

AI-BASED PICK AND
PACK AUTOMATION:
**HOW SIEMENS AND
STOROPACK ARE
REDEFINING PACKAGING
LOGISTICS**

CHALLENGE

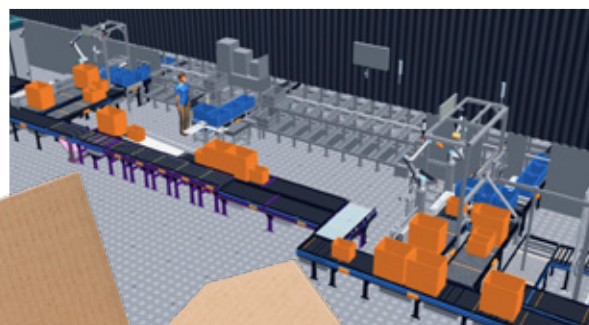
VARIETY OF VARIANTS, LACK OF SPACE, AND HIGH THROUGHPUT

Hundreds of individual shipments leave the Siemens Electronics Factory in Erlangen every day. Each shipment combines different components and sizes as well as different packaging options. Is it even economically feasible to automate such a process, especially when space is limited? "Many would have said it couldn't be done. But we are tackling such challenges," explains Daniel Benke, Project Manager for Innovative Logistics at Siemens in Erlangen.



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DANIEL BENKE,
PROJECT MANAGER FOR
INNOVATIVE LOGISTICS AT
SIEMENS



SOLUTION

A FULLY INTEGRATED PICK- AND-PACK LINE WITH AI

The new line integrates seamlessly into the automated logistics environment. Only at second glance does one realize that packages are processed here, ready for shipment with virtually no manual labor. Both business partners contributed important key competencies to this solution:

MATERIAL FLOW & CARTON PROVISION

- ▶ Driverless and automated transport vehicles deliver products to the pick-and-pack line.
- ▶ The AUTO.ERECT carton erector from Storopack prepares the shipping cartons.

AI-SUPPORTED BIN PICKING

- ▶ Siemens uses its own AI solutions for bin picking and placing product cartons into shipping cartons.
- ▶ The robots are integrated into the automation system via the SIMATIC Robot Library; data processing runs on SIMATIC IPC.

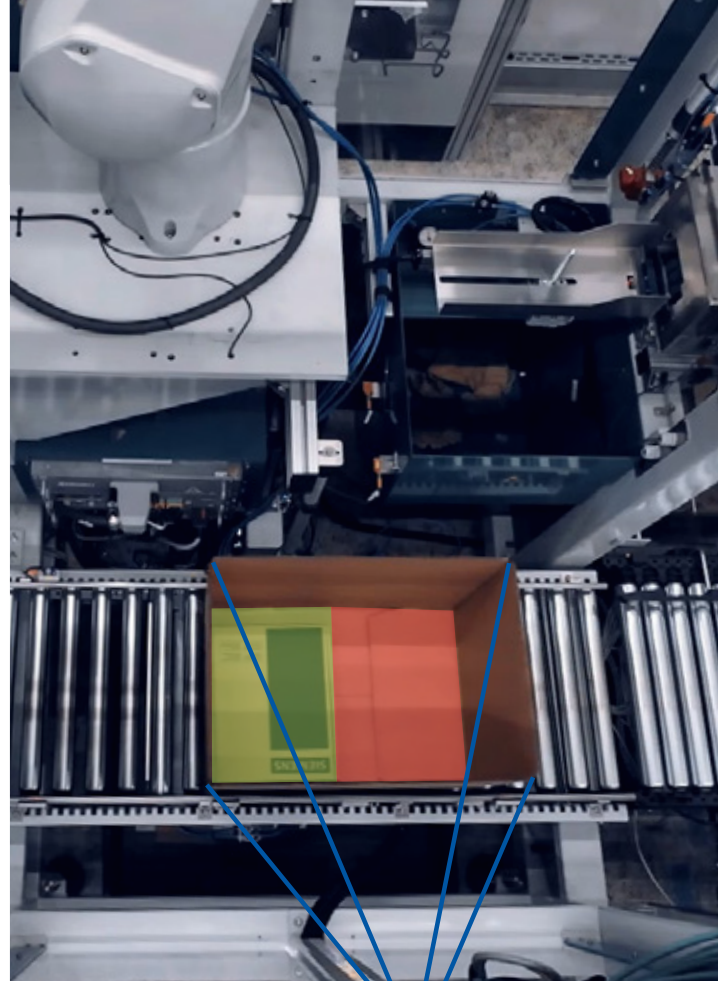
PROTECTIVE PADDING AND CARTON SIZE OPTIMIZATION WITH AUTO.PROTECT AND AUTO.MINIMIZE

- ▶ Storopack's AI was already pre-trained and could be integrated quickly.
- ▶ This AI detects empty spaces in shipping boxes.
- ▶ A robot precisely fills these gaps with protective padding – similar to an experienced employee.
- ▶ The boxes are cut to size and sealed automatically.

What makes it special is that artificial intelligence is at work in a total of four places, ensuring that the boxes are packed compactly and securely—without any human intervention. The AI mimics how a human would solve this task: an AI “sees” into the box with a camera, “recognizes” where each product package can be placed, and a robot inserts the product boxes accordingly. Another AI uses a camera to detect where the gaps are in the box, and another robot then pads the box with protective material.

WHY AI IS A GAME CHANGER HERE

“In fact, it would have been practically impossible to automate this process to such an extent using traditional algorithms,” explains Saber Mazeni, Packaging Logistics Manager EU at packaging specialist Storopack: “Block-and-brace, i.e., the targeted filling of voids in shipping cartons, is anything but trivial. The system must reliably detect where gaps are and place the protective material so that it really fits. And that only works if it takes a large number of parameters into account at the same time: different sizes, shapes, surfaces, and colors of the products. This would be almost impossible to manage with conventional programming. Machine learning, on the other hand, can recognize precisely such complex patterns and learn packing strategies, thereby making this step truly automatable. Machine learning is a real game changer here.”



The system reliably detects where gaps are and places the protective material so that it really fits.



MACHINE LEARNING AS THE ANSWER TO CURRENT CHALLENGES

AI opens up new opportunities not only for Storopack, Saber Mazeni continues: “The availability and reliability of employees who perform such relatively monotonous and simple tasks is a recurring topic in customer discussions. Our AUTO.PROTECT module is capable of automatically handling the majority of a typical e-commerce shipper's portfolio.” To this end, Storopack developed AI that can independently find and automatically implement packing strategies for protective and shipping packaging.

THE RIGHT COMBINATION OF LOGISTICS KNOW-HOW AND PACKAGING EXPERTISE

Storopack's AUTO.PROTECT solution is only one part of a highly automated process: Siemens uses its own AI solutions for bin picking and placing the products in the cartons. However, Siemens was looking for partners for the challenging task of block and brace, recalls Daniel Benke: “We drew up a list of our requirements, approached Storopack at a trade fair, and they showed us a system solution that could do practically everything we needed: flexible format changes and format-specific packaging. It was clear to us that this was the right partner.”



Void Fill & Block-and-Brace

SIMULATION & INTEGRATION VIA DIGITAL TWIN

Before the physical line was set up and integrated into the environment, the process was set up and simulated using a digital twin, in order to ensure a smooth material flow. Daniel Benke explains: “This verification of design and function on the model is a must at the Siemens appliance factory in Erlangen. To do this, the CAD model of the Storopack systems was integrated into the 3D planning. From material flow to kinematics and collision detection in the robots, we can test everything in the model.” The digital twin was also used to generate training data for the AI models. “We use this data internally to train our own AI algorithms,” explains Daniel Benke. Storopack had already done preliminary work for the project with Siemens in this regard and had pre-trained an AI for block-and-brace. The vision system had also been pre-qualified to recognize different topographies and surfaces. “This enabled us to implement a productive solution very quickly,” says Saber Mazeni.

 Watch the video:
Here's how Siemens is successfully using the solution.
www.storopack.com/siemens-video

RESULT
SMOOTH COMMISSIONING
OF A PRODUCTIVE AND
COORDINATED SYSTEM

Despite the high requirements, the integration of the AUTO.PROTECT system into the existing line at the Siemens plant in Erlangen went smoothly thanks to this good preparatory work: “With just a few adjustments, we were able to pad the cartons, and Siemens was very quickly able to select and adjust presets for formats,” says Saber Mazeni. This allowed the project team to focus specifically on optimizing the process, such as the position of the robot or improvements in process times.

Saber Mazeni is proud of what Storopack and Siemens have achieved together:

“The result is really excellent, especially in the context of the system solution: We set up cartons automatically, the products are delivered automatically and placed in the cartons, and at the end, our AUTO.PROTECT ensures that everything is protected and compact for shipping.”

SABER MAZENI
PACKAGING LOGISTICS MANAGER EU
AT STOROPACK



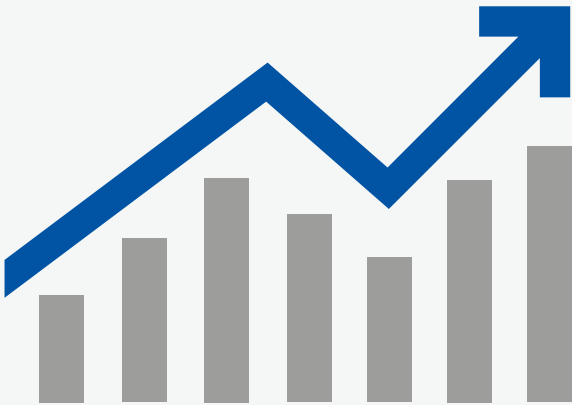
And what does Siemens say?

“With this line, we are demonstrating that AI not only works in automation, but also makes economic sense.”

DANIEL BENKE,
PROJECT MANAGER FOR
INNOVATIVE LOGISTICS AT SIEMENS

And he can back up this conclusion: “We have increased our productivity by 125%. The automated material flow reduces the workload for logistics teams, eliminates manual processes, increases flexibility, and allows us to make better use of all resources. We have automated the process in the same area where we used to work manually, but we now have 25% more output. We use paper for packaging, which saves on packaging volume and therefore space in the truck. This not only saves costs, but also around 25% in CO₂ emissions.”

The Siemens Storopack solution demonstrates that AI in logistics can make complex packaging processes economically automatable, scalable, and sustainable. The combination of vision systems, machine learning, robotics, digital twins, and AUTO.PROTECT opens up new possibilities for companies in terms of output, efficiency, and environmental performance on existing packaging automation space. This successful customer project is therefore a blueprint for the packaging logistics of tomorrow.

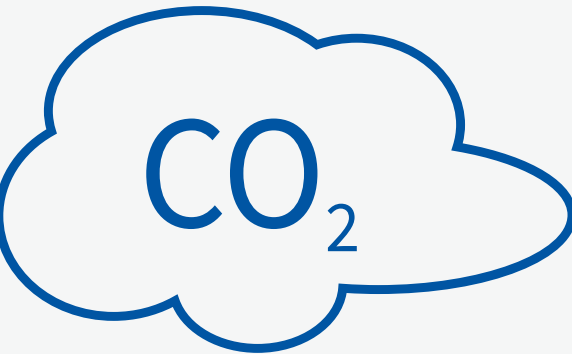


+ 125% PRODUCTIVITY

- ▶ EFFICIENT AUTOMATIC MATERIAL TRANSPORT
- ▶ AUTOMATIC BIN PICKING AND PACKAGING

+ 25% CAPACITY

- ▶ AUTOMATION WITHOUT REQUIRING ADDITIONAL SPACE
- ▶ PARALLELIZED PROCESSES
- ▶ ROBOT-BASED PROCESSES



- 25% CO₂ FOOTPRINT

- ▶ PAPER PACKAGING AND CARDBOARD BOXES INSTEAD OF PLASTIC
- ▶ VOLUME-REDUCED SHIPPING CARTONS REDUCE THE SPACE REQUIRED IN TRUCKS





If you would like to obtain additional information or speak to us directly, please feel free to get in touch with us. At Storopack we are happy to help.

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