



CKF are best of the bunch with their banana palletising solution for Primafruit



CKF Systems were delighted to have been chosen by Primafruit to develop a new bespoke robotic de-palletising and re-palletising system at their site in the Vale of Evesham. Primafruit are a primary supplier of a broad range of fruit.

Challenge

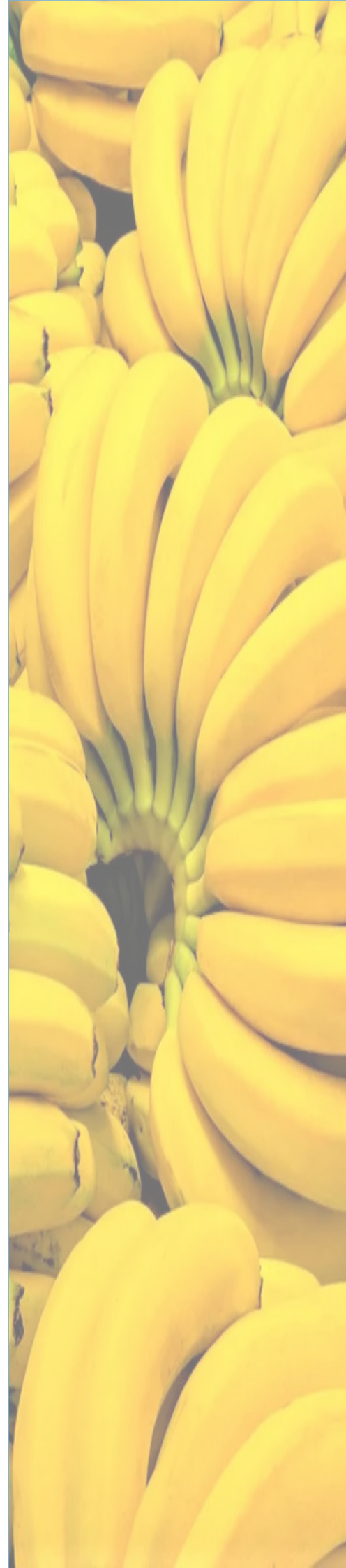
The banana inspection and packing lines within Primafruit at their Evesham facility were heavily reliant on manual labour. Imported produce, cardboard trays filled with bananas, were received stacked on pallets, typically to a height nearing 2.5m. The operation for Primafruit was to de-stack the cardboard trays, inspect the produce and re-pack the fruit into either cardboard trays or collapsible, returnable plastic crates prior to re-palletising and despatch to their retail customer. Primafruit wanted to automate the process at their state-of-the-art facility which is perfectly located in a central hub for agriculture and have a dedicated pack house, chilled storage, and ripening chambers. The new system was another important step in their automation journey creating a more efficient and safe working environment.

Approach

CKF has vast experience, designing and building robotic palletising systems for a wide range of industries. This application demanded that the CKF team fully understood the challenges such that customised solutions could be developed to provide Primafruit with an efficient automated process. The challenges were identified as:

- De-stack filled cardboard trays from a pallet 2.5m high that could have an inconsistent stack form and deformed cases due to transit
- Manage and deliver cardboard trays containing bananas to each inspection and re-packing station ensuring there is always an empty tray or re-useable plastic crate available at each station to enable continuous inspection and re-packing
- Re-stack either cardboard or re-useable plastic crates onto the finished pallet ready for despatch
- Minimise the system footprint for the efficient use of the existing floorspace

For the automation to be cost effective CKF proposed a single robot for de-stacking and re-stacking. Searches, tolerances, case quality and stack profile are all key elements to the success of any robot palletisation.



To undertake the de-stacking and re-stacking utilising a single tool would require a bespoke design. The CKF Engineering team also understood the demands on the tool to handle two differing containers i.e. cardboard trays and plastic collapsible, re-useable crates. It was vital that the tooling developed would maintain the integrity of the bananas, without marking or causing any damage.

By using a single robot cell, the system would maximise the floor space available to ensure that designated access routes for personnel and the movement of materials would be maintained.

Solution

CKF, an experienced ABB value provider for over 13 years, utilised an ABB IRB 660 industrial robot system in the solution design - this dedicated palletising robot is designed to handle a load of up to 180kg at a reach of up to 3.15m. Its low weight upper arm, 4 axis design and parallel rod system means it delivers optimised speed, reach and payload. This robot is exceptionally fast making it ideal for palletising bags, boxes, crates, bottles and more.

The CKF Engineering team developed the bespoke gripper to pick either two or three cases at a time (dependent on stack orientation.). The single tool was designed to suit both de-stacking and re-stacking, together with handling two case variants of differing dimensions, location points and material. Based on an anodised aluminium framework to reduce weight, the tool utilises pneumatically actuated side grippers and base slide plate for transfer of the multiple case format, additionally, a vacuum assist is required to enable lifting of the product trays prior to separation from the stack.

Due to the lack of conformity of the pallet stack from the suppliers to Primafruit, the CKF team developed the Robot positioning for de-palletising using an onboard sensor array to determine the coordinates of height and stack position prior to the pick operation.

Once transferred from the pallet, stack cases are transferred to and from the inspection cells on the CKF range of ZPA conveyor sections which utilises the Interroll DC platform. This perfectly matched range of controls, motor rollers and power units enable the provision of a unique combination of conveyors for this system. This includes CKF accumulation conveyors configured to provide individually controlled zones, allowing zero pressure accumulation of the product trays and the flexibility to be configured to different sizes.

The system is driven on a Rockwell platform using a compact GuardLogix 5380 safety controller with a 10" SVGA touch screen for Operator interface. Troax safety fencing is used around the robot cell to provide the enclosure, with Leuze light guards providing protection for pallet entry and exit.



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