



Multi-Magazine Robotic Case Erector

Project Overview

To increase the efficiency of their order fulfillment operation, this educational supplies manufacturer planned to consolidate five distribution facilities into a single location.

They intended to replace their manual case erecting line with an automated solution that would accommodate small batch runs of multiple case sizes within a compact footprint.

Customer Objectives

Flexibility with limited floorspace

Randomly erecting as many as six different case sizes for small batch runs in varying quantities

Maintaining throughput rates of 9-12cpm for each case size with minimal equipment (due to space restrictions)

Ability to accommodate new case sizes and make system adjustments easily and self-sufficiently when necessary

High quality output

The system would need to produce consistently-square and securely bottom-sealed cases despite corrugate irregularities

Consistent production with minimal downtime

Changeovers to new cases sizes would have to be fast and simple to execute

Restocking case blanks should not disrupt production

Pearson Solutions

A single robot was programmed to carry out a pick sequence based on priority case assignments and quantity selections

Three dual-stacked powered magazines were designed to house knockdown cases utilizing vertical space. Smaller cases were strategically placed in the lower magazines and larger cases in the upper magazines so the robot could meet rate requirements based on the reach distance to each magazine.

A seal station served dual functions facilitating erecting and also bottom sealing

Pearson's User Centric Design (UCD) provided a simple-to-navigate HMI with an intuitive recipe selection screen for the customer to easily make alterations to pick patterns

The robot provided positive vacuum and an articulated pick-off motion to ensure reliable case singulation from the magazine

Opposing vacuum was used for case forming, along with a squaring arm and synchronous drive system to ensure case sides were perpendicular. A hold-down plate facilitated a secure tape application.

No end-of-arm tool changeovers were needed and the compact seal station used servo-powered self-adjusters to accommodate varying case widths and heights on-the-fly

Magazines were designed for ease-of-access at operator height and with double-entry doors

Safety programming allowed operators to fill low magazines while the robot continued to pick and erect knockdown cases from other magazines without halting production

Sequence of Operation:

An operator dictates the robot pick logic by selecting case priority and quantity selections in the cell HMI. Using vacuum, knockdown cases are picked by the robot from one of the (3) dual-stacked powered case magazines.

The robot moves the corrugated blank to the infeed of the sealing system, where opposing vacuum cups initiate the opening of the case. Once the case is partially opened, the case squaring arm engages a minor flap kicker to provide additional squaring and support for the cases.

The cases are then indexed forward into the bottom sealer infeed where the leading minor flap is folded up into place. The dual lug synchronous drive system keeps the case square and aligned during the folding and sealing sequence, while the self-adjusting plate applies pressure from the top for a secure tape application.

Once the designated sequence is complete, the robot will repeat the process for the next case size programmed for picking.

