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Nighttime in the small-parts store

When the last staff member has closed the doors and the lights go out between 7 p.m. and 7:30 p.m., equipment and bins begin to move as if by magic in the logistics center for spare and consumable parts at TRUMPF in Ditzingen. It's now the time for some tidying up. Fully automatically The nighttime reorganization takes until dawn. At 6:30 a.m., when staff arrive at the store for the early morning shift, order reigns again on the racks of the automated small parts store.

More than 35,000 different items are located in the 13,000 square meter, 20 meter high main store on Trumpfstrasse. Inventory value: over 66 million euros. Stored here are large items such as power amplifiers, i.e. amplifiers for laser pulses, or slat-band conveyors, which are used to dispose of swarf or scrap metal, some weighing up to three tons, as well as tiny screws, only a few millimeters in size. Around 3,500 removals – known as picks – are made on average every day, and on some days as many as 4,000 to 4,300. TRUMPF delivers around 75 percent of these to German and European customers. The heart of the logistics center, however, is the small parts store. Small, frequently required parts such as nozzles, lenses and filters are stored here in high racks with more than 32,000 bin locations. These are taken to the pickers via conveyor belts. But how do they get there? This is undertaken by particularly hardworking mechanical helpers: pallet lifts. These travel up and down the high racks extracting blue, 40 x 60 centimeter bins with up to four insert boxes containing the small parts.

Keeping order is important: prior to picking, pallet lifts place the blue bins containing the small parts on conveyor belts.

An IT system that knows almost everything

Despite the hard work performed by the pallet lifts, there is a conflict of objectives: achieving quick, maximum output, on the one hand, and optimal travel, on the other. "As a result, a bin can sometimes end up in a less than optimal location on its return," reports Philipp Marschand, head of the warehouse control center and quality assurance in TRUMPF's international

spare parts logistics. How does this happen? "When returning a bin, the system selects a free space near the next retrieval point to enable quick processing, even if that space is not ideal." This still makes sense, because the goal during the day is to supply pickers as quickly as possible. A bin with a rarely needed part, for example, might not then be taken back to its original place at the top back, but instead stored relatively far away at the bottom front, where a container with a fast-moving part has just been removed. Philipp Marschand: "This saves on long travel distances at peak load times and allows us to work as efficiently as possible in the store."

One consequence is that the store can easily become a little disorganized during the day. Philipp Marschand compares the small-parts store to a children's bedroom that parents would prefer to be tidy. Each "toy" in the store should be placed in its proper place. This takes place by automatic reorganization. Philipp Marschand: "The clever feature is that our IT system detects when there is little or no activity in the small-parts store: at night, on weekends, during lunch breaks. It's then time to tidy up with an automatic electronic signal triggering an optimization run without the need for manual intervention. The pallet lifts then start moving and take the bins to new, better places: parts needed frequently go to the bottom front, and those rarely needed go to the top back." So the system knows which parts are needed more often, and which less often. It doesn't end there because the system can also react flexibly to problems. If it detects minor errors, such as a bin whose contents it cannot assign, it does not stop, but skips this point and works through the next tasks.

Each part has a specific location within the store to make cumbersome searching unnecessary.

Innovative storage solutions – a system enabling an average of 3,500 picks per day.

Speaking proudly about the small-parts store's performance, Philipp Marschand, head of warehouse control and quality assurance in TRUMPF's international spare parts logistics, says: "Customer orders are processed more reliably and more quickly."

The first few meters on route to the customer: plastic bins contain up to four insert boxes for small parts.

Four years of preparation have paid off

"When the store is particularly disorganized, up to 2,500 actions are needed per night to restore order and thus ensure quick and secure operation," as Philipp Marschand explains. TRUMPF benefits from the automatic tidying but also customers too: "It makes us even more efficient so that we can then process customer orders even more reliably and quickly."

Introduction of an automatic reorganization system by a TRUMPF IT team and an external service provider did not happen at the snap of the fingers: four years of experience went into the project. The experts have been fine-tuning, eliminating initial bugs and constantly updating functions. "To keep a system like this running smoothly without human intervention, programming must be fault-tolerant," emphasizes Philipp Marschand. The effort put into development has been worthwhile. The "children's bedroom" in TRUMPF's logistics center for spare parts in Ditzingen gets tidied up every night, so that in the morning order reigns again.

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