” comments Mahek. Incorporating the small, compact unit into an environment consisting of item components that was already familiar to staff played a big part in ensuring it was accepted and any reservations disappeared. The cobot has become a permanent feature that is valued by the workforce, and they have even given it a name. Drawing inspiration from its snake-like movements and the year the project was implemented, they came up with “Cobra20”.

**Considering numerous factors**

“The cobot and its robot technology are part of a whole. Employees, the equipment used and – naturally – economic aspects also have a big impact on successful integration,” says Krzysztyniak. It’s therefore essential that Cobra20 can be used for several production operations rather than just one single process. After a brief setup period, the robot should be able to execute screw applications and therefore manufacture components from three different product groups. It goes without saying that safety aspects also play a major role when introducing robots. Machinery Directive 2006/42/EC needs to be taken into consideration, along with various standards and technical specifications such as ISO/TS 15066. In addition to this, only certified components should be used. To ensure optimum staff protection, item integrates the cobot into the working environment in a way that virtually rules out any accidental contact with people. Virtual guards provide additional safety. If the robot arm moves outside this predefined workspace, the movement is automatically braked. Another influencing factor when it comes to the success of such a project is working with reliable partners that supply the necessary components, such as perfectly coordinated grippers. The gripper supplied by Zimmer, for instance, has the flexibility to be programmed for a number of tasks. “Our aim is to use Cobra20 at various work benches for a variety of production operations involving different staff. Rather than being permanently installed, the system is designed as a flexible solution that can be docked onto the relevant work benches as required,” explains Krzysztyniak. The device can be combined with various functional cells based on the tried-and-tested building kit principle, thereby making it quick and easy to turn manual assembly work benches into (semi-)automated assembly lines.

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**Caption 1:** To relieve the strain on staff in the small parts assembly team,

item opted to use the “Cobra20” cobot.

**Caption 2:** When producing the item roller, the collaborative robot takes the necessary components and inserts them into the assembly device.

**Caption 3:** The early involvement of staff is a vital success factor when it comes to introducing cobots at a company. item employees in various departments took part in the process from the outset, contributing ideas and expressing their wishes.

**Caption 4:** To ensure as many employees as possible can use the cobot independently, item considers easy, intuitive operation to be vitally important. “The introduction of the new technology completely wowed everyone,” says Nasim Mahek, a control station operator from the small parts assembly team.

**Caption 5:** After assembly, the robot arranges the finished products in the workpiece carrier. While the cobot is working away, its human colleague can get on with other tasks.

**About item**

item Industrietechnik GmbH is the pioneer in building kit systems for industrial applications and a partner of the manufacturing industry across the entire globe. Today, the item product portfolio comprises more than 4,000 high-quality components designed for use in machine bases, work benches, automation solutions and lean production applications. The company has received a string of awards for products with ground-breaking industrial design and end-to-end ergonomics.

item is spearheading digital engineering by driving forward the digitalisation of processes with software tools developed in-house. The item Academy offers training at various levels, with on-demand training and online courses available in multiple languages.

Headquartered in Solingen, Germany, item has subsidiaries in various countries. Some 900 employees worldwide harness their know-how and passion to develop innovative solutions and services. Twelve sites make sure the company is always close to customers in Germany, with a global logistics chain ensuring swift delivery times for all components.

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