



# The Potential of Nanotechnology Passivation in RIMA's Pre-Treatment Cycle

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RIMA SPA is a company serving the international agricultural, construction, ecology, and logistics machinery markets. In order to meet the higher and higher functional and aesthetic requirements of these sectors and increase its production volumes, it acquired a new coating plant and relied on DN Chemicals for the development of a seven-stage pre-treatment cycle already set up to integrate a nanotechnology passivation phase in future.



Some components manufactured and coated by RIMA.

With the exception of a market contraction due to the global COVID-19 pandemic, the annual report published by CECE<sup>1</sup>, the organisation representing and promoting the European construction equipment industry, reported that the construction sector has been experiencing steady growth for more than seven years now. Moreover, in addition to demanding high functional and mechanical characteristics, in the last few years the ACE sector has been paying particular attention to finishing aesthetics.

An example of this evolution in industry trends is the development of RIMA SPA (Montichiari, Brescia, Italy), which has been producing machine components for the ACE, ecology, and logistics sectors for fifty years, such as cranes, excavators, trailers, aerial platforms, and waste treatment and packaging equipment, and which recently had to update its paint shop with a new plant in order to meet the new quality and quantity requirements.

The replacement of its previous system went hand in hand with the implementation of a new pre-treatment process that was specifically designed by DN Chemicals, a Milan-based company specialising in

surface pre-treatment solutions. In anticipation of further developments in RIMA's production requirements, this cycle was structured in such a way that a nanotechnology no-rinse passivation phase can easily be implemented if required, which would eliminate sludge formation and reduce water and energy consumption.

**Local production, international exports**

Founded by Riccardo Magri as RI.MA in 1972, this firm has always distinguished itself through the quality and flexibility of its production, quickly growing from a small metalwork workshop manufacturing mechanical bearings and iron wheels to an international company and a benchmark partner for the ACE industry. Subsequently taken over by three employees who each expanded a specific branch and renamed it RIMA SPA, it is now a manufacturer and exporter of foot and wheel bearings, fifth wheel couplings, base bearings, hydraulic cylinders, and other components for aerial platforms, hoisting bridges, trailers, forklifts, excavators, dump trucks, cranes, drills, compressors, waste treatment equipment, and machines for packaging, dust extraction, and road maintenance.

<sup>1</sup> <https://www.cece.eu/publications/cece-annual-economic-report>



The entrance to the pre-treatment tunnel and one of its tanks.



“Thanks to our structure and resources, we can support our customers in a very short time both in Italy and abroad. Indeed, in addition to our Montichiari-based headquarters, we have a production plant in Romania and a storage and direct sales subsidiary in the UK. The experience and expertise acquired over all these years have made our company a benchmark for many sectors, from agriculture and construction to ecology and logistics,” states Paolo Zani, quality inspector at RIMA.

### From laser cutting to finishing

At the Montichiari production site, RIMA manufactures components such as stabilisers, iron wheels, and hydraulic cylinders. The company handles the entire production process in-house: starting from raw materials, i.e. iron pipes, steel sheets, and chrome plated bars, it manufactures all the internal and external mechanical components of its products. Its metalwork department performs cutting, machining, turning, sanding, and welding operations. Then, the parts are taken to the paint shop.

### The growing importance of coating

“Fully integrated production is our strength. We can paint pre-assembled components or individual parts to be assembled, packed, and shipped later on. As mentioned, the distinguishing feature of RIMA is the comprehensive service it is able to offer. This, however, calls for extreme flexibility,” notes Zani.

In the past, the company mainly applied primers, but customers now demand complete coating systems that meet the highest quality and aesthetic standards. “The construction and ACE sector has been completely transformed. Now, surface finishes are no longer considered merely a functional requirement to enable assets to withstand corrosion and high temperatures, but is also an element that distinguishes them stylistically.



The pre-treatment tunnel with the tanks in the foreground and the demineralising columns.

## Get more from water



**A hydraulic cylinder exiting the pre-treatment tunnel.**

Painting, which was already an integral part of our offer, has therefore become crucial," says Zani. "Initially, we used a two-stage pre-treatment cycle with a phosphodegreasing product supplied by DN Chemicals and a rinse with mains water; then, we applied a primer with an articulated robot. If a top coat was also required, however, the parts had to be manually loaded onto a second automated line, where another robot applied the coatings expressly requested by customers. While meeting all quality requirements, that plant and its related pre-treatment cycle were unsuitable for the increasing demands in terms of quantity." To cope with such new production volumes and aesthetic requirements, RIMA therefore replaced its system in July 2019.

### **The pre-treatment cycle developed by DN Chemicals**

RIMA chose to rely on an external consultant who analysed its requirements, identified the main possible suppliers, and took its technicians to visit other firms in the sector that had already adopted the same cycles, so that they could see the new pre-

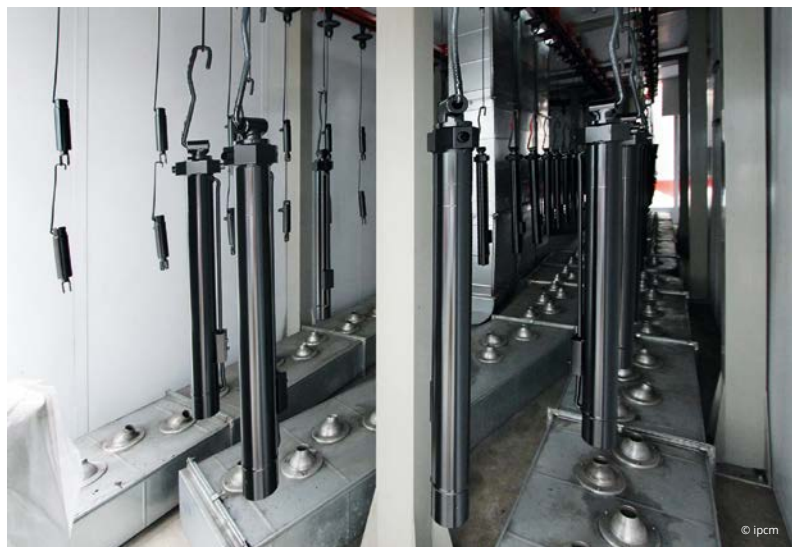
- Turn key solutions for industrial wastewater treatment
- Design and manufacturing of plants and chemicals for industrial wastewater treatment
- Chemical-physical plants
- Sludge treatment and compactor systems
- Ion exchange demineralization systems and reverse osmosis systems
- Oil separators
- Filtering systems
- Batch type systems
- Flotation units
- Chemicals and spare parts for water treatment
- Technical service, support and maintenance of wastewater treatment plants



**Beware of imitations, buy the original!**



**Paint application with an articulated robot.**



**The drying oven.**

treatment processes and the proposed technologies first-hand. "During those factory visits, we noticed that it was possible to improve quality, speed up production, and simplify management. This is why we renewed our cooperation with DN Chemicals in the pre-treatment area and installed two articulated robots interconnected to the mixing machine and the paint management unit," indicates Zani.

In the new plant, the components are loaded onto the load bars of the overhead conveyor and taken to the pre-treatment tunnel performing seven stages: pre-degreasing, degreasing, two rinses with mains water, phosphating, and a further rinse with mains water followed by one with demineralised water. The tunnel is also set up to easily implement an atomisation phase with a no-rinse nanotechnology product in place of phosphating. Afterwards, the parts are transported to the dry coating booths, where two Lesta articulated robots with a self-learning function apply the primers and top coats in over sixty RAL colours in their matte, semi-gloss, and gloss versions, making up RIMA's catalogue. Finally, the workpieces are dried and then cooled.

This process makes it possible to meet both the company's internal specifications and customer requests in terms of corrosion protection and paint adhesion, as well as RIMA's requirements regarding production pace.

### **Nanotechnology for a further quantum leap**

"RIMA has made a significant qualitative leap, which could be further enhanced in future with the implementation of nanotechnology passivation as a replacement for phosphating. We highly recommend that, because it reduces maintenance and water and energy consumption, as the phosphating product requires a minimum temperature of 40 °C and generates sludge. Nanotechnology products, on the other hand, can be applied at cold temperatures and are more environmentally friendly," indicates Roberto Rebuffo, technical sales specialist at DN Chemicals.

"The development of the new pre-treatment cycle coincided with the decision to upgrade our paint shop. Having already worked with DN Chemicals, we were aware of their excellent flexibility and professionalism. Indeed, their in-house R&D laboratory developed a customised pre-treatment cycle for our new requirements and their capillary network of technicians allowed us to quickly implement it on the new plant. The project was complex but, thanks to the experience of all the suppliers involved, it was possible to install and test the system very quickly and implement a process that met all our requirements in terms of salt spray resistance and paint adhesion. Last but not least, the new treatment cycle has allowed us to double our production," states Zani with satisfaction. ○