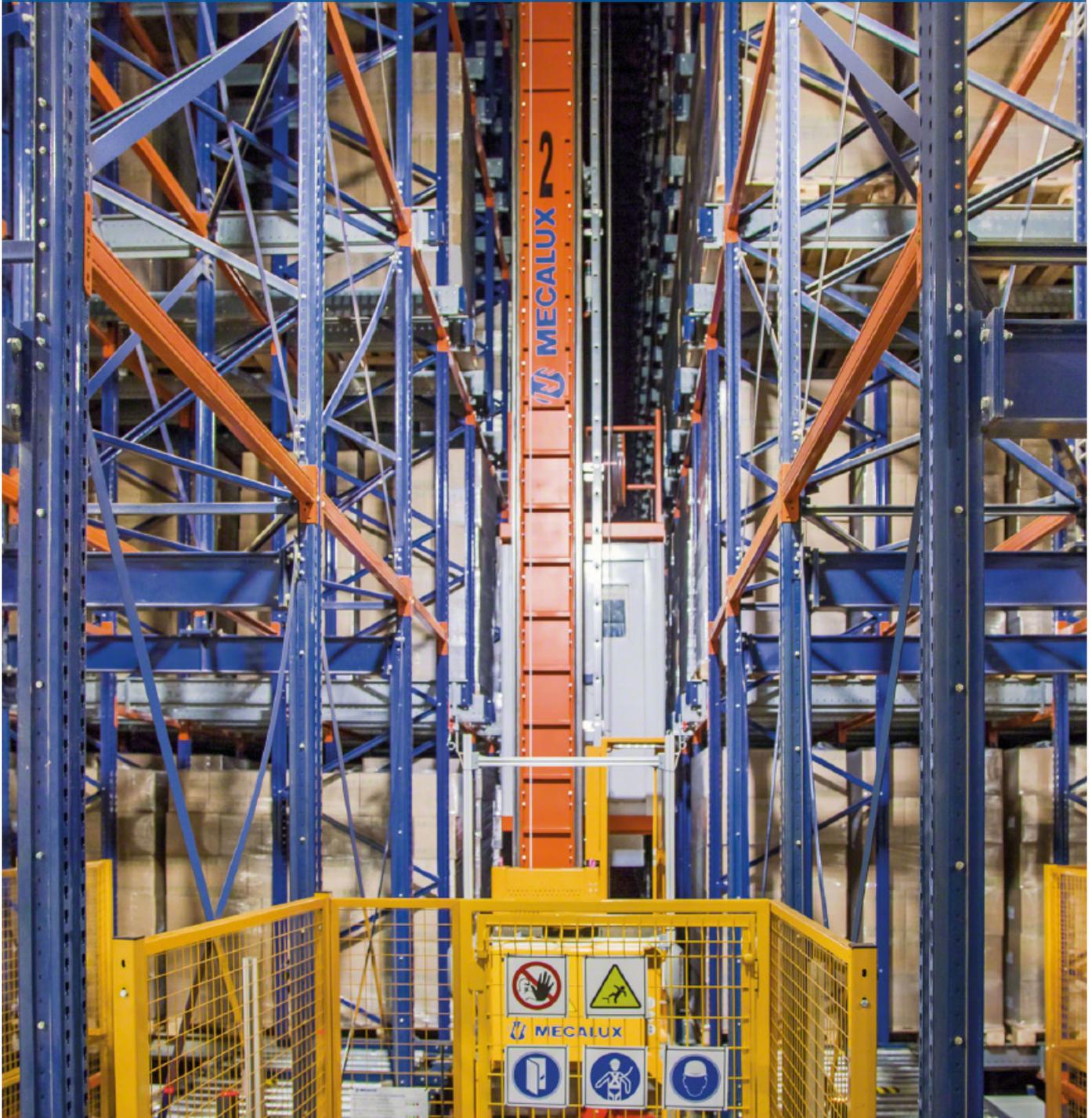


Case study: Bem Brasil

Frozen chip heaven at Bem Brasil automated clad-rack building

Location: Brazil



Bem Brasil, a frozen pre-cooked chip producer, has built a 25 m high automated clad-rack warehouse with a capacity for more than 33,000 pallets. This intelligent warehouse is fitted out with the Pallet Shuttle system operated by stacker cranes. Apart from that, the Mecalux Easy WMS was implemented, the warehouse management system whose mission is to control the in-house operations and processes with efficiency.



About Bem Brasil

Founded in 2006 in the city of Araxá, Bem Brasil is a company that produces more than 100,000 tonnes of pre-fried frozen chips a year. Currently, it has become the national leader in the sector and one of the most popular brands in Brazil, and a household staple.

In 2017, Bem Brasil opened a new plant in the town of Perdizes (just 50 km from Araxá), located strategically to expedite the distribution of its products throughout the entire country.

The needs of Bem Brasil

The frozen chips company wanted to boost its growth rate from the last few

years and to expand into international markets. Lately, the group's business strategy was based on vigorously updating product sales and, recently, it has also modernised its packaging.

Bem Brasil required an intelligent warehouse to house both raw materials used in production processes and the finished products ready to be shipped out. The installation had to provide the maximum potential storage capacity to accommodate all these SKUs, as well as to streamline in-flowing and out-flowing goods.

In addition, to ensure optimal preservation of the goods, the frozen storage installation needs to run at a constant -30 °C.

The solution

The business approached Mecalux to get it to collaborate in the design, building and roll out of this new frozen goods warehouse.

The result is a more than 25 m high automated clad-rack warehouse with the automatic Pallet Shuttle system that provides a storage capacity of above 33,000 pallets. Warehouse areas:

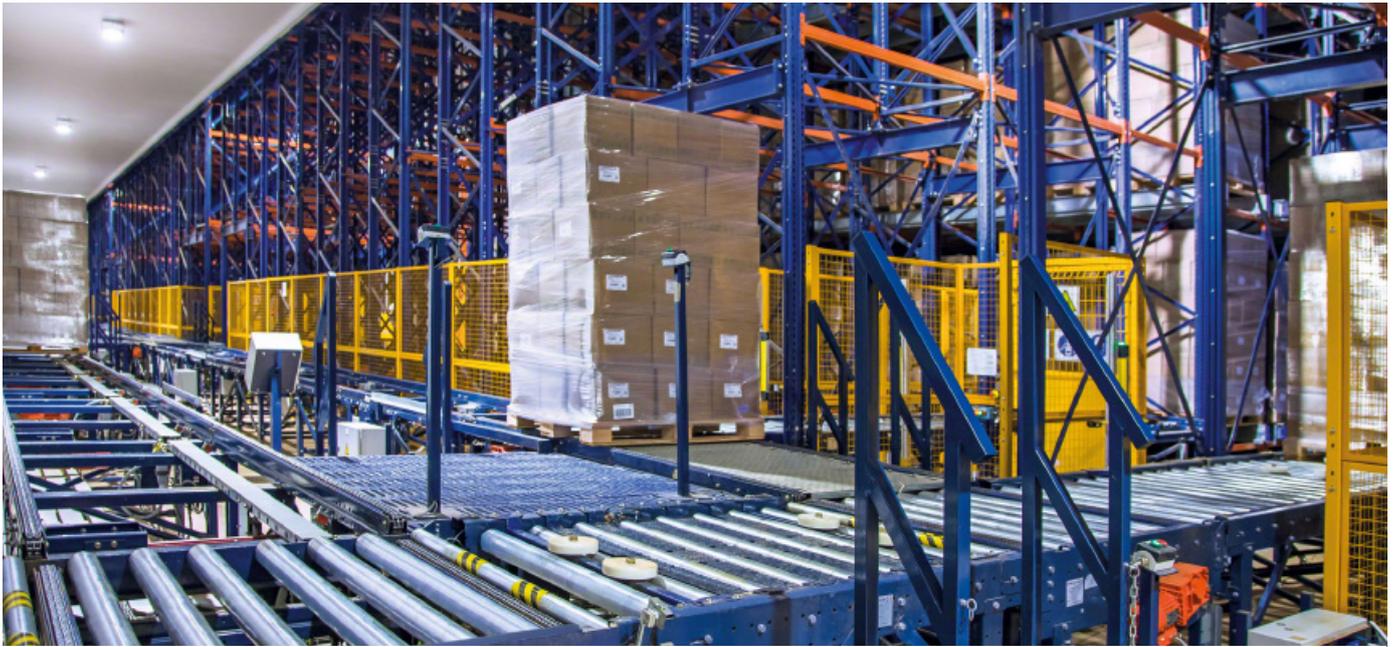
1. Storage aisles
2. Incoming goods from the production centre
3. Incoming goods from outside production
4. Live preload channels



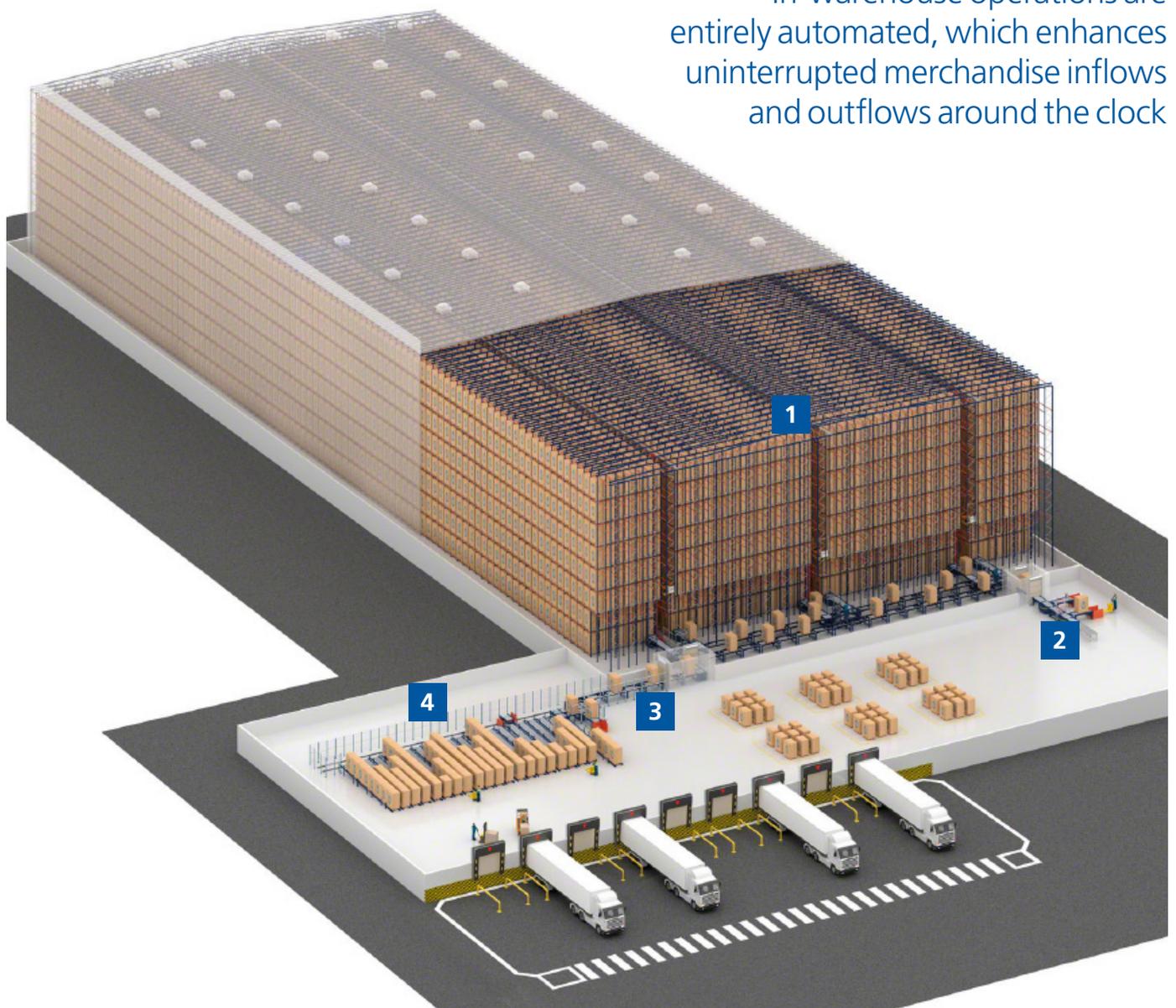
João Emílio Rocheto
Chairman & President at Bem Brasil

"The automatic Pallet Shuttle system is a solution that is compact, practical, fast and flexible. Its robotised operations have helped us cut costs in the power we use, improve work conditions for employees and increase handling efficiency and conservation of our goods."





In-warehouse operations are entirely automated, which enhances uninterrupted merchandise inflows and outflows around the clock





Features of a clad-rack frozen storage warehouse

Clad-rack warehouses are buildings formed by racks that support their own weight, of the stored goods, as well as of the lateral and roof cladding.

During the design phase, one must take into account factors that interact with the structure, such as the force of the wind, the seismicity corresponding to the installation's zone and the local regulations in force.

This type of construction is widely used in frozen storage chambers since it only takes up the space that is strictly necessary, which pays off in terms of lower power costs to keep the installation at sub-zero temperatures.

The structure is assembled on top of a heavy-duty concrete slab that insulates the floor and sides of the building.





Inside the running warehouse

The automatic PS system was set up and run by stacker cranes in a chamber made up of three, 143 m long aisles and a block of racks on each side that hold between eight and sixteen pallets deep.

Overall, the storage capacity reaches a total of 33,696 pallets of 800 x 1,200 mm with a 500 kg max weight each.

The Pallet Shuttle is a high-density system suited to consumer products and a large volume of pallets per SKU. The model installed in the Bem Brasil warehouse is fully

automated: three stacker cranes (one per aisle) transport the merchandise between the input and output positions of the warehouse up to any storage channel.

Inside the channels, the automatic shuttles execute the workflow movements with the goods automatically, shifting the pallets to the first open spot.

To draw out the goods that must be sent from the warehouse, the Pallet Shuttles collect the pallets, send them to the end of the channel and insert them into the stacker crane's cradle.

The Pallet Shuttles have built-in supercapacitors able to recharge in a matter of seconds when stationed in the stacker crane's cradle



1. The Pallet Shuttle in the stacker crane's cradle waits for the pallet's arrival from the checkpoint.



2. The stacker crane scoops up the pallet with several chains installed in the cradle and moves to the channel assigned by the WMS.



3. The automatic shuttle raises the load slightly and slots it into the storage channel. It slides with the pallet to the first open location and, once there, lowers the pallet, setting it on top of the rail.



4. The stacker crane waits for the Pallet Shuttle to finish and move automatically back onto the cradle.



Type of stored goods

Less is more at this centre's operations: the receipt and dispatch of goods take place at one end of the warehouse via a circuit of chain and roller conveyors that organise pallet flows.

There are twin reception stations, each of which is allocated to a specific type of goods that is going to be housed in the warehouse:

1. Goods flowing from the production centre. Operators place empty octa bins (large cardboard or plastic bulk containers) under a hopper so that they fill with products. Then, a hydraulic lift table raises the load to the height of the inbound conveyor.
2. Goods flowing into the production centre from outside. It is set up right next to the preloading area, while both areas are separated to stop the interposition of the two operations.

No matter where the goods flow from, the pallets must pass through the checkpoint, which verifies they are in good condition and their weight and measurements correspond to the quality requirements in the automated warehouse.

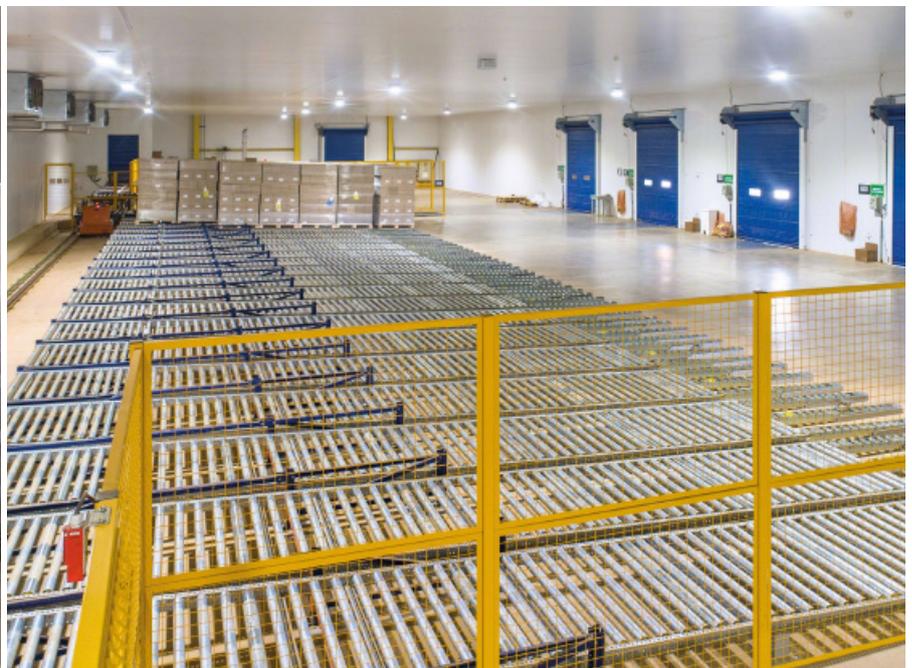
Dispatch zone

The warehouse has a huge staging area with twenty live channels that are each seven pallets deep. This zone is set apart from the automated warehouse via vertical doors to stop cold loss.

Roller channels are slightly inclined so that pallets slide via gravity from the highest to the lowest point, which faces the docks. The rollers have a split setup at the exit point, meaning pallet trucks can slip their forks in to extract the pallets.



The pallets stay grouped in the preloading channels depending on if they belong to the same order or route, waiting to be loaded on the distribution lorries

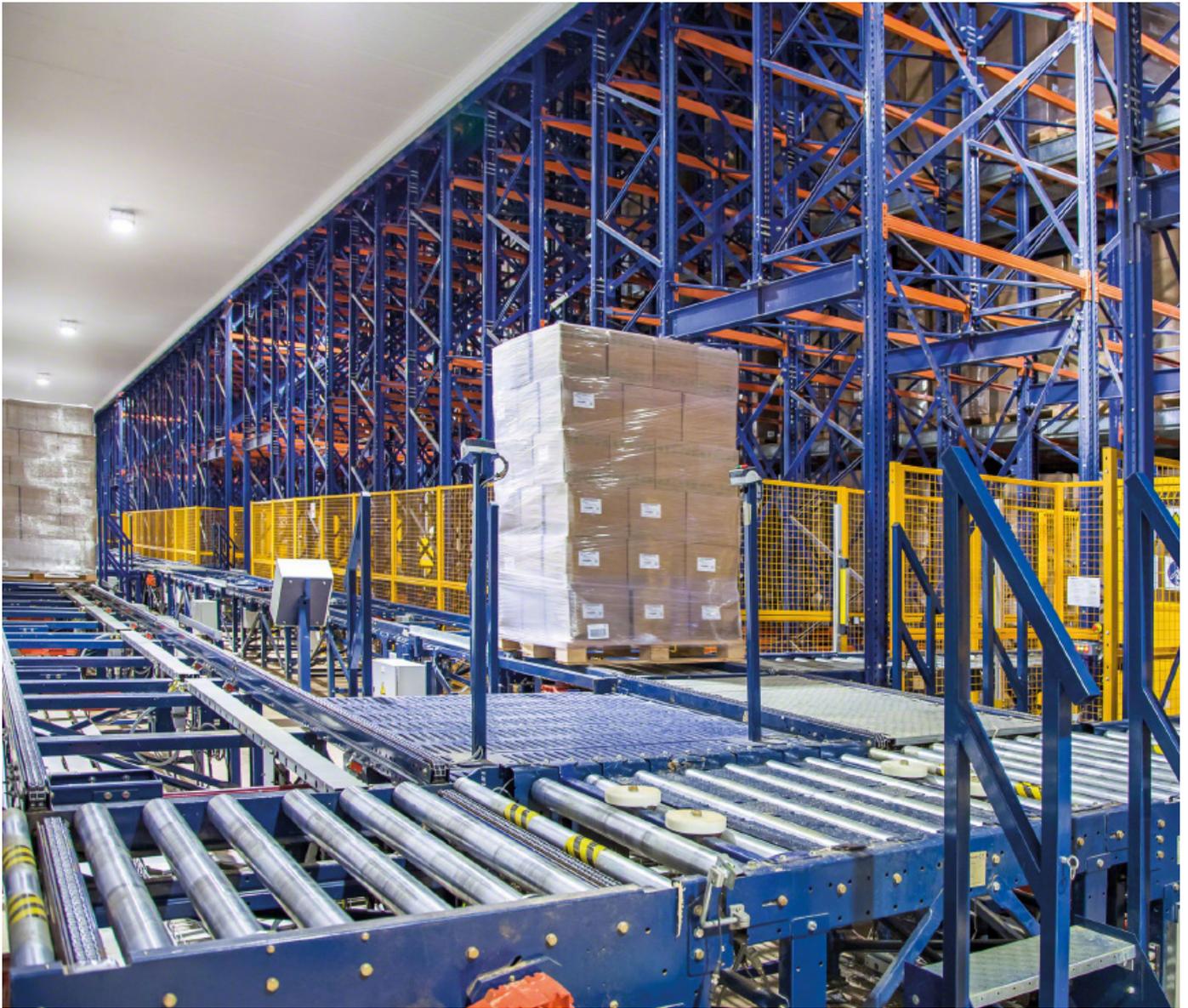


An intelligent WMS

The Easy WMS warehouse management system by Mecalux is tasked with coordinating and spearheading all in-warehouse operations, as well as assuring everything is running smoothly.

Among its primary functions are the receipt, location allotment and storage of pallets as per their start point and turnover, or the extraction and the end shipping destination.

Moreover, given that this is a fully-automated warehouse, the Galileo control module is implemented, which sends movement orders to the various devices within the installation (conveyors, stacker cranes and Pallet Shuttles).



Advantages for Bem Brasil

- **Max storage, max pallets:** the Bem Brasil centre can house more than 33,000 pallets of 1,000 x 1,200 mm that have a top weight of 1,120 kg each.
- **Productivity never better:** the automated warehouse assures a smooth flow of goods with operators hardly having to step in, eliminating any potential error.
- **Good management:** all operations are governed by the Mecalux WMS and the Galileo control module. This gives movement commands to the electromechanical devices that comprise the installation.



Technical data

Storage capacity	33,696 pallets
Pallet size	1,000 x 1,200 mm
Max. pallet weight	1,120 kg
Warehouse height	25 m
Warehouse length	143 m
Temperature	-30 °C

