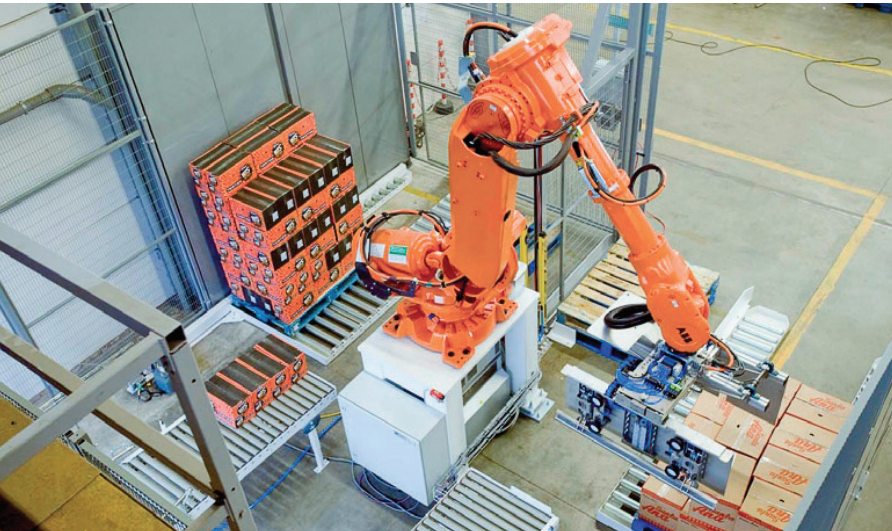


## ABB CSi Case

### Being safe saves space and money



— 01 Accidents with robots are extremely rare, but ABB's SafeMove technology brings an extra dimension to shop floor safety.

When CSi, an international systems integrator was tasked with an automation upgrade to a manual palletising process used by a large Spanish food and drink company, they encountered a significant design constraint.

Operators had been working close to the main conveyor that transported cartons containing grocery items around the shop floor where they were diverted onto short outfeed conveyors. The operators' task was simple: remove the cartons, place them on pallets, remove pallets that were full and to maintain a small stock of empty pallets.

However, during the design phase CSi realized that with the short conveyors, for safety reasons the robots would not be allowed to move when the operators were working with the pallets, so the cell had to be secured with a surrounding fence and sliding doors.

The constraint came from the fact that the production line had to run continuously. Because of the small cell size, the robot would have to stop moving when the sliding door was opened. That is the way a conventional safety system works, but then there would be an unacceptable risk that the pick points would fill up and cartons would overflow.

SafeMove opens up for man-machine collaboration. The operators and the robots can work together without compromising on safety. It uses geometrical and speed restrictions, maintaining automatic operation. This combines the flexibility of human interaction with the precision and handling capacity of robots. SafeMove brings great savings on floor space by restricting robot motion to precisely what is needed by the application.

The production line would then either have to be halted or the cartons would have to be sent to a reject conveyor and the customer would not accept this type of interruption.

"Before receiving the order, we knew that we had to come up with a solution that allowed the robot to go on working during the pallet change," says Pim Kaarsgaren, Project Manager for this installation. "We examined ABB's SafeMove technology and decided that it was an efficient and cost-effective way of limiting the robot's movements."

The SafeMove technology allowed CSi to design a cell having two sections, a fixed fence in the middle and two sliding doors and within each section there is an area where operators could work in complete safety, Kaarsgaren says.

Cartons are currently produced at a rate of around 100 to 110 a minute and there are 16 cells. The cartons come off the production line onto left- and right-hand gravity-fed conveyors. Full pallets are transferred onto a second conveyor and the operator takes them away using a forklift trolley. After the pallet has been transferred to the second conveyor the robot picks up a new pallet from a stack that the operator maintains.

In the manual process an operator could work with both conveyors since the handling rate was only six cartons a minute. This was more than enough time to pick and place the cartons and remove full pallets. In the automated process robots can pick and place three to four cartons at a time. A full pallet would have around 30 cartons, so this part of the process would take less than a minute.

The money angle comes from the fact that these short pick and place times allow one operator to maintain four cell sites, not only at the current rate but also at the planned increase to 160 cartons a minute. This results in a very significant financial saving.

“We have realized a solution whereby the robot can move at a safe speed of 250 mm/sec within the area defined by SafeMove when a door is open, but the robot can run at full speed in the other section if that door is closed,” says Kaarsgaren. “In the unlikely event that an operator approaches the robot and interrupts a light beam, the robot will activate an emergency stop.”

In order to pick up a pallet the robot arm has to reach into the operator’s area, so if the door is open this action is blocked, but the robot can continue working in the other section. However the operator would normally wait before opening the door in order to allow an empty pallet to be placed in position.

SafeMove is a relatively new development and this order for 16 systems is the second largest ABB had received. Comprehensive training and support was supplied in the Netherlands and only a few questions had to be answered by specialists in Sweden. A test cell was assembled and tested in-house at CSi and this will be the last one that is shipped to Spain. Towards the end of March four cells had been installed and put into production: The remainder are done one at a time and all 16 are scheduled for completion by the end of May.

CSi designed and installed the manual process so they were aware of the space constraint and the need for non-stop production. This, together with testing and fine-tuning in the Netherlands, enabled fast, issue-free installations in Spain. The only minor problem that came up was the need to adjust the gravity-fed feeder conveyors. The final result is a very satisfied customer.

#### **SafeMove advantages**

- SafeMove is an independent safety rated computer inside the cabinet of ABB’s fifth-generation controller, the IRC5.
- SafeMove makes an independent computation of the robot’s position, orientation and speed and compares these with restrictions specified by an authorized safety responsible.
- The system meets ISO 10218 safety regulations and all robot axes as well as any installed auxiliary axes can be safely supervised.
- In the case of a violation of a restriction, SafeMove will immediately stop the robot. The stopping is ensured by mechanical brakes that are tested periodically.
- Events, alarms and changes of state are logged in the robot controller’s flash disk.
- SafeMove will allow ABB robots to realize brand-new, lean manufacturing concepts.

#### **CSi Industries B.V.**

- CSi designs, produces, and implements fully integrated logistic systems for materials handling and product distribution. The focus is on leading producers of fastmoving consumer goods, mainly in the food and drinks industry.
- Headquarters in Raamsdonksveer, the Netherlands.
- Worldwide sales and support with sales offices in Germany, United Kingdom, Mexico and Russia.
- Production facility in Romania.
- An approved ABB systems integrator for 16 years.
- Privately owned with three shareholders.