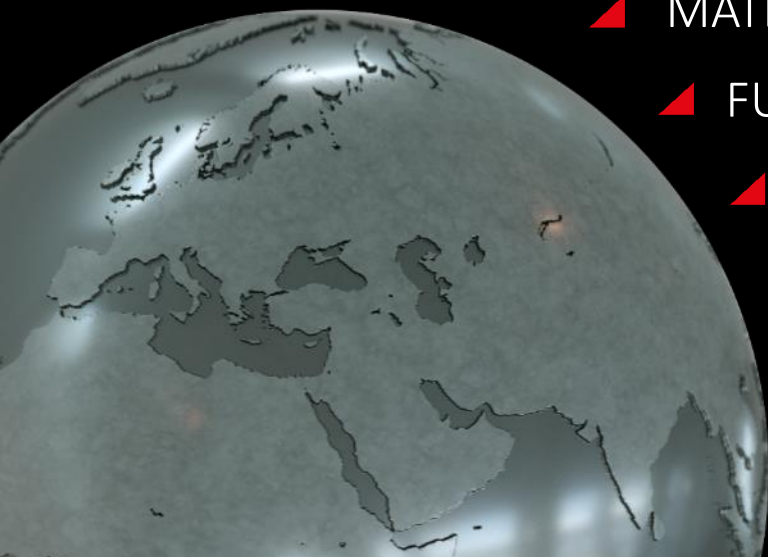


BB





- ▲ MATERIAL HANDLING EQUIPMENT
- ▲ FULL AUTOMATIC PACKAGING SOLUTIONS
- ▲ INDUSTRY 4.0
- ▲ ENERGY EFFICIENCY
- ▲ ROBOTICS & ARTIFICIAL VISION SYSTEMS
- ▲ INNOVATION IN PRESSES

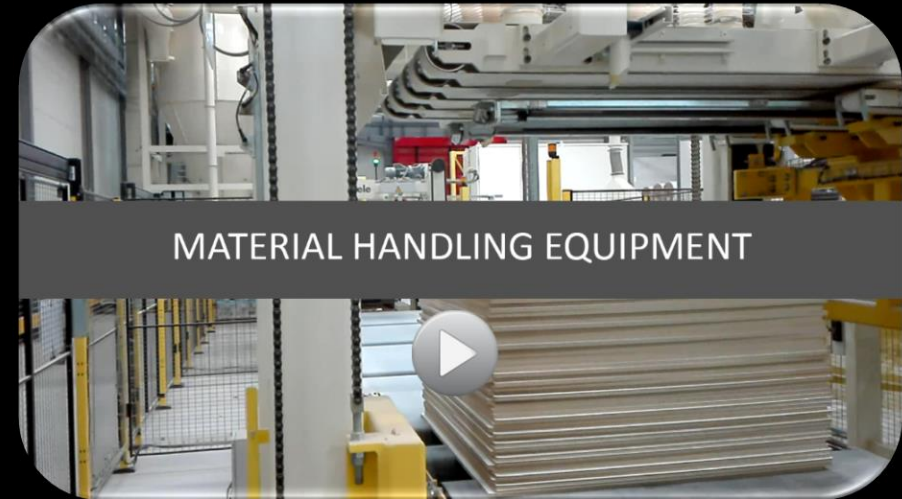


The innovation in material handling systems is in the DNA of Biele Group.

Our presence in sectors such as **Wood**, **Metal**, **Building** and **Automotive** allows us to generate synergies between different technologies and the constant improvement of speed and energy efficiency of our complete solutions.

### State of the Art solutions for:

- ✓ **FURNITURE PAINTING LINES**
- ✓ **THIN BOARDS**
- ✓ **ULTRA LIGHT MATERIALS**
- ✓ **HIGH PRESSURE LAMINATE**
- ✓ **FRAME ASSEMBLY**



CONCEPT: PACKING

PROJECT: FURNITURE PACKING & PALLETIZING

Automatic packaging lines require many repetitive and heavy-duty movement operations that are ideal for robotic application.

In addition, artificial vision systems are used to ensure that the final customer receives the product with all the necessary elements for assembly: spare parts, hardware, instruction book, labeling, etc.





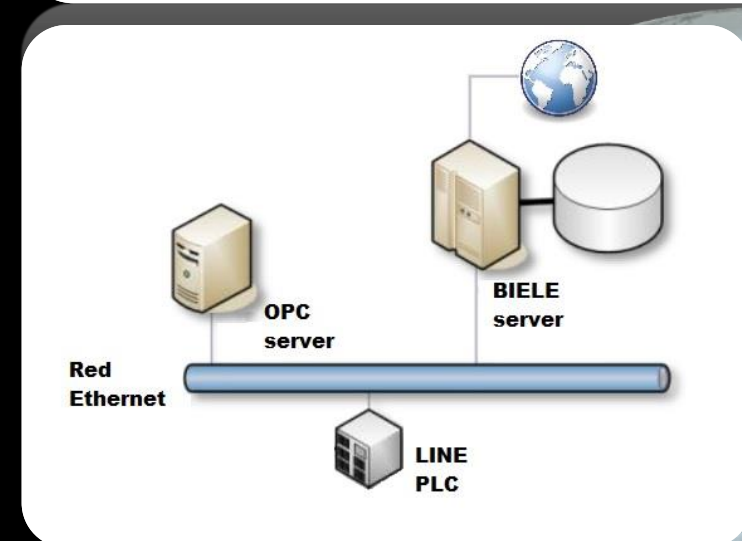
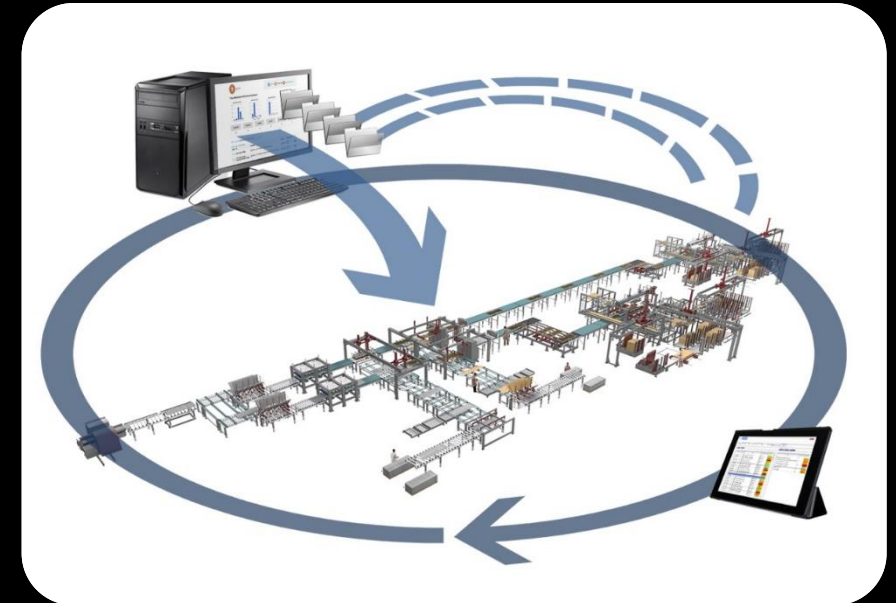
### INTEGRATION OF 4.0 TECHNOLOGIES IN BIELE GROUP LINES

Cutting edge technologies require latest innovations to procure end customers with products that will increase line availability augmenting production figures as well as planning and monitoring ongoing line necessities.

Biele Group has developed I4.0 based tools to adapt all type of lines and processes to a new era.

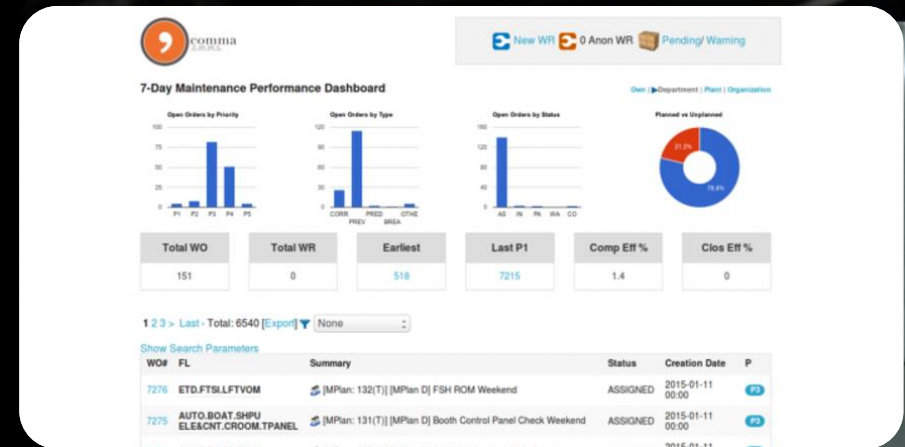
Biele Group provides software solutions for the maintenance and production fields, covering a wide range of features and open to customize and develop its tools to client's needs. Biele solutions are:

- ✓ BIELE CMMS (Computerized Maintenance Management Software)
- ✓ BIELE MES (Manufacturing Execution System)



CMMS

By means of a Computerized Maintenance Management Software (CMMS) Biele will deploy on each line the basis to improve the maintenance operations enhancing the performance, enduring the lifetime of each of the components and controlling every aspect necessary to increase machine availability.



### CMMS



Maintenance Activity Planning



Maintenance Resource Management Planning



Maintenance Monitoring



Event & Alarm Monitoring



Spare Part Purchase & Stock Analysis



Maintenance Reports



Biele LIVE Support



Documentation



Warehouse Traceability



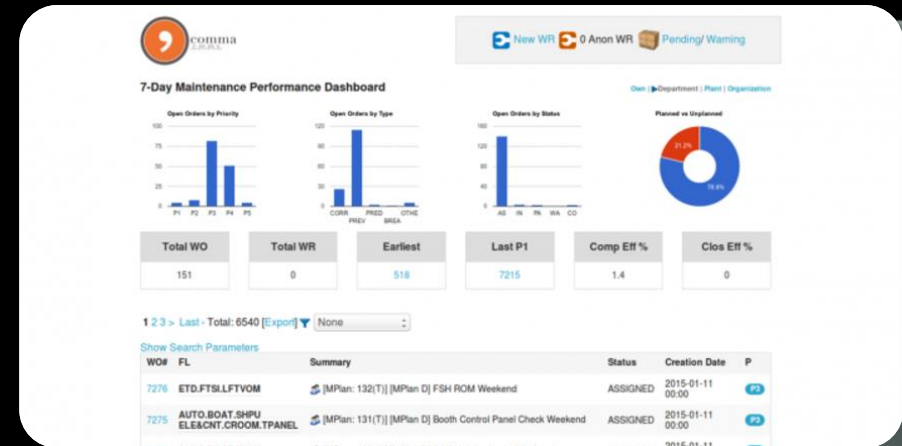
Portable Solutions



Augmented Reality

## Biele INDUSTRY4.0

CMMS



### MES

By means of a Manufacturing Execution System software (MES) Biele will provide all the necessary information to enhance all production related information availability in real time enabling faster decision making thus procuring better overall production results i.e. improving production figures, production lead times, costs, defective components etc.





### MES



Production  
Planning



Production  
Monitoring



Product  
Traceability



Live KPIs



Customizable  
Reports



Event & Alarm  
Monitoring



Event  
Reporting



Raw Material  
Stock Control



Warehouse  
Stock Control



Energy  
Efficiency



Portable  
Solutions

## Biele INDUSTRY 4.0

MES



High-speed lines require precise panel transport systems to avoid damage to product quality.

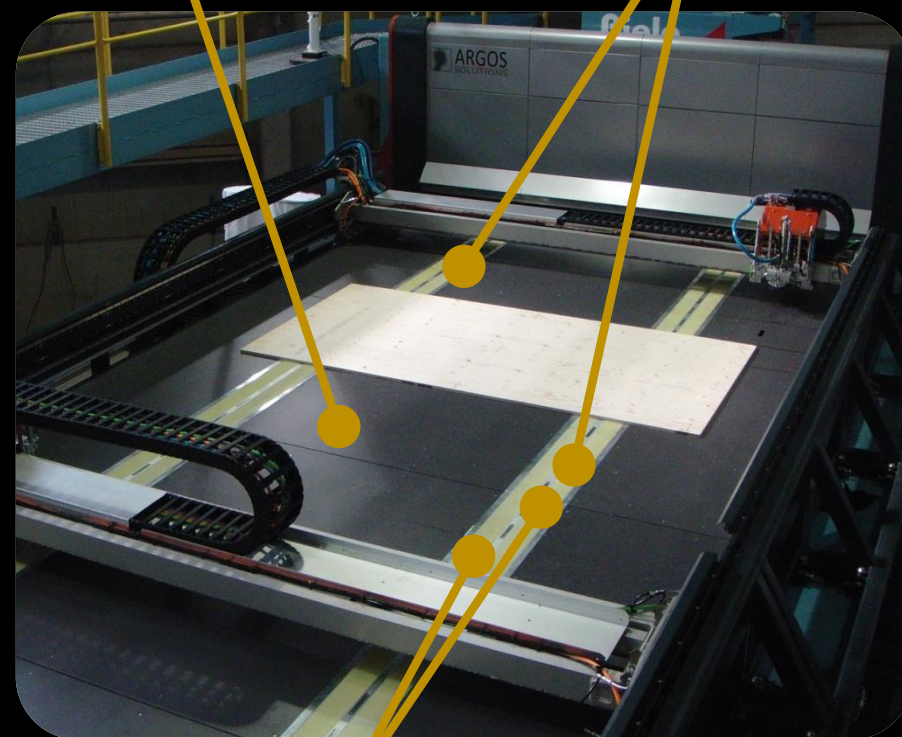
For these applications, vacuum transport systems are very common in the industry.

The EVO System developed by Biele allows all these functionalities, in addition to ensuring maximum energy efficiency.

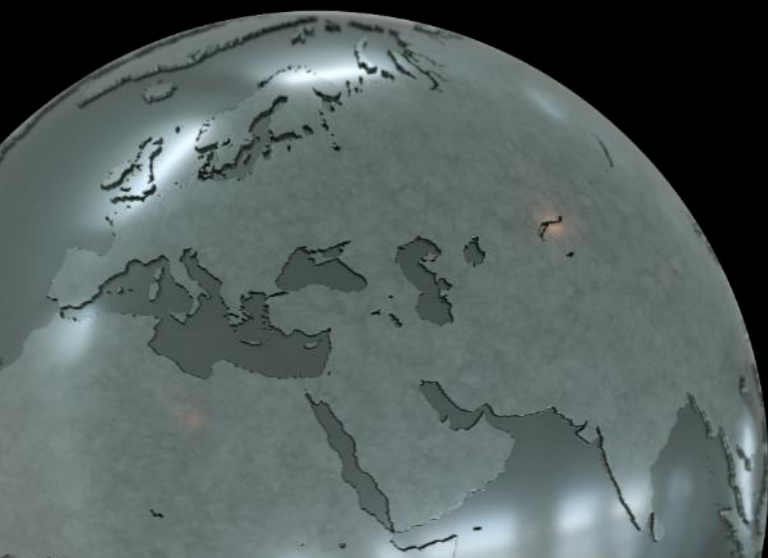
## ENERGY EFFICIENCY EVO VACUUM HANDLING SYSTEMS

Extremely stable  
and low friction table

High friction timing belts

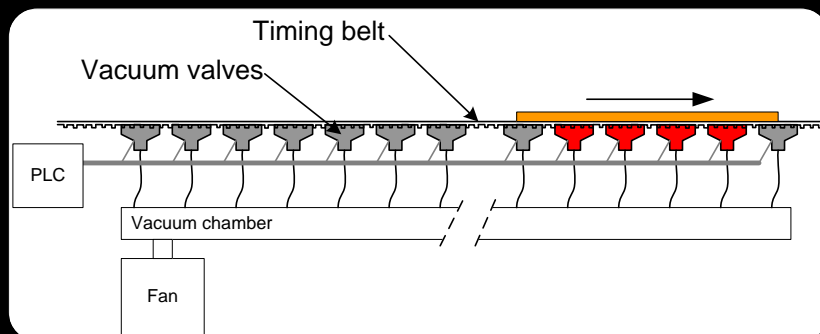
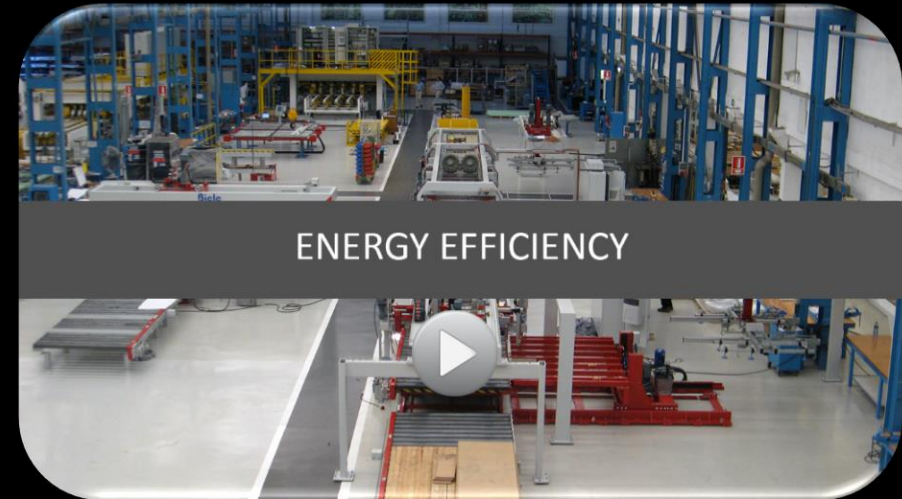


Controlled vacuum chambers



Energy Efficiency consists on two main strategies, leading to a reduction on Energy Consumption to a third:

- ✓ Reducing the demand to the vacuum system:
  - Tracking of boards for each arm
  - Special belts with low transversal air loss
- ✓ Vacuum Pressure and Air Flow Optimizing:
  - Vacuum pressure is adapted to the quality of the board
  - Air Flow is adapted to the amount of boards being processed



Go to: [Energy Efficiency in Presses](#)



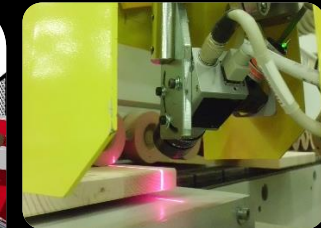
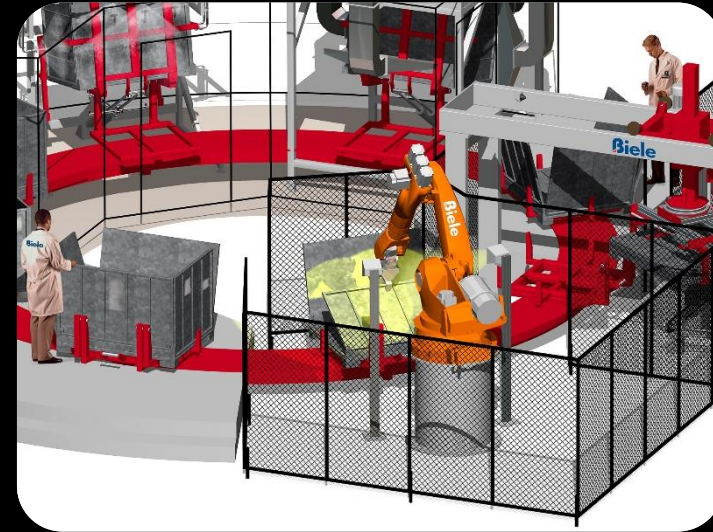


The new Biele Group spin off, Robotics & Artificial Vision, combines state of the art vision systems with robotic handling.

The addition of both technologies allows the development of solutions in order to perform reliable, high speed and repeatable manufacturing operations.

### We develop:

- ✓ **PACKING**
- ✓ **SURFACE DETECTION**
- ✓ **GEOMETRY INSPECTION**
- ✓ **OBJECT RECOGNITION**
- ✓ **LACK OF MATERIAL DETECTION**
- ✓ **HPL EDGE DETECTION**





CONCEPT: PACKING

PROJECT: FURNITURE PACKING & PALLETIZING

Automatic packaging lines require many repetitive and heavy-duty movement operations that are ideal for robotic application.

In addition, artificial vision systems are used to ensure that the final customer receives the product with all the necessary elements for assembly: spare parts, hardware, instruction book, labeling, etc.



### CONCEPT: SURFACE DETECTION

Surface detection is critical in order to identify defects in the production processes that can minimize rejects or lower quality products. For many years now, Biele has been using cutting edge vision systems to facilitate operations that are not doable by humans in a reliable and efficient way.

**PROJECT:** Detection and Repair of Plywood Panels. Based on Camera systems that detect cracks and knots of Plywood panels made of different species. In these lines, the defect will be routed and filled with different type of putty depending on size and application.

**PROJECT:** Detection and outsourcing of Furniture panels in finishing lines. By means of Cameras, we are able to detect pieces running at a high rates into finishing lines, in a way that the system automatically can outsort B quality pieces and replace them by A quality ones before stacking.





CONCEPT: GEOMETRY INSPECTION

PROJECT: INTERLEAVER LINE

Fiber Cement interleaver make up station

In a line where sorting and rejecting of elements is a key feature, BIELE customizes the solution including 3 different technologies for the inspection of the elements in 3 different areas of the line: >>>



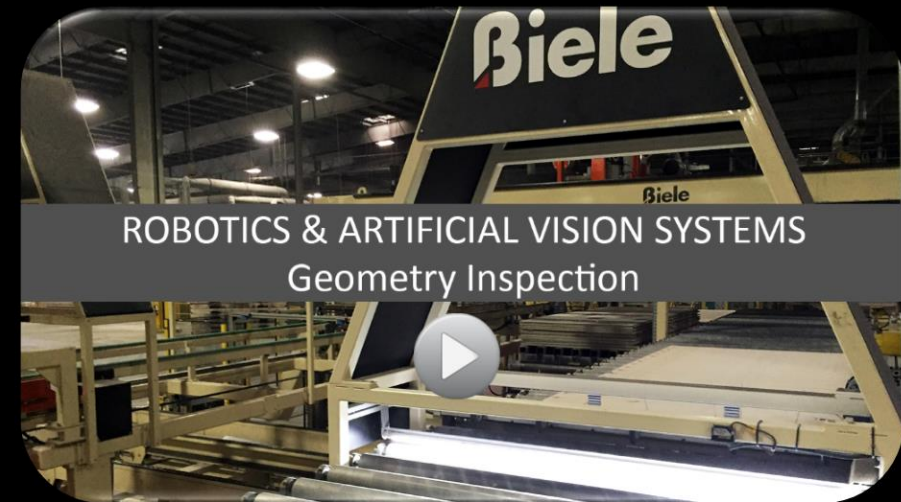
CONCEPT: GEOMETRY INSPECTION

PROJECT: INTERLEAVER LINE

Fiber Cement interleaver make up station

In a line where sorting and rejecting of elements is a key feature, BIELE customizes the solution including 3 different technologies for the inspection of the elements in 3 different areas of the line:

- ✓ **Shadow processing with lights and cameras:**  
Detection of elements (interleavers vs steam strips) and deactivation of different areas of the handling system.
- ✓ **Laser system for detection of shapes:**  
To detect different level of deformation of previously sorted elements.
- ✓ **Linear camera for detection of surface:**  
To detect smaller defects of previously sorted element.



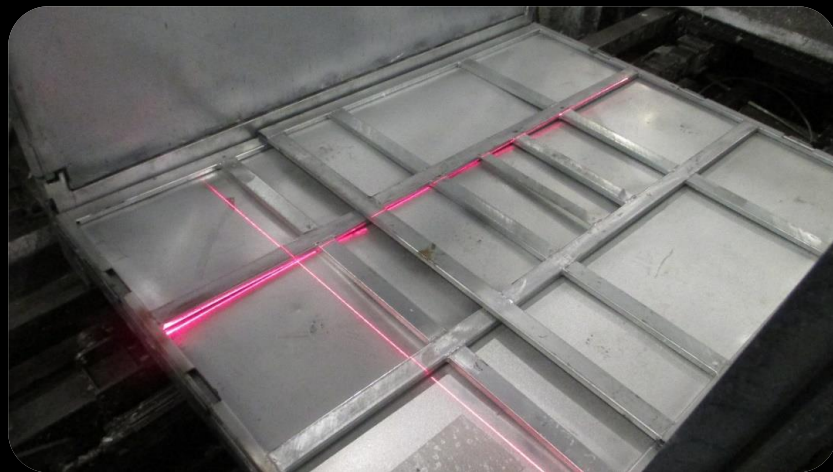


CONCEPT: OBJECT RECOGNITION

PROJECT: CONTAINER CLEANING CELL

Vision systems are used to provide information about the sequence to be followed by the robot to open a folded container.

Containers are used to transport rubber.



CONCEPT: LACK OF MATERIAL DETECTION

PROJECT: TRIMMING LINES

For products with applications of high value added in both plywood and solid wood, it is necessary to guarantee the quality of the edges of the panels.

Through the combination of laser systems and cameras, it is possible to detect the lack of material in the edges of the boards.



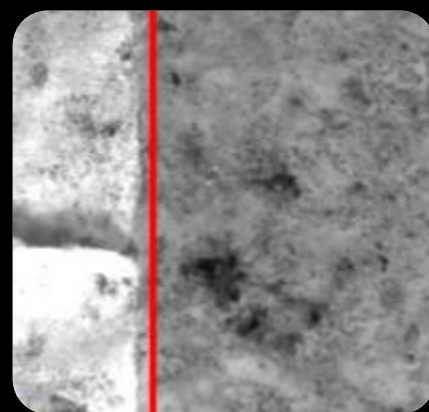
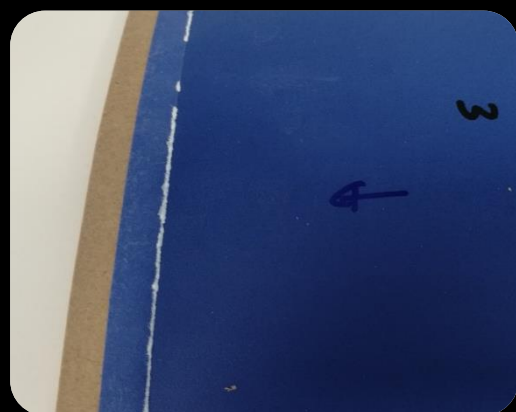
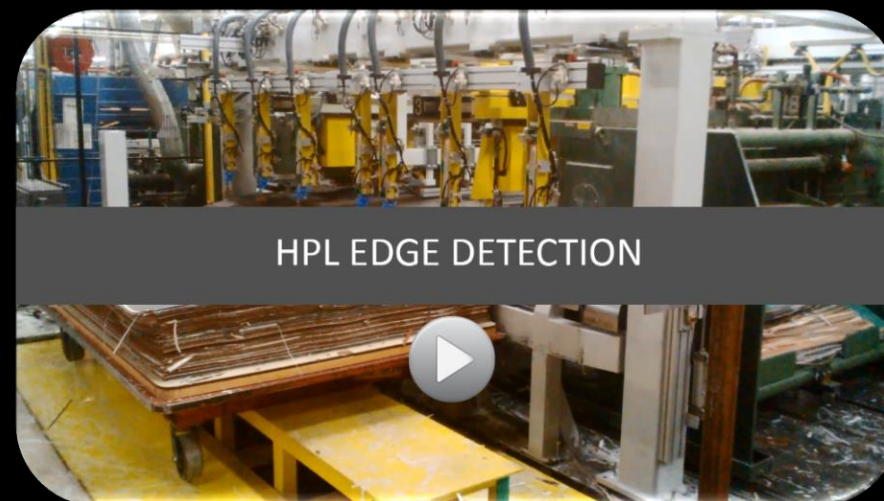


CONCEPT: HPL EDGE DETECTION

PROJECT: HPL TRIMMING LINE

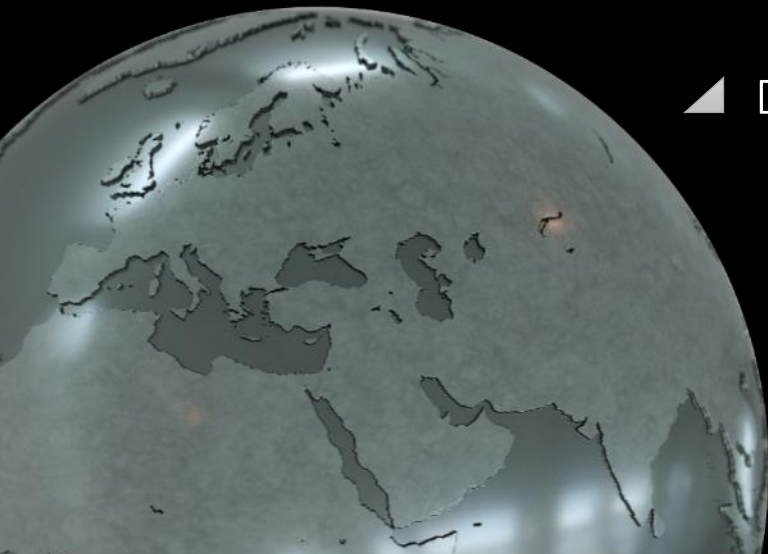
Vision systems are used to detect the size of the soft edge and guarantee an accurate alignment of the laminates during the trimming process.

The result is a maximum utilization of the useful surface of the laminate, a better cutting quality and a lower power consumption.





- ▲ DE-WATERING PRESSES
- ▲ ADAPTATIVE PARALLELISM
- ▲ EMBOSSED IN REGISTER FOR SHORT CYCLE PRESSES
- ▲ COOLING PRESS
- ▲ ENERGY EFFICIENCY





New application to remove water out of the veneer stacks before going to the drying process

De-watering presses, also known as filter presses, are an innovative solution where the veneer stacks are pressed in order to squeeze a great amount of water out and simplify the drying stages.

The bottom line is to save up in the energy required at the dryer and consequently reduce in a significant way the production costs

Technically speaking, using Cylinder Sections Compensation, we achieve the very accurate and reliable system required to guarantee the parallelism of the press plate when going down and touching the material



DE-WATERING PRESSES



New application to remove water out of the veneer stacks before going to the drying process

De-watering presses or filter press

PROJECT: 1,850 Ton Stack Press

### MAIN FEATURES

Product: Birch and Spruce Wet Veneer

Type of press: Cold press

Closing force (Ton): 1,850

Platen dimensions (mm): 2,800 x 3,000

Specific pressure (Kg/cm<sup>2</sup>): 25

Cylinders: Upper driving

Maximum stack height (mm): 1,200

Daylights: 1

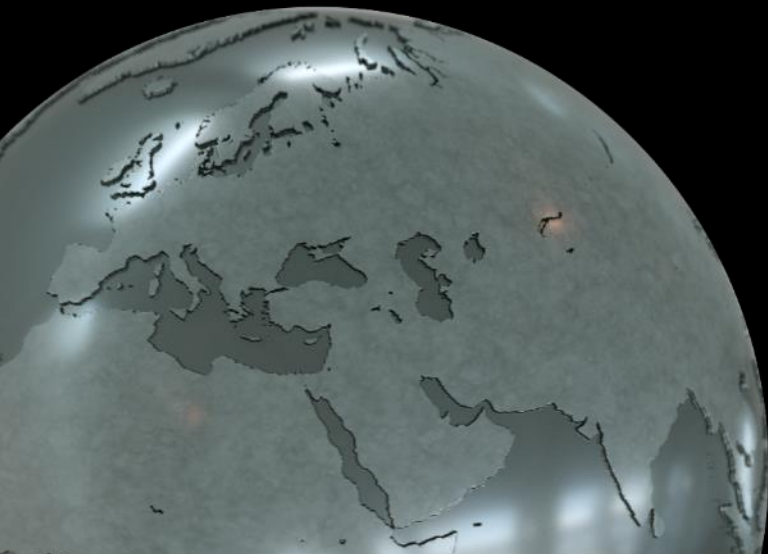
Daylight height (mm): 1,400



Tailored solutions on parallelism  
according to product requirements

PARALLELISM TYPE: **Cylinder compensation**

The solution shown in this case concerns to a 5,500 Ton  
press with 1,500 x 3,000 mm plates. Specific pressure 175  
Kg/cm<sup>2</sup>. The pressure in upper cylinders can be  
independently regulated by pairs in order to achieve a  
parallel compression of the stack.



Tailored solutions on parallelism  
according to product requirements

PARALLELISM TYPE: **Cylinder compensation**

PROJECT: 5,500 Ton Stack Press

### MAIN FEATURES

Product: Wet fiber cement (PH=12)

Type of press: Cold press

Closing force (Ton): 5,500

Platen dimensions (mm): 1,500 x 3,000

Specific pressure (Kg/cm<sup>2</sup>): 175

Cylinders: Upper driving

Maximum stack height (mm): 910 (50 sheets and 50 interleavers)

Daylights = 1

Daylight height (mm) = 1,110





Tailored solutions on parallelism according to product requirements

PARALLELISM TYPE: **Kiss contact:**  
**Active control of parallelism.**

The pinion-rack system shown in blue ensures an accurate guidance during the upper platen lowering.

A set of high precision sensors located on each corner of the upper platen gives a real time measurement of the platen parallelism.

Once the upper platen comes into contact with the material, the platen adapts to its geometry. Limits are defined in connection with the torque of the shafts shown in blue.



Tailored solutions on parallelism  
according to product requirements

PARALLELISM TYPE: **Kiss contact:**  
**Active control of parallelism.**

PROJECT: 980 Ton Fiber cement in line Press

#### MAIN FEATURES

Product: Fiber cement

Type of press: Cold press

Closing force (Ton): 980

Platen dimensions (mm): 1,450 x 6,300

Cylinders: 4. Upper driving

Daylights: 1

Daylight height mm: 300

Deflection of Plates (mm):  $\leq 0.10$

Guidance system accuracy mm:  $\pm 0.5$



Tailored solutions on parallelism according to product requirements

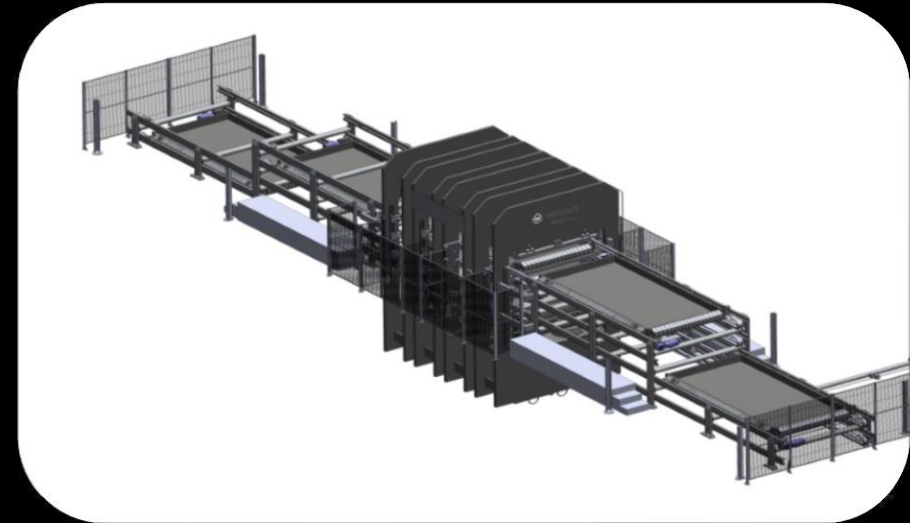
### PARALLELISM TYPE: **Molds coupled during melting**

This type of parallelism relates to presses where the material to be produced becomes semi-melted.

Up to 120 mm thick polyethylene boards are produced at the same time.

First of all, the lower pressure platen travels along special long V-guides (in red). A pinion-rack system reinforces guiding accuracy.

As the material is being compressed under high temperature, it becomes semi-melted. Molds are then coupled by using a bolt system as shown in all press platen corners.





Tailored solutions on parallelism  
according to product requirements

PARALLELISM TYPE: **Molds coupled during melting**

PROJECT: 4,300 Ton Press for Technical Plastic Board Production

### MAIN FEATURES

Type of press: Hot press

Product: Ultra high molecular weight polyethylene /  
Polypropylene

Operating temperature (°C): 220

Number of daylights: 4

Mold dimensions (mm): 2,060 x 4,170 x 220

Final material thickness (mm): 120

Closing force (Ton): 4,300

Cylinders: 8. Lower driving

Specific pressure (Kg/cm<sup>2</sup>): 50

Length of line (m): 27



New technology for embossing in register applying artificial vision

Embossed In Register Technology (EIR), also known as Synchronous Pore Technology, has been applied by Marzola in Short Cycle Presses since 2000.

EIR uses artificial vision to match the laminated paper with the pattern of the press platen.

Deco paper becomes to nature and can be applied not only on products based on wood panel substrates, but also on other materials such as kraft paper, rubber, etc.

Deep embossing is obtained through robust press design with pressures above 100 Kg/cm<sup>2</sup>



New technology for embossing in register  
applying artificial vision

PROJECT: 1,225 Ton Press

### MAIN FEATURES

Product: Laminated Flooring

Type of press: Hot press

Operating temperature (°C): 160

Closing force (Ton): 1,225

Platen dimensions mm: 1,400 x 2,600

Cylinders: 8

Specific pressure (Kg/cm<sup>2</sup>): 35

Number of daylights: 1

Daylights height mm: 300





New technology for embossing in register applying artificial vision

PROJECT: 9,500 Ton Press for High Pressure Decorative Laminates (HPL)

Site: Cartagena de Indias, Colombia

### MAIN FEATURES

Product: Direct lamination products

Type of press: Hot press

Operating temperature (°C): 200

Closing force (Ton): 9,500

Platen dimensions (mm): 2,150 x 5,400

Cylinders: 12. Upper driving

Specific pressure (Kg/cm<sup>2</sup>): 100

Number of daylights: 1

Daylights height mm: 300



### GOAL

Synchronous Pore Technology to match pores between décor paper and press plate.

### SOLUTION

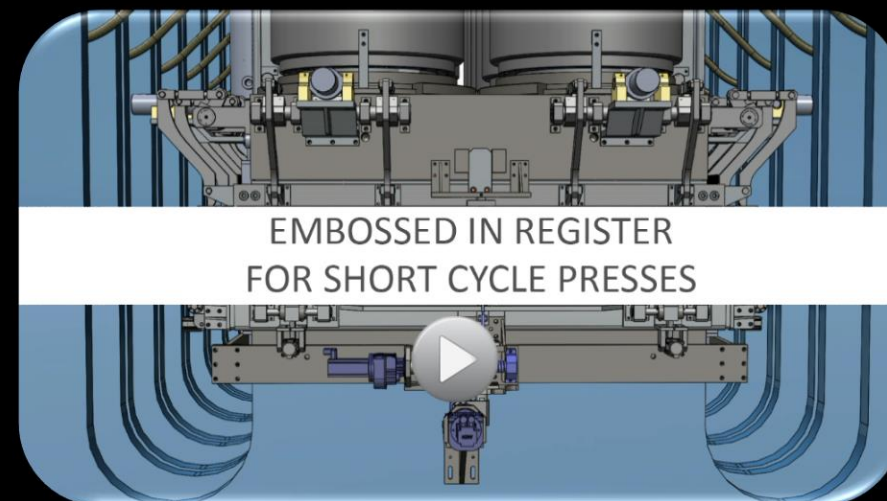
Combination of several measuring and vision systems to match décor paper and template.

### PAPER

Artificial Vision systems are used for measuring paper, allowing 100% control over size deviations produced during the impregnation process.

### PRESS LOADING SYSTEM

In-press XY-Compensation systems to ensure for correct laying of the product inside the press.



EMBOSSSED IN REGISTER  
FOR SHORT CYCLE PRESSES

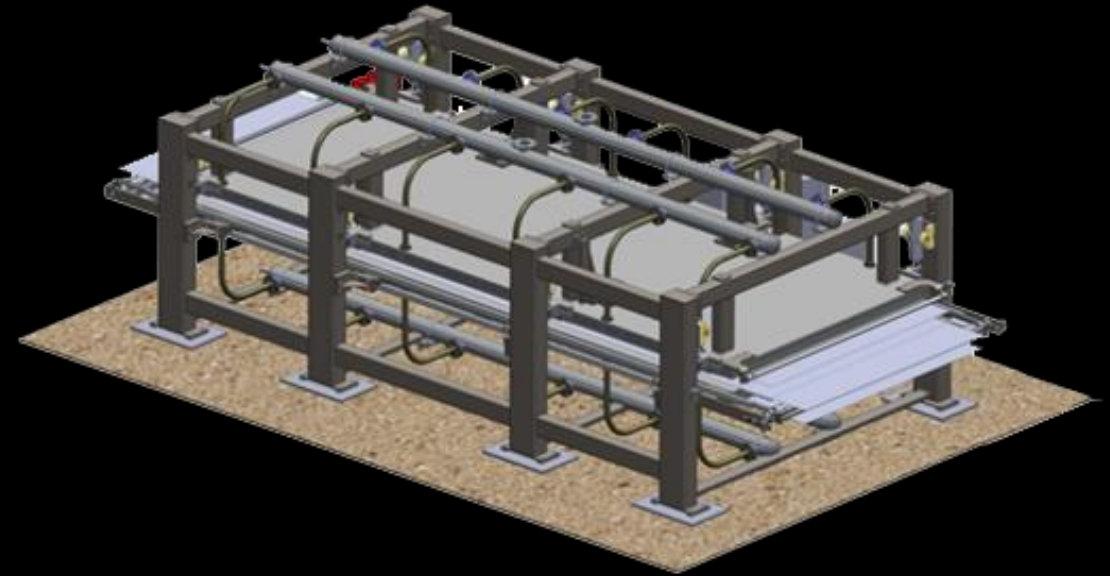


New system for faster and uniform cooling of materials using hydraulic pressing

Marzola has developed a press able to cool different materials by contact. It represents many advantages compared to the traditional cooling systems after pressing.

Among others, the main advantages are:

- ✓ Cooling by contact is much more homogeneous
- ✓ Avoid warping. Absence of stress in the material
- ✓ Reduce cooling cycle time
- ✓ Less floor space needed
- ✓ Better gloss finishing of the product
- ✓ Contributes to post-process optimizing, as in case of sanding and cutting processes





Innovative solutions to decrease systematically consumption energy keeping the quality of the products and increasing lifetime materials.

Proposed innovations lead to Cost Savings and Environmental Friendly Solutions.

The operational parameters have a strong influence on the energy losses. However, certain technologies applied in the presses can also have a major impact on saving energy consumed.

Marzola has developed different innovative solutions to reduce the energy consumption on presses and increasing lifetime of components:

- ✓ Hydraulic Accumulation
- ✓ Triple Chamber System
- ✓ Frequency Control Solution

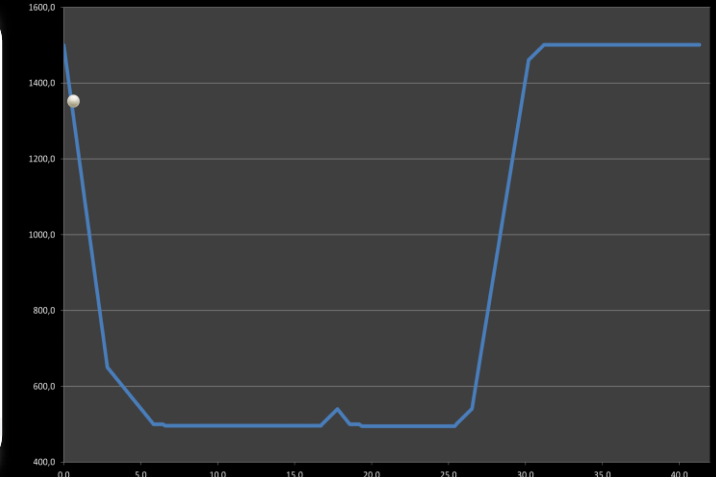


Innovative solutions to decrease systematically consumption energy keeping the quality of the products and increasing lifetime materials.

This solution takes advantage of periods of low energy demand in the cycle so to accumulate the energy needed in high demand situations.

### FIELDS OF APPLICATION

- Processes with high peak of power demand
- Processes with stops, pressure maintenance or low demand intervals



	Standard Solution	<u>With Accumulation</u>	Theoretical
Motor/Pump Power Needed (CV)	<u>100,0</u>	<u>30,0</u>	23,5
Time at full load (%)	9%	82%	100%
Annual Consumption (MWh/year) *	<u>219,5</u>	<u>143,6</u>	118,4
Inefficiencies (%)	85%	21%	0%
Energy savings (MWh/year)	0,0	75,9	101,1
Energy savings (%)	0,0	35%	46%
Installed power needed (CV)	103,0	35,5	25,5
Oil volumen needed (liters)	<u>1800</u>	<u>1000</u>	--

\*Data based on 250 TM press.

PROJECT: 2,000 Ton Hydraulic Press for blockboard panels

### MAIN FEATURES

Product: Blockboard panels

Type of press: Hot press

Operating temperature (°C): 170

Closing force (Ton): 2,000

Platen dimensions (mm): 2,300 x 6,700

Specific pressure (Kg/cm<sup>2</sup>): 13

Cylinders: 10. lower driving

Daylights: 14

Daylight height mm: 150

Pressing Close: Needed 360 CV during 14 seconds

Compression: Needed 190 CV during 5 seconds

Total cycle time: 6 minutes

Motor: 60 CV

Accumulation System: 350 L





