Case Study: SKF – Lüchow Plant

# SKF Revolutionizes Production

## SFK is setting new industry standards with 29 robot cells from rbc robotics and a new manufacturing concept

**SKF is outperforming its production targets thanks to the innovative "Customization through Modularization" concept. The expansion, which was implemented with the automation technology from rbc robotics, boasts maximum performance on a small footprint. This flexible and future-proof solution not only meets the strict quality standards of end customers, but it also sets new industry standards.**

SKF in Lüchow is an outstanding example of innovation and efficiency in modern manufacturing technology. As a company of the globally active SKF Group, which specializes in the development, production, and sales of rolling bearings and seals, the Lüchow location stands out due to its advanced production processes and the implementation of forward-looking technologies.

The success of SKF in Lüchow is based on a combination of technological expertise, continuous innovation, and a commitment to quality standards, which renders this location a role model in the industry and a key player within the SKF Group.

### The challenge

The objective of the project was to increase the degree of automation on existing production lines, in which the automated feeding and packaging of the finished rings was identified as a key area in which efficiency could be improved.

Standardized 600 x 800 mm bins on floor rollers were used to feed and package the rings. The random storage of the rings in the bins required an efficient bin picking solution. Particular emphasis was placed on minimizing the number of components left behind in the bin, paired with a high infeed rate and aiming for a picking rate of less than 10 seconds per component in order to continuously supply the grinding lines.

Simple loading and unloading of the cells was decisive in order to relieve the burden on the operating staff and enable them to focus on core tasks. The finished rings were packed in the same bins with intermediate layers for careful storage and preparation for transport. It was important to

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*Simple loading and unloading processes and an efficient logistics concept ensure maximum productivity.*

maximize the bin volume used.

A particular challenge was the spatial limitation, because only 2 x 2 meters of surface area was available for each cell. The solution also had to accommodate a wide range of ring geometries and dimensions and enable the straightforward conversion of production lines, ideally with minimal or no setup parts. The cells also had to be integrated into the existing line quickly and without disrupting ongoing production.

It became obvious that a modular solution was needed in order to implement the project within the specified time and budget and to make the planning phase as efficient as possible.

## The solution

The innovative and modular design concept led to the development of two cell types after the construction phase. The core element in both variants was an industrial robot with a 10 kg payload class on an integrated seventh linear axis. This axis significantly expands the robot's working range and offers numerous advantages.

Each cell is equipped with two bins from which the robot can continuously remove material, which optimizes the robot's paths and maximizes the production output. The cell control (S7 1500) and the robot controller are permanently integrated into the cell and are operated via a 15" touch panel. An intuitive user interface with numerous graphics and illustrations streamlines control. A connection to the production control system is also provided.

The base module measuring 1,750 mm x 2,000 mm and with a height of 2,100 mm is available in the FX series from rbc robotics as FXb 800 3D.

For packaging at the end of the production line where the rings are packed in the same bins but with intermediate layers, an additional bin space is added to the base cell for the intermediate layers. This extends the cell by just 650 mm while maintaining the same basic dimensions.

A key element is the recognition system, i.e., the "eye" of the cell, which plays a crucial role in bin picking, as it enables safe detection and collision-free removal of the components. The component gripper, which is mounted right on the robot arm, facilitates fast and safe removal. For components weighing up to 3.5 kg and with an emptying rate of up to 100%, the FXb 800 3D achieves a picking rate of over six components per minute. It works reliably around the clock at SKF.

The rings are packaged layer by layer by the robot, with the intermediate layers being inserted automatically. The placement pattern is generated depending on the type,

*An agile robot empties bins and keeps the production lines running smoothly.*

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without requiring manual programming of the robot. The ring dimensions are entered and the setting pattern is automatically calculated and sent to the robot.

## The result

The automatic feeding and packaging solution has led to significant improvements in manufacturing. This system enables the continuous supply and packaging of components, which eliminates downtime caused by material shortages or missing finished part bins. The closed design of the cells has also noticeably reduced noise.

Another important advantage is the reduced strain on employees. The line support and component packaging requires less personnel. The automation allows the employees to focus almost entirely on quality assurance and manufacturing, as all monotonous tasks are handled by the automation. Collisions and damage to the sensitive, high-precision surfaces are avoided when palletizing the rings.

At less than 10 minutes per type, the changeover times for the automation cells are remarkably short. New types can be prepared offline and seamlessly integrated into ongoing production.
All cells are also connected to the higher-level Manufacturing Execution System (MES) and allow online monitoring. Potential deviations can be detected and analyzed in real time, thus ensuring a consistently high production output.

The cooperation between SKF and rbc robotics is a prime example of how to collaborate effectively in automation technology. Characterized by excellent communication and shared objectives, the project with 29 robot cells significantly improved the production technology and efficiency. Challenges such as tight schedules and modular concepts were successfully overcome together. The technological expertise of rbc robotics and the commitment of both partners pave the way for a promising future.


*Image on left: The closed cells integrate perfectly into production and significantly reduce noise.*
*Image on right: Ready for new challenges. Kilian Schmidt (SKF) and Helge Koopmann (SKF) together with sales manager Dirk Hablick from rbc robotics.*

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## Interview with Helge Koopmann from SKF

*Helge Koopmann / Project Manager and Process Engineer SKF*

**1. How would you describe the current collaboration between SKF and rbc robotics?**

**Mr. Koopmann:** The collaboration is built upon good communication, a shared goal, and trusting cooperation.

**2. What are the most important aspects when selecting a cooperation partner?**

**Mr. Koopmann:** Honest and trusting communication at eye level. Trust in the implementation of a technical solution.

**3. What were the challenges in collaborating with rbc robotics and how were they overcome?**

**Mr. Koopmann:** One of the challenges was the ambitious time table of the project. Between the award of the contract in January to the delivery of the first machine in July we only had six months.

For successive supplies and the corresponding installation of the robot cells, rbc robotics also met the agreed delivery dates, so that we were able to integrate a new robot cell into production on average every 2–3 weeks.

Another challenge was the modular design of the robot cell, which had many advantages for both rbc robotics as well as for SKF. From SKF's perspective, for example, the cell could be commissioned quickly. I fondly remember a best-case scenario in which we managed to have a robot cell delivered by truck on a Friday morning and it was already fully available for production the following Sunday at the start of the night shift at 10 p.m.

**4. How does SKF benefit from rbc robotics' technological expertise?**

**Mr. Koopmann:** The implementation of the aforementioned project involved the use of bin picking, a new technology on the market, and the associated challenges. We were fully satisfied with rbc robotics' professional approach to benchmarking and the subsequent selection, as well as the transparency of the results provided to SKF.

**5. What lies ahead for the collaboration between SKF and rbc robotics? Are there any projects planned for implementation in the near future?**

**Mr. Koopmann:** As far as SKF is concerned, nothing stands in the way of a future collaboration with rbc robotics. We have already discussed additional automation involving five robot cells in the heat treatment area.

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