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process automation  
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# SYMPOSIUM 2011 : INTERNATIONAL NETWORK MEETING AT MATRASUR COMPOSITES

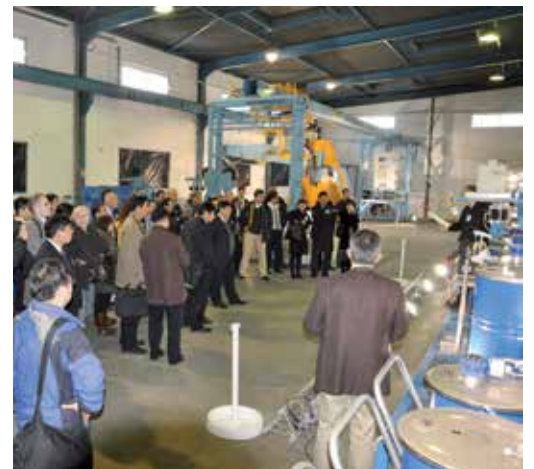
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7-axes trimming robot type USIMAT in action



Roboticians ready to perform the live demonstration



1500 m<sup>2</sup> were necessary for the organization



Instantaneous programming based on the copy of the operator's movements by the robot



10-axes spray-up robot type ROBOTAT for gelcoat and resin & fiberglass in action



Continuous material supply system for robot

# IT'S TIME TO ACT !



Didier BARBINI, Director

**H**ello to you all!  
 It's been several months since the 1st International Symposium took place at MATRASUR Composites. The Symposium was the occasion to attend to various live demonstrations which truly showed that

the automation of production processes is now affordable to all composite part manufacturers. Only a specialized, precise and innovative automation technology will allow companies to continue to produce, to maintain their margins and prepare for the future with confidence. With its 38 years of experience MATRASUR Composites is able to offer specific, custom-made automation solutions to its customers. To do this, MATRASUR Composites is surrounded by a Network of international partners for a local and ongoing technical and commercial service worldwide.

**Only a specialized, precise and innovative automation process will allow companies to continue to produce**

The present Newsletter will provide you with a view into the different automation processes carried out worldwide, and will allow you to enter into the heart of businesses, discover the latest technical innovations, and follow up on leading-edge production technologies. This Newsletter is aimed for MATRASUR Composites' Network of Partners and Customers. As an equipment integrator and manufacturer, MATRASUR Composites can perform a personalized audit visit to the different production facilities and propose an automation project that suits the company's immediate needs. The next International Network Meeting will be held at MATRASUR Composites the day after the JEC Europe Trade Show, in Marcoussis, near Paris, France. At this occasion we will present our newest technologies in terms of equipment.

See you soon,

# Small companies : A chance to automate your production - Act now !

For the first time it is possible for a company in the Composites Manufacturing Industry to automate its production process while complying with the new work legislation.

The head of the U.S. Department of Health and Human Services, Kathleen Sebelius, has made it known that her department is preparing to elevate the classification of Styrene to a “reasonably carcinogen”.

Meanwhile in Europe...

A decree on the limit level of styrene emissions reported a tightening of the legislation. Up-to-now suggested values of 23PPM for VLEP-8 hours and 46 PPM for VLCT-15 minutes are said to become binding values, effective July 1<sup>st</sup>, 2012.

In short, companies can no longer postpone deadlines.

They must act now!

## Today companies have 2 solutions

The first solution is to invest in highly performing extraction systems in order to comply with the new styrene legislation (23PPM) without changing the organization.

This solution is a source of **cost**.

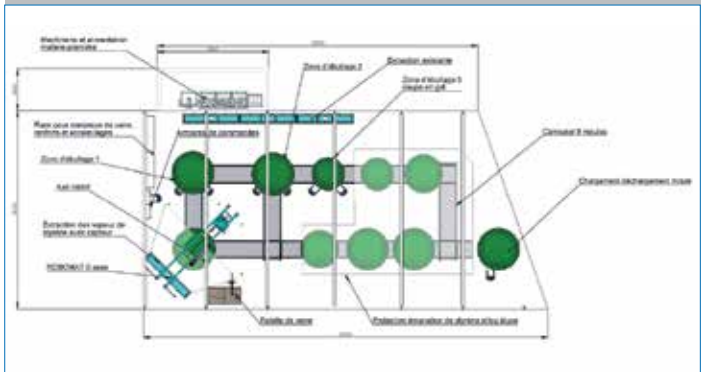


The second solution is to invest in an automated production process :

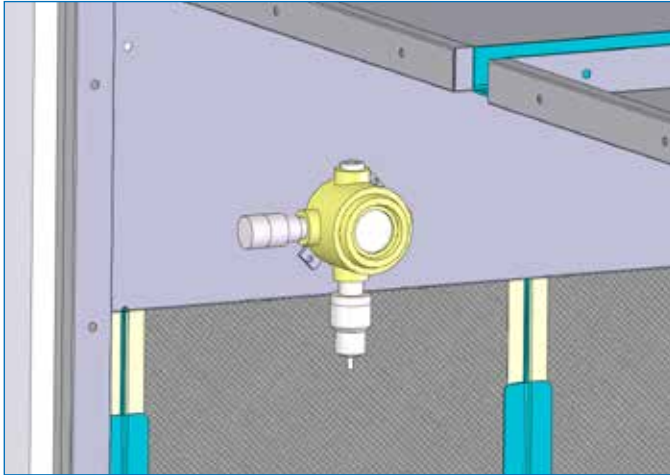
This solution is a source of **profit**.

The automation of production processes today is a “must”.

It is the only answer to two main concerns: Achieving competitiveness and complying with work legislation. Not only will your company be able to meet work legislation requirements, it will also be able to increase productivity and part quality. Investment return is fast and the company can secure its future on the long term.



## STYRENE SENSOR



Most composite part manufacturers turn on the styrene extraction system in the morning at the maximum power level and turn it off in the evening, regardless of the number of PPM and the concentration of styrene in the air.

MATRASUR Composites has developed a sensor that detects the quantity of PPM in the atmosphere and adapts the level of extraction accordingly.

The level of extraction is dependent on the level of styrene. The extraction intensity will adapt instantaneously to the actual ambient pollution thus achieving significant savings.

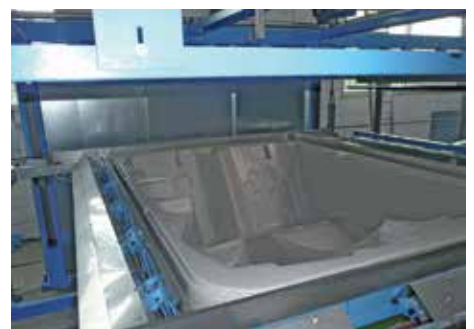
## MATRAFORM: NEW THERMOFORMING MACHINE FOR LARGE INDUSTRIAL PARTS

Example of application : Spa manufacturing

Manufacturers of thermoforming machines today are forced to adapt their existing machine range to fit large part manufacturing.

MATRASUR Composites has developed a thermoforming machine which takes large industrial part constraints into account in order to propose simple but innovative, robust and suitable equipment.

The MATRAFORM machine is proposed at a very competitive price and it is provided with a user-friendly, progressive software.



# MATMAX: NEW CASTING UNIT FOR EPOXY RESIN, POLYURETHANE RESIN, AND SILICONE ELASTOMERS

Example of client applications in 2011 :

- **Manufacturing of silicone moulds for the production of fake stones etc. :**

High viscosity material

Polyurethane resin : 2500 CPS at 20°C, density 1.4

Hardener : 75 CPS at 20°C, density 1.4

Mixing ratio: 8:1 by Volume

Casting flow : 5L/min

Dynamic mixture with speed variator

- **Bonding of oyster spats on plastic grids:**

Casting of 180 drops of adhesive in 100 seconds

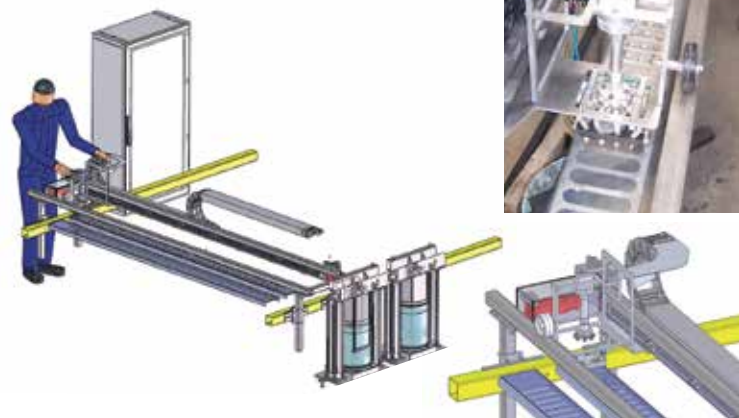
Each drop represents 2gr of mixed material

After bonding, the grid is immersed in water to let the oysters grow

Epoxy resin : 30 000 CPS at 25°C

Hardener : 130 000 CPS at 25°C

Mixing ratio : 1:1 by Volume



This new machine type MATMAX is especially designed for the casting of two-component, high-viscosity materials which require high accuracy and a very homogeneous mixture. The machine is designed to meter and dispense both small quantities or high volumes, depending on the pumps used.

Major advantages :

Use of plates with two column jacks to pump material. The system is adapted to standard material drums

Use of gear pumps for continuous material supply  
Ability to change the resin/hardener ratio without changing the flow rate

Temperature control system for resin and hardener  
Reproducibility of casting volumes due to a volume breakdown through rotation





# ROBOT INTEGRATED TO A CAROUSEL

Why integrate a robot to a carousel?

- To optimize all stages of production
- To use the floor surface in the most efficient way
- To decrease mould handling operations that may come to be very costly in terms of labor
- To have operators intervene only for roll-out and reinforcement operations
- To have a controlled production flow
- To concentrate lamination in one area, reduce extraction, and risk areas in the workshop
- To place the metering system in a safety room with controlled temperature
- To oachieve high productivity

The spray-up of release agent, gelcoat and barrier-coat can be carried outside production hours since only one operator is needed to launch the program.



After spray-up and roll-out operations, moulds are brought into a curing tunnel equipped with a heating system and an extraction system for controlled curing cycles and increased surface quality.

This organization of production reduces pollution in the workshop and increases the efficacy of extraction.

The 11-axes robot with instantaneous programming technology allows to automate pool production without calling for skilled personnel or disrupting daily habits.

Programming is performed instantaneously.

The operator sprays with the robot as he would with a traditional machine.

Programming time equals spray-up time.

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The roll-out cabin is equipped with a low-level extraction under the mould and a high-level extraction from above. During roll-out the extraction system generates an air flow from above towards the lower area thus eliminating the concentration of styrene and allowing operators to roll out under good conditions.

Production can be concentrated in a small area with controlled extraction according to the task to be performed, allowing the company to comply with work legislation and reduce heating costs.

The motor of the extraction system is located outside the cabin so that noise is reduced.





There are no material losses.

The metering technology remains the same.

Operators can quickly master this technology with a training.

Each material (release agent, gelcoat, barrier coat, resin, solvent ...) has its own feeding circuit connected to the robot.

The operator will select the desired material to be sprayed according to the program to be performed.

The control cabinet and launching screen are outside of the spray-up cabin from which the robot can be seen.

Metering units are located in a separate room with controlled temperature set to 20°C.

The robot prevents operators from being exposed to styrene emissions.

The thickness of vertical layers can be doubled without fiberglass fallout thanks to a dynamic spray fan.

The robot's programming technology allows to take only into consideration the spray-up pattern that complies with production's specifications thus helping the company save up to 12% in material consumption.

Working with material at constant temperature allows to control viscosity and gel cycles.

Working at a constant flow rate ensures a repeatable process and guarantees constant layer thicknesses over time.

The "low spray control" technology ensures the simultaneous spray-up of resin and fiberglass with reduced emissions and air inclusion for a faster roll-out.

The "high-speed injection roving cover" technology of the robot's chopper ensures the simultaneous spray-up of resin & fiberglass without fiber pollution.

Roving strand breaks are automatically detected by the system which immediately stops the robot. The robot can then pick up spray-up where it was left.

The operator no longer determines the production cycle; it is the robot that executes all tasks repeatedly according to the established program.

The concept of a robot integrated with a carousel is both a suitable solution for facing growing environmental constraints by concentrating production in a limited area, and a secured solution to significantly increase production with the certainty of reproducing the same part quality while keeping control over raw material consumption.

The company no longer suffers from absenteeism problems or faulty operator handlings but counts on repeatability, quality and is capable of honoring lead-times.

The automation of the workshop also provides the company with an undeniable advantage over its competitors.

The Return On Investment rate of the equipment is attractive.

**It is a leading-edge technology for companies that wish to continue to produce while guaranteeing the future of the company.**



# TRIMMING ROBOT FOR LARGE SIZE RAILWAY PARTS IN MONOLITHIC COMPOSITE OR REINFORCED WITH GLASS, ARAMID OR CARBON

## 6-axes robot type Robomat

### Client's specifications :

- Application scope: Trimming and drilling of railway parts with large dimensions
- Cart with part support structure to be supplied
- Part shrinkage to be considered: +/- 6 mm
- Possibility to trim large infused parts and RTM injected parts
- Positioning system for the part support cart must adapt to all part dimensions
- Soundproof cabin with dust extraction system to be supplied
- Robot adapted to carbon, aramid dust environment

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Labour legislation on fiberglass dust inhalation by operators is very strict.

Trimming operations are known for being hard tasks to be performed with accuracy. Finding suited personnel is difficult.

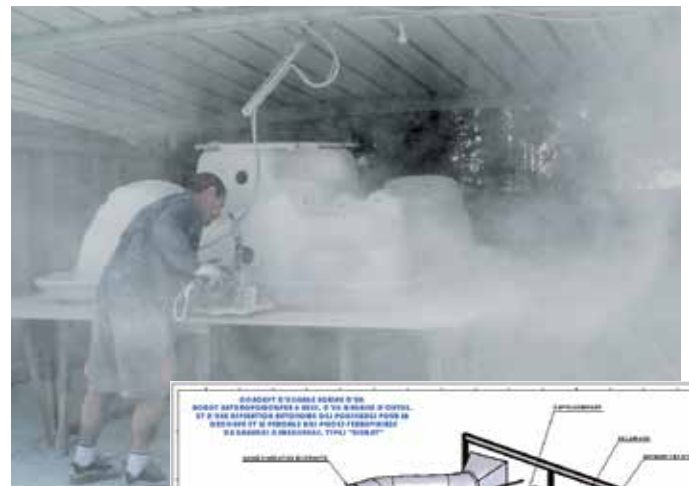
The use of a trimming robot had become an affordable solution for Small & Medium sized companies (SME).

### The USIMAT trimming concept allows to:

- Divide trimming cycle times by 4
- Obtain high precision and perfect process repetitiveness
- Stop operator exposure to trimming dust and eliminate the risk of accidents
- Concentrate trimming operations in one area

### Comments

The challenge of this project laid in : creating a part support structure that would suit all part sizes, dealing with the part shrinkage, and choosing the right electric spindle given the variety of reinforcement materials (glass, carbon, aramid).



## USIMAT: 6-AXES INDUSTRIAL ROBOT

The 6-axes Usimat robot is designed for the trimming and drilling of industrial parts out of monolithic composite or composed of a sandwich structure with glass, aramid or carbon reinforcement.

The Usimat robotic concept allows to trim large parts or parts with difficult accessibility thanks to the possibility to reposition the part support cart.

The robot is mounted on a platform fixed on the floor.

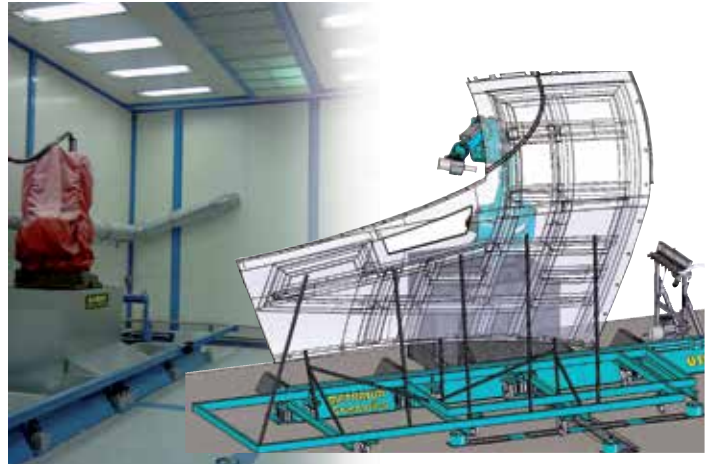


## POSITIONING SYSTEM FOR PART SUPPORT CARTS INSIDE THE TRIMMING CABIN

Once the part mounted on the support cart, the operator will position it in the trimming station with the help of a positioning system.

To face the large variety of parts to be trimmed, MATRASUR Composites developed a positioning system for both small and large-sized parts that allows to set the part in different positions.

The positioning system allows to optimize the in and out part flow in the cabin considering the production flow of the workshop.



## ROBOT CONTROL CELL AND PORTABLE TEACH PENDANT FOR 6-AXES USIMAT ROBOT

### Robot control cell:

The robot control cell is reliable, compact-design, and highly performing. It is very user-friendly and accessible to all users.

### Robot's Teach Pendant :

The robot is equipped with a portable Teach Pendant that allows to register programs directly from the trimming zone.

The Teach Pendant allows to create peer to peer programs by placing the robot's spindle head in the desired position and registering.

Programs can be launched from both the Teach Pendant or the robot control cell.



## PROGRAMMING SOFTWARE



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