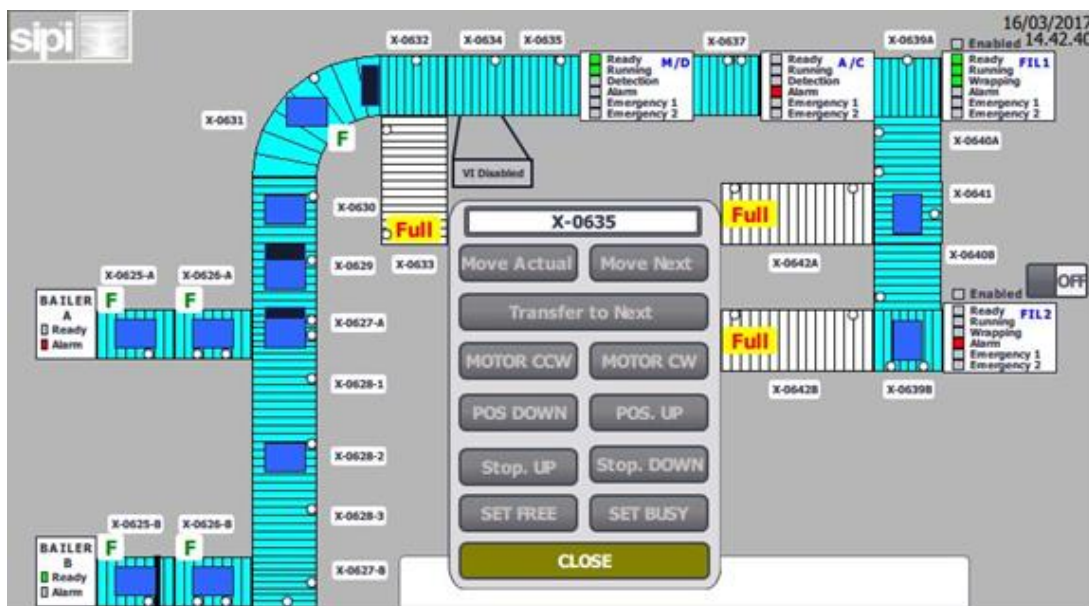


Cliente: International JV

Tipo impianto: Synthetic rubber production

## SYNTHETIC RUBBER HANDLING



### Plant functionalities

The plant is a synthetic rubber production plant, the rubber loafs have to be carried from the press to the palletizer robot and have to be checked.

The system controls the entire production process:

- Production (Presses)
- Quality check
  - o Optical control
  - o XRAY
  - o Weight check
- Filming ( Manage loading on two units to optimize production)
- Palletizing done by anthropomorphic robot
- Directing of pallet/crate to warehouse

Quality checks are done on each product unit, loafs that do not respect the parameter are discarded and carried to different areas according to their defect.

## System

The system takes on loafs at the end of the production line and carries them towards the palletizing area on conveyor rollers made of stainless steel. The operator panel shows the real-time situation in order to allow everyone to check the plant's status at any time.

Loafs are carried by conveyor rollers and metallic crates, they pass through several checks and they are rejected if they don't comply with the standards for height, impurities found by the Metal-detector or weight found by the Auto-checker. Control points are along the whole line and have in-between each of them stopping areas for pieces not in compliance with standards to allow operators to remove and manage them.

## General specifications

System security and Configurabilità e sicurezza sistema:

The system manages automatically the production process, especially:

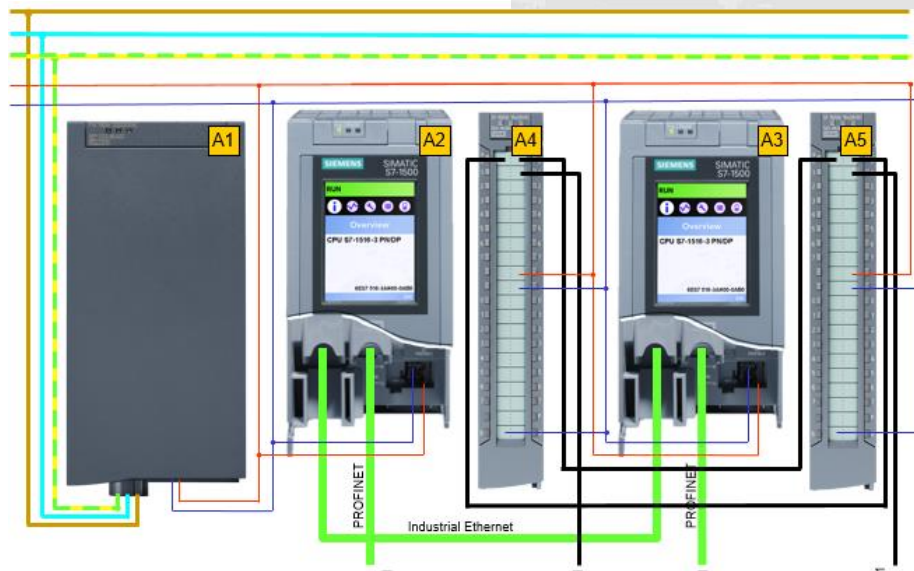
- Automatic handling
  - o The system optimizes cycles occupying always the first free position downline.
- Securities management
  - o Risky areas are kept separated from each other and equipment-stops limited on a realistic risk analysis.
- Energy saving management
  - o If the system is inactive, it goes automatically to standby, it starts again automatically once the conditions are set.
- Semi-automatic handling
  - o Operability is made easier through semi-automatic functions to support operators.
- Manual
  - o All the maintenance functions are executable both through a graphic interface and the local starters' interface.
- Diagnostic program
  - o The system provides an accurate diagnostic service for each piece of equipment (Equipment error, network error, etc.)
  - o Semi-automatic functions also include a feasibility study to give the operator essential information for the management of the plant.

Accessibility to the automatic and manual functions is allowed only to authorized personnel, access profiles are created and can be linked to each operator.

Access to the system from several panels online allows an accurate control of maintenance activities of the plant. Each panel displays messages in the specific area in order not to cram the operator with information that does not regard his area.

## System Architecture and Configuration

- PLC: SIMATIC S7 1500/ET200SP



- CPU: two 1511 in redundancy
- HMI: three KTP 900 Basic PN
- Network: Profinet
- Starter: M200D

### TIA1500 redundancy

In order to increase reliability of the system, the dotted control system has been set up in cooperation with Siemens to call for the application of redundancy. Development and testing have been done in collaboration with Siemens specialists that provided us with the needed software libraries (betas still not on the market).

The configuration is as follow:

#### **PN-network:**

PLC Master and slave have the same configuration, they are both linked to the distributed I/O system. The IP address of both the CPUs is the same (PROFINET (PN)-port X1).

For this reason, one of the two CPUs (the slave one) is not connected with the distributed I/O system.

#### **IE-network:**

The two CPUs are constantly aligned through a 2nd network and dedicated libraries. This operation is done using two different IP addresses.