

Case Study: Palletizing Time-Sensitive Food Product In An Extreme Climate

Application: Palletizing
Robot Model: Kawasaki CP180L robot

OVERVIEW

In this case study, the end user faced a dilemma that many manufacturers have experienced: As machinery ages, should their dollars go toward fixing their line or replacing it altogether? Downtime caused by frequent breakdowns made the decision easy for this end user, who worked with Denver-based Kawasaki robot integrator Conveying Industries to revamp their entire line and upgrade their existing valve baggers, robotic palletizer and stretch wrapper with up to date equipment that was faster and more reliable than what they currently had.

One of the biggest changes Conveying Industries made was adding a Kawasaki CP180L palletizer to the customer's line, which provided the reliability and consistency they needed to meet their production goals, avoid costly downtime, and streamline overall efficiency.



Kawasaki CP series robots feature industry leading cycle times and broad motion range, while running on an energy-saving controller.

CHALLENGES

- Delicate product with time sensitive production cycle
- Extreme temperatures in manufacturing environment
- Must palletize at a rate of 18-20 bags per minute

The customer's goals sound simple, but they required a high performance robot and customized solution in order to achieve them. The end user produces a temperature-sensitive food product, which can melt easily. The system needed to be able to operate 24 hours a day, seven days a week, and in extreme temperatures - oftentimes over 100°F.

Time Sensitivity

Another concern was the highly time sensitive nature of the food product in this process. Once it's made, the manufacturer has limited time to bag the product and start distribution before it's deemed unusable. Any downtime would result in immediate, critical delays in production and bagging, which would result in loss of sales.

"Once you start processing (this product), you can't afford downtime," said Bill Priday, Sales Director at Conveying Industries. "It was critical that (the solution) was reliable, running and with no downtime."

Feeling the Heat

The customer's facility is located in southern California's desert climate, where temperatures can reach up to 120° in the summer months. The region's extreme conditions presented challenges for the integrator, who needed to ensure all equipment would be able to operate at such high temperatures.

SOLUTION

- Old robot replaced with new, high-speed Kawasaki CP180L palletizing robot
- Manual bagging system replaced with form-fill-seal bagging system
- Air conditioners mounted to robot controllers to prevent machine overheating
- Custom HMI allows for simple operation and troubleshooting

"The CP180L is a dedicated palletizing robot - reliable, simple to operate and maintain, and downtime is virtually zero." Priday said. "It's a robot that will run and run and run... and not present any problems for the customer."

-Bill Priday, Sales Director, Conveying Industries

Conveying Industries updated the customer's line with new machinery, including a Kawasaki CP180L palletizing robot and a new form-fill-seal bagging system that uses durable polyester bags, as opposed to the kraft paper bags they were using previously.

Once a bag is filled in the vertical form-fill-seal bagger, the sealed bag goes through a bag flattener conveyor to redistribute the product, and a square roller conveyor to ensure the bag is level. From here, the product travels through metal detector, and a laser jet printer puts codes on the bags for tracking.

After the conditioning process is complete, the bags are presented to the robot for palletizing. An empty pallet is dispensed from the pallet magazine, and is delivered to the palletizing station via conveyor. The robot picks bags individually and places them on the pallets in a pre-configured pattern at a rate of 18-20 bags per minute.

Conveying Industries designed a custom end-of-arm tool for the customer, which uses an air-operated clamshell design with fingers that fit between the rolls of the pickup conveyor. Plats on the top of the gripper hold the bag in place as the fingers glide underneath the bag, ensuring the product stays put for reliable and consistent placement on the pallet.



The custom end-of-arm tool, designed by Conveying Industries, securely picks each bag off the conveyor at a rate of 18-20 bags per minute.

Once a pallet is completed, it is transferred down to a top slip sheet dispenser via conveyor and through an automatic stretch wrapper machine. The last step is the gravity accumulation conveyor, where the forklift drivers pick the finished pallets, and take to the warehouse for distribution.

To avoid equipment malfunctions due to the extreme desert heat, Conveying Industries installed air conditioning units on top of the Kawasaki E controller units to prevent overheating.

Smooth Operation

To help the customer with day-to-day operations and allow for thorough operation, Conveying Industries also developed a custom touch screen HMI that communicates directly with the robot. The interface provides a bag and layer count to ensure goals are being met, and allows the operator to adjust the number of layers per pallet or placing positions when needed. In case any issues arise, the system provides troubleshooting suggestions and tracks the alarm history so operators can better understand the robot.

RESULTS

- Robot can palletize up to 22 bags per minute, 18-20 bags per minute on average
- Number of operators needed for this process decreased by more than 50%

After implementing the new equipment and CP180L robot, the consistency the end user experienced was a welcome improvement.

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With their previous robot, the end user could not achieve their production goals due to breakdown-induced lapses in production. Now, the Kawasaki CP180L is able to consistently palletize 20 bags per minute for hours a day with fewer operators. At full speed, the rate increases by 4 bags per minute from the previous robot's capabilities. In addition, the new system only requires two operators as opposed to five - a benefit reflected in the customer's bottom line.

The combination of the Kawasaki CP180L robots' simple design, high reliability, ruggedness and high palletizing speed with Conveying Industries' custom-designed HMI interface and end-of-arm tooling resulted in a solution that suited the customer's needs.

Kawasaki Robotics (USA), Inc.

Corporate Headquarters for Americas
28140 Lakeview Drive, Wixom, MI 48393, U.S.A.
Phone: +1-248-446-4100 Fax: +1-248-446-4200

KawasakiRobotics.com