



palletising

# Case Story

## Automatic palletising of cases with coffee



*A producer of coffee in Switzerland was looking for a special solution for palletising cases for its new production facility. The customer required a compact system that would palletise cases at high speed, whilst at the same time, the robot had to be able to pick empty pallets from a stack and position them on the palletising position. Specific customer TPM requirements had to be with each robot cell integrating with AGVs that automatically pick and place empty and full pallets.*



### KEY DATA

- ✓ Sector: coffee industry
- ✓ Country: Switzerland
- ✓ Configuration: 6-axis Fanuc robot and multifunctional gripper
- ✓ Infeed conveyor for empty pallet stacks and outfeed conveyor with buffer conveyor for full pallets
- ✓ Specially designed product forming table with pusher and pickpoint
- ✓ Capacity: 28 cases per minute per line, 10 pallets per hour per line, operational 24/7
- ✓ Product: cases

CSi took up the challenge and through close cooperation with the customer, created a bespoke design palletising system. To date four lines are operational, with additional lines planned for the future at the same location.

CSi designed a complete palletising line according to 'lean principles', with the conveyor system placed directly at floor level in such a way that it is extremely easy to clean and easily accessible for operators and engineers. The robot, with its open structured base plate, was also placed directly on the floor and the empty pallet magazine was omitted.

The robot is equipped with a multi-purpose gripper so that it can pick up not only boxes, but also empty pallets. An additional space for a stack of slip sheets was provided inside the compact footprint of the robot. The system can quickly switch between palletising pallets or slip sheets. The layout of the line was adjusted so that the infeed and outfeed of the pallet conveyors are on one side, allowing AGVs to easily deposit empty pallets and pick up full pallets.

Based on a post-installation study carried out by the customer, CSi proved that it had provided the best possible solution in relation to maintenance costs and energy consumption. This market leading design clearly stood out from the CSi competition and was a decisive factor for choosing CSi.

Stacks of empty pallets are transported automatically to the infeed conveyor by means of a shuttle car. The robot will detect the height of the empty pallet stack automatically with a sensor on the gripper. Also, the position of the pallets will be detected by a sensor, so that the robot knows the exact position of the upper pallet on the stack. The empty pallet will be picked and placed on the palletising position by the robot using retractable hooks.

#### TECHNICAL HIGHLIGHTS

- ✓ Gripper with hooks for picking up and positioning empty pallets
- ✓ Vacuum gripper for picking up an entire row of boxes
- ✓ Pallet entry and exit on one side for pallet exchange with AGVs
- ✓ Pallet conveyors at floor level

The gripper, which is also equipped with a vacuum system, will pick up an entire row of boxes in one cycle and place it on the pallet. The case infeed conveyor is equipped with a case turning station, that rotates boxes in order to obtain the desired layer pattern. After feeding in a complete row, a pusher moves the row over to the robot pick point. Here the robot picks up the row of cases and places it in the correct position on the pallet. When the pallet is full, it will be conveyed to the outfeed position, where it will be picked up by an AGV.

#### BENEFITS

- ✓ Easy access for operators and maintenance because of the special layout of the machine
- ✓ Compact footprint and easy to maintain
- ✓ Flexible and simple for operators to program new pallet patterns
- ✓ Standard solution which can be used across factory locations
- ✓ Very high degree of technical availability of the palletising function

While the full pallet is transported out, the robot will pick up a new empty pallet. The retractable hooks on the gripper unfold and will take a new empty pallet from the stack automatically. The robot continues palletising cases from the pick point as the next row of boxes enters the robot cell.

The system is capable of performing both operations at the same time continuously, so the maximum required number of cases per hour can be palletised, 24 hours a day, 7 days a week.

The robot can palletise one size of cases at a time. For different case sizes, a matching layer and stacking pattern can be programmed using the accompanying software (optional).

Different case sizes can also be programmed in advance on a PC and can be uploaded to the memory of the robot. Depending on the size of cases to be palletised and with help from the information in the MES system, the palletising program can automatically be adjusted to a new pattern without intervention of an operator. Thus, there is no need to adjust the machine between various production runs. This happens automatically, so the





## INNOVATIONS

- ✓ System layout according to 'lean principle' requirement of the customer
- ✓ Extremely hygienic line layout according to TPM (Total Productive Maintenance) plan.
- ✓ Specially designed pallet conveyors to integrate with AGVs on one side
- ✓ Seamless integration into MES system for batch tracking and trending OEE data

downtime between product changes is reduced to an absolute minimum. The software allows the customer to program the stacking patterns himself without the need to contact CSi. All in all it is an extremely flexible and compact system, which is seamlessly integrated into the MES and OEE data trending for the factory. The entire system is provided with polycarbonate screen fencing. The main advantage compared to steel fencing is that the operator always has a perfect view of the machine and the palletising process, with an access door also fitted so that the operator has quick access to the robot, when necessary. Pallet conveyors are equipped with safety light screens and when they detect motion, the entire system will be automatically shut down, thus optimum safety is always guaranteed in compliance with all safety regulations.

CSi provides operator training after the installation and commissioning. In this instance training was highly important due to the strict TPM plan, with operators taking responsibility for cleaning and maintenance of the entire line. In a relatively short time, the operators became familiar with the machine and were able to program, operate and maintain the machine completely independently.

For CSi the challenges of this project were that the system had to be easily accessible, hygienic and easy to maintain. CSi has extensive experience in the field of TPM and showed professionalism and flexibility throughout the entire sales process. CSi delivered and installed a system that was designed to be fully compliant with all of the needs and exacting requirements of the customer.