ABCO AUTOMATION

CASE STUDY

CASE PACK AND PALLETIZING SYSTEM

FOR A LEADING

PACKAGED GOODS AND PROTEIN COMPANY

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INTRODUCTION

One of the world's leading pork processors and hog producers has spent over 80 years perfecting the production of bacon, ham, hot dogs, smoked sausage, Italian meats, lunch meats, and more. The company's mission is solid: "produce good food the right way." And that means upholding its core responsibilities: provide humane treatment of animals, be a steward for the environment, advocate for the local community, and create a rewarding and safe work environment. While the company's focus has been in pork production, it identified that future growth would stem from transitioning to a packaged goods and protein company.

One of the company's brands offers numerous packaged goods, including frozen meatballs, portable meal kits, deli meats, and pepperoni/salami products. The brand strategy is to market and package those products to consumers seeking convenient, satisfying, and affordable meal options. In order to supply handy, economical packaging, the company needed to be more competitive in its packaged goods production. The company pursued processing changes that would help them reduce costs, streamline operations, and improve efficiencies.

The packaged goods company made advancements/investments in automating the front end of their production processes; however, they needed to update and automate their highly labor-intensive packaging and palletizing processes. With robotic automation integration downstream, the company could realize the following benefits:

- Perform multiple operations such as picking, placing, and palletizing from a single robot
- Reduce potential damage to products; precise robot movements eliminate accidental surface damage
- Decrease packaging errors; eliminate case-pack verification and reduce returns
- Reduce labor costs while increasing throughput
- Increase worker safety; robots can carry heavy loads as well as work in unfavorable conditions such as hot or cold temperatures
- Save on overall space due to small footprint requirements and several robot mounting options
- Leverage fully-automated end-of-arm tool change-over to handle multiple or new products more easily and cost-effectively

APPROACH

ABCO designed and built a "case pack and palletizing system" for a production line that handles portable meal kits. The system's main purpose is to eliminate manual processes, such as case creation, tray handling, inspection, tray picking/packing, and case sealing/palletizing.

At the beginning of the automated process, an operator loads cases into a case former, loads pallets at two pallet locations (pallet locators), and starts the "case pack and palletizing system" in automatic mode. The case former automatically constructs cases. Its mechanical design employs pins, a raised dome, and plates to precisely force open a case, which ensures a continuous repeatable output. The case former is fully automatic with a tape head and tool-less changeover; high speeds allow forming up to 20 cases per minute.

Formed cases convey into the case infeed where they are held in position for loading three at a time. ABCO added a tray infeed conveyor with two lanes to receive meal trays from the tray labeling operation, then pass the trays through a metal detector. A company-supplied metal detector was integrated to reveal the presence of metallic contaminants; this prevents contaminated food from ending up on retailers' shelves.

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APPROACH CONTINUED

Trays that fail during metal detection are rejected by blowing the trays off the conveyor into a reject bin. Trays that pass are conveyed onto the accumulation conveyor where they accumulate and are positioned for robotic pickup.

ABCO added a Fanuc robot with end-of-arm tool to pick nine meal trays and place three trays (each) into three boxes; case loading continues until there are six layers of meal trays in each case. This model robot is extremely fast and versatile with an end-of-arm tool that also picks six cases for palletizing. A single vacuum supplies the pickup for both the trays and sealed cases. This Fanuc robot is capable of carrying a maximum payload of 308 lbs., while performing a maximum reach of 112".

Once the cases are loaded, they are released, travel down the case outfeed, and move to the case sealer. ABCO included a case sealer that automatically folds the top, then tapes the top of the case. Changes between case sizes are performed with three adjustments: width, height, and folders. Sealed cases move from the case sealer to the end of the palletizing infeed conveyor where one at a time they transfer to the case accumulation conveyor. At the end of the case accumulation conveyor, ABCO specified a pusher that impels individual cases into a loading zone. After accumulating six cases, the robot picks up six cases at a time and places them in proper orientation on the pallet.

Through this entire process, the robot "multi-tasks," alternating between product picking, case packing, and case palletizing until the pallet is full. The system sends a signal to the operator indicating the pallet's filled status; the operator loads a second empty pallet, and the process repeats.

The system includes two safe zones, allowing an operator to exchange pallets while the robot is in operation. Safety guarding includes a light curtain on the operator and robot side of the palletizing location. This system features an Allen Bradley PLC-based, UL-listed control panel for supervisory and conveyor control.

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COMPONENTS

- Case Former (customer supplied)
- Case Infeed
- Tray Infeed Conveyor
- Dual Lane Tray Accumulation Conveyor
- Fanuc Robot with Base
- Robot End-of-Arm Tool
- Case Outfeed
- Case Sealer (customer supplied)
- Palletizing Infeed Conveyor
- Pallet Locators
- Safety Guarding
- Control System

AUTOMATION SYSTEM BENEFITS

- Turnkey system ensures all components work together from the onset
- ABCO single contact point for design, build, installation, and startup of machines keeps the project on track, on budget, and online
- ABCO after-startup support ensures continual operations
- Fully automated operations maintain product standards, increase throughput, and reduce labor
- Centralized control station consolidates setup, alarm, maintenance, and operational functions
- Customized solution meets all production process criteria and allows for the integration of specialized equipment

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