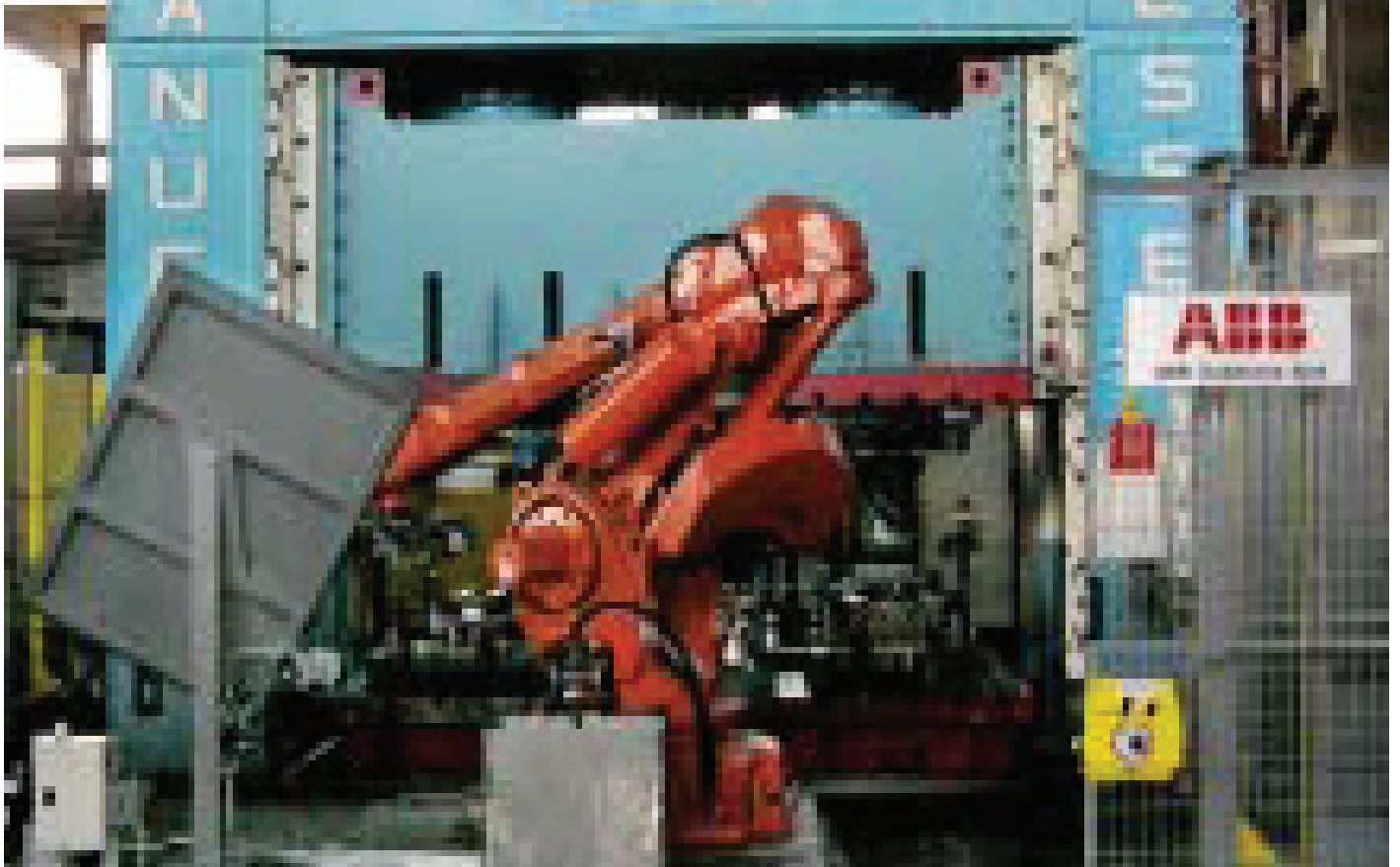


## Caroni Case study: Metal Fabrication



Model becomes turnkey system. A newly developed robotized system for Caroni S.p.A forms part of an ongoing technological process. The system is designed to keep pace with developments in the manufacturing process, which can be continually improved at this level of automation.

### Heavy sheet metal

Italian manufacturer Caroni S.p.A. has more than 50 years of experience in processing heavy sheet metal for the agricultural machinery sector. This sector, along with the automotive sector, accounts for most of the company's business activities. The mechanical components involved are so sturdy that the sheet steel must be processed in a special way, using high

tonnage presses, which bear down on dies that are often very large. A new robotized cell on the market essentially performs the processes of welding and handling pressed sheet metal components. This cell works in conjunction with a second cell to supply the presses that produce components destined for the heavy vehicle market.

Welding robots have been in use at Caroni's Cuneo plant as far back as 1985. Recently, the company found itself in the position of needing the ability to undertake large, international manufacturing projects with customers who demanded not only prompt supply but also consistent product quality. This led to an acceleration in the robotization process. The result was two new robotized islands, one for welding and the other for component handling.

### A turnkey system

This automation project, designed as a turnkey system in early 2003, was commissioned from ABB as the supplier and technological partner.

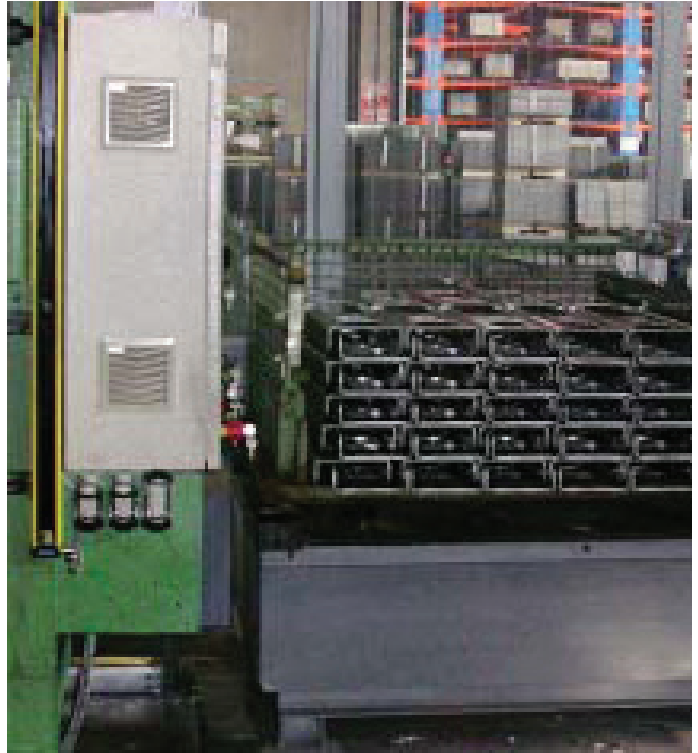
The project was set up mainly to facilitate a manufacturing project intended to last for around a decade. The introduction of a set of anthropomorphic robots was crucial to ensure that this need was properly met. As the technical partners, ABB technicians were required to understand the company's needs and come up with an automated solution that was compatible with the potential offered by anthropomorphic robots. They were asked to outline the best productive model possible. Using simulation software such as RobotStudio, ABB created a hypothetical model that was made into a prototype in just a few months.

The robotization project involved the installation and startup of the entire plant as well as procedures for guiding and controlling the robots. The system design features two operational cells. The first controls the presses, and the second handles and welds the sheet-metal components. The first cell is a complete cold pressing system. It incorporates two high-tonnage presses that work side by side to convert steel panels into large semi-finished components, which on average weigh more than 10 kilograms each. Moving components of this weight requires considerable physical force. Three ABB IRB 6400 robots carry out the task, saving human operatives from what would be a tiring and potentially dangerous job.

## A demanding operation

The development of this cell and related equipment provided an opportunity to review the entire manufacturing process, which is now an uninterrupted series of interconnected actions in which unfinished parts are loaded onto the presses and pressed before the pressed components are unloaded. A second dedicated cell welds the semi-finished sheet metal components. An ABB IRB 4400 robot loads the components to be welded once they have been fitted onto a specially designed piece of equipment, while another robot, an ABB IRB 1400, carries out the welding. Because of the unusual geometry of the components, it is a repetitive and demanding operation.

Once the welding has been carried out, the first robot performs an additional manipulation to unload the component, removing the component from the specially designed equipment and placing it onto a loading pallet in line with logistical requirements. The process involves two distinct actions that are integrated and synchronized to optimize the results of the entire cycle. The two cells operate in complete independence, and each one operates as a stand-alone unit.



Caroni counts many major Italian and international brands among its customers. The international market now accounts for some 80 percent of the company's business.

The manufactured quality and consistency guaranteed by robots meet the essential requirements of demanding job orders. The robots also make it physically possible for the company to work on a just-in-time basis.

## FACTS

### Benefits for Caroni with robotization

- Enabled the company to undertake large, international manufacturing projects with consistent product quality.
- Provided an opportunity to review the entire manufacturing process,
- Saves human operatives from heavy and potentially dangerous jobs.

### ABB Robotics

[www.abb.com/robotics](http://www.abb.com/robotics)