

Case Study: Creating a Customized Solution for Produce Palletizing

Application: Palletizing

Robot Model: CP180L high-speed palletizing robot

OVERVIEW

When ever-increasing production goals are met with high labor and shipping costs, robots can help manufacturers improve their bottom line. In the case of Cecelia Farms, automating their palletizing operations with Kawasaki has helped the produce company increase throughput while avoiding labor costs.

Caxton-Mark, a robotic integrator out of Leamington, Ontario, coordinated the install of a CP180L robot to palletize cardboard boxes of produce in a fully automated end-of-line system. They took factors such as increased pallet heights and ergonomic concerns into consideration as they created a completely custom solution for the large-scale farm.

CHALLENGES

- Stack pallets up to 20 boxes high (120 boxes total per pallet) while staying balanced
- Eliminate ergonomic concerns for operators incurred by tall pallet heights
- Create a custom end-of-arm tool (EOAT) that handles boxes without damaging fragile product
- Maintain production speed of 6 pallets/hour

In order to keep shipping costs as low as possible, Cecelia Farms needed to fill their trucks from floor to ceiling, which means extended pallet heights were a must. This height requirement posed an ergonomic challenge for their employees, who found it challenging to lift the 25-lb. boxes of produce that high. Additionally, Cecelia Farms needed a high-speed robot that would be able to consistently meet their goal of loading 6 pallets/hour, without crushing the product.

Designing the Right End-of-Arm Tool

The Cecelia Farms project posed several challenges for their integrator, Caxton-Mark. Once the boxes were stacked onto the pallet 20-high, the pallet needed to be able to stay upright it moved down a conveyor 12 ft to the forklift. To accomplish this task, there needed to be as little space as possible between the boxes so they could stay balanced on the pallet. Caxton-Mark needed to design an EOAT that could pick up one or two boxes at a time and stack them extremely close together while maintaining high product quality and throughput.



The custom tool designed by Caxton-Mark allows for damage-free loading of product



This pedestal-mounted Kawasaki CP180L was able to maintain production speeds while eliminating ergonomic concerns for operators.

SOLUTION

After some trial and error, Caxton-Mark found the ideal solution. The first gripper they designed created too large of a gap between the boxes and resulted in pallets that toppled on their way to the plastic wrapper. They also tried a gripper that squeezed each box from the ends, but the cardboard boxes were crushed under the pressure.

Finally, Caxton-Mark designed the gripper that Cecelia Farms is currently using. It opens on one side only, so it's able to place the boxes while maintaining a ¼" gap between the stacks, which keeps the boxes tightly packed and stable.

The large work envelope and industry-leading speeds of the Kawasaki CP180L help Cecelia Farms check some of their other must-haves off their list. The CP180L robot meets their 6 pallet per hour goal at 80% robot speed. With some changes to their process and EOAT, they'll be able to reach 90% and increase throughput by an additional pallet per hour. The CP180L robot is capable of 2,050 cycles per hour with a 130 kg payload, which makes it one of the fastest in its class.

The high vertical reach (2,200 mm) of the CP180L robot was perfect for Cecelia Farms, who listed being able to stack almost 8 ft high as a must-have. Automating this task relieved Cecelia Farms employees of this ergonomically taxing job responsibility, and allowed the farm to keep their labor costs low.

Automating this system also increased throughput because Cecelia Farms no longer had to take breaks into consideration. The robot can run up to 24 hours a day without stopping.

Taking Advantage of Training Opportunities

To be able to troubleshoot the palletizing system, D.M., the technical support team member at Caxton-Mark, utilized Kawasaki's Wixom, MI Training Center. The Advanced AS Language course they took gave them the tools they needed to not just problem solve, but program completely on their own – something they feel comfortable doing now.

This training also made it easier for the team to communicate with the programmer while on-site at Cecelia Farms doing tech support work. "(Before training) You might be able read the codes, but you don't understand what the codes are for," D.M. said. "After doing the training and reading the reference book they gave us at the class, when you see a set of code you know what the purpose is and what is causing the problem."

RESULTS

- Custom EOAT allows for damage-free loading of product and balanced pallets
- Throughput and pallet height requirements are met due high speeds and extended vertical reach of Kawasaki CP180L robot
- Possibility to increase throughput with minor changes
- Labor costs decreased
- Training helped technical support team member diversify skillset

The positive effects of this customized palletizing solution are obvious, says the Caxton-Mark project lead. "Companies have got to get with the 21st century," he said in respect to palletizing robot use in the food industry. "Everyone is going to be buying these."

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