PALLETISING
END OF LINE AUTOMATION
An Mpac Group Company

Case Story

Automatic depalletising and de-boxing British butter

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A well-known producer of butter products in the UK asked CSi to design a depalletising system for boxes with butter. The company owns and manages some of the most popular dairy products and has a strong portfolio of butter brands. The company promotes and distributes all products in Europe and the rest of the world and had plans to grow the entire category of dairy products. In collaboration with one of its suppliers, CSi designed a double depalletising line including all conveyor systems. In addition, two de-boxing units with a fully automatic processing system for the empty boxes and plastic waste linked to them, were installed.

The depalletising line consists of two robots from ABB, Type IRB 660 with IRC5 controller, both of which were equipped with their own infeed conveyor for full pallets with boxes of butter. The pallet infeed conveyors are placed at a height of 500 mm above the floor and consist of several separate sections. After the first section, a separate section on which the pallet can be stopped follows, and all information relating to the pallet can be entered in the MES system. The system is not only able to depalletise full pallets, but also partially loaded pallets flawlessly. Furthermore, the system automatically verifies afterwards, whether the correct product has been introduced and whether the number of cartons which were depalletised was accurate. In this way it prevents the wrong butter product ending up in the production and also it keeps track of all the boxes that were depalletised, so that only completely empty pallets are forwarded to the empty pallet stacker.

KEY DATA

- ✓ Sector: dairy industry
- ✓ Country: UK
- ✓ 2 robot depalletisers ABB,
- ✓ 1 central pallet destacker
- ✓ Integrated vision-system to identify boxes and position of the boxes
- ✓ Separate outfeed conveyors for empty boxes and plastic waste
- ✓ Capacity: system 1: 280 boxes/h, system 2: 200 boxes/h
- ✓ Product: butter in boxes, 25kg, 10 boxes per layer, 4 layers per pallet
- ✓ Pallet size 1200x1000 mm, height 1155 mm

OPPORTUNITIES

- ✓ The vision system automatically detects the position of each box, even in randon stacking patterns and/or incomplete layers
- ✓ Combined shuffle vacuum gripper depalletises the boxes in a stable and controlled way
- ✓ Automatic processing of waste materials
- ✓ High availability of the depalletising line at low operating costs

INNOVATIONS & TECHNICAL HIGHLIGHTS

- ✓ Shuffle gripper with integrated vision system
- ✓ Automatic identification of each box position by identifying and measuring the logos on the boxes
- ✓ Specially designed vacuum gripper for boxes with convex sides
- ✓ Logistic control by Siemens PLC
- ✓ Fully automatic depalletising of full or partially loaded pallets
- ✓ Automatic removal and processing of cardboard and plastic waste materials
- ✓ Images of vision system also on the operator display of the ABB robots
- ✓ Boxes are depalletised fully automatically and the products are de-boxed
- ✓ Separate conveyors for empty boxes and plastic waste

After a full pallet is placed on the conveyor and all the data are entered in the MES system, the pallet will be transported to the depalletising position. First, a picture of the pallet is made by the vision system, which CSi installed as a special additional feature on both robot grippers. The camera takes a picture of the pallet and the vision system is now able to not only recognize the numer of boxes, but also the eact position of each box.



Another special feature is, that this system is capable of identifying the box position as well as the height at which the box stands, by measuring the size of the logos on each box. This system also operates in an environment where boxes are coming out of a cold store and therefore can be moist, without any failure. Both robots were equipped with a shuffle-vacuum gripper which will first tilt the boxes and then places the fork underneath to support the 25 kg boxes from below so they will not tear apart. In this way each box can be depalletised and placed on the adjacent infeed position in a controlled way.



Between the robots there is one central pallet stacker which automatically stacks the empty pallets after depalletising. The pallet stacker automatically generates a signal when it is full and the pallet stack can be removed with a forklift.

Because both robots can depalletise the boxes faster than the de-boxers are able to handle, CSi has installed two accumulating conveyors just before the de-boxers. On these accumulation conveyors, the barcodes on the boxes are scanned automatically and the resulting data will be compared with the task assigned by the MES system. In this way continuous monitoring of whether the correct type of butter is fed into the production process is guaranteed.

The accumulation conveyors are fitted with box stoppers which will always ensure that only one single box will pass as soon as the de-boxers give a signal. With the depalletisers, CSi also supplied a fully automated system for processing waste packaging materials. All waste boxes are discharged and will be conveyed to the baling-press where they are pressed and strapped so they can be recycled.

EXPERIENCE

Due to the very close cooperation between CSi and the customer, the customer had full confidence in the proposed solution. The installation of this project only took three weeks after which it was put into operation successfully.