

Depalletizing and palletizing of banana cartons

Starting point / Task definition

At the banana ripening facility of Coop Schweiz, crates of bananas are restacked before being shipped. The company also inspects the quality of the fruit at this time, and ensures that they are shipped exclusively on europallets. Weighing and attaching prices to the bananas was previously also carried out here, but since this is now done at the point of sale, an opportunity existed to automate the main tasks which remained. A special requirement is that the fruit must be handled with great care. Thus the crates with the delicate bananas have to be picked up and put down gently, without being tilted or tipped over. Moreover, the automation equipment has to be able to pick up boxes which were pressed together or became tilted during sea transport.

Implementation / Solution



Given this set of requirements, only jointed-arm robots came into consideration as an automation solution. Coop Schweiz decided in favor of three KR 160 PA Long Range palletizing robots. These KUKA robots are equipped with five axes and can cover an area which holds up to six pallets. Furthermore, with their special gripper systems they can be gentle or robust, depending on the specific task. The gripper is also able to cope with differences within a layer which might result from crate slippage. Displaced stacking patterns are compensated for with the aid of a centering frame and a float-mounted chain conveyor.

The two unstacking robots are fed by chain conveyors. As soon as a pallet stops, the system positions the top layer centrally relative to the robot gripper, thus aligning it for programmed robotic handling. To do this, the centering frame, which is lowered from above, and the chain conveyor both move in the X and the Y axis. This process is repeated for each of the ten layers. The Long Range palletizer alternately grips two banana crates lengthwise and three crosswise in accordance with the packing pattern of the pallets. It then sets the crates down on two roller conveyors, which pass through quality stations for visual inspection on the way to the stacking robot. The stacking robot simultaneously takes two boxes from each of the two roller conveyors, and places them in seven or eight layers on a europallet. To ensure that it stacks the boxes exactly on top of each other and with the necessary stability, a centering blade is installed on the frame which surrounds the carrier.

System components / Scope of supply

- :: Three KUKA KR 160 PA Long Range palletizing robots
- :: Three PC-based robot controllers, including control panel with Windows interface
- :: Two grippers with integrated pneumatic jaws and a vacuum suction system
- :: A gripper with a centering blade
- :: Conveyor system
- :: Robot programming
- :: Safeguards
- :: Assembly
- :: Commissioning

Supplied by KUKA systems partner Trapo AG, Gescher-Hochmoor near Muenster, Germany.



Number of report:
R 162

Industry:
Foodstuffs, beverages

Application:
Handling
Palletizing and order
picking

Product:
Robots
Palletizing robots
Controller
KR C (Robot Controller)

Implementation:
03.01.2000

Customer:
Coop, Kaiseraugst,
Schwitzerland



■ Results / Success

:: Significantly higher quality

Thanks to its investment in the three robots and their peripheral systems, today Coop Schweiz achieves uniform and significantly higher quality.

:: Short cycle times

The robot's extraordinary acceleration capacity guarantees short cycle times, and therefore high throughput. The user benefits from this on the weekends especially, when the robots have to deal with very large quantities.

:: Improved working conditions

When one considers that the banana crates weigh about 19 kg each and that goods weighing from 80 to 120 tonnes have to be handled each day, it becomes clear that the robots have contributed significantly to improved working conditions.

:: Flexibility

Since the robots are equipped to handle up to 1,000 banana crates per hour, the system still offers reserve capacity. The control technology can also be adapted to new requirements, since it allows the modification of all motions in a variable area. The system also demonstrates flexibility with regard to the carriers used, since it can handle pallets with dimensions up to 1200 mm x 1200 mm.

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