A cutting-edge, flexible application system promoting the sustainable development of Rimorchi Bertoja

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Rimorchi Bertoja, in collaboration with its long-standing partner Wagner, has recently installed innovative application equipment already set up for transitioning to completely water-based coating cycles, as part of its journey towards total production sustainability. The highlight of this application system is the cleaning solution, specifically designed to reduce consumption and waste.

From the first Italian Highway Code to the most recent European regulations on safety, energy efficiency, and environmental sustainability in road transport, the evolution of the rules governing vehicle traffic has played a decisive role in shaping the country's industrial trailer market – a sector that continues to represent a strategic investment for business competitiveness and for the efficiency of road transport and logistics services at both the national and European levels.

Italy, the third-largest country in Europe in terms of the volume of goods transported by road, is now facing the transition to the decarbonisation of heavy transport, with complex challenges ranging from the high average age of vehicles to the limited spread of new technologies. The renewal of fleets is no longer just

Rimorchi Bertoja has specialised in the design and construction of special trailers and semi-trailers for heavy transport since 1926.

an environmental priority but also an economic and structural necessity for the entire sector. Italian companies specialising in the production of trailers and semi-trailers play a key role in fostering innovation and construction quality. Among them is Rimorchi Bertoja, a long-established manufacturer based in Pordenone that has been building its technical identity since 1926 by following, and often anticipating, regulatory developments in the sector. Its commitment to design and production excellence also translates into the adoption of advanced industrial processes and, in particular, energy- and quality-optimised coating systems, also conceived to ensure high performance in terms of sustainability.

An evolution spanning from the early 20th century to the present day

"The history of trailers for exceptional transport such as those we manufacture here," says purchasing manager Mirco Franchi, "reflects the technological and industrial evolution of the last century." At the beginning of the 20th century, these vehicles were mainly used to transport raw materials and heavy machinery, such as locomotives and turbines. During World War II, their function began to include the transport of military equipment and supplies, playing a decisive role in the conflict's logistics. With the subsequent economic boom and expansion of international trade, trailer technology underwent significant evolution between the 1950s and 1960s: vehicles were designed to handle increasingly large loads, such as space rocket modules and power plant components, paving the way for the road transport of exceptionally large items.
In the 1970s and 1980s, design efforts focused on improving operational safety, driving stability, and load management, leading to the introduction of increasingly advanced control systems. At the same time, growing attention to sustainability accelerated the implementation of electric traction and fuel cell solutions, steering the industry towards heavy-duty mobility with a lower environmental impact. "The drive towards sustainability," adds Franchi, "is about the decarbonisation of heavy vehicles but also their production processes. This is why our coating department has taken on a strategic role in terms of environmental compatibility: the transition from solvent-based to water-based paints we are currently completing is concrete proof of this. For the supply of application equipment, we have relied on a company with a long history like ours: the Italian division of the J. Wagner GmbH Group, based in Valmadrera (Lecco)."

Design and construction expertise since 1926

With almost a century of experience, Rimorchi Bertoja is a benchmark designer and manufacturer of special trailers and semi-trailers for heavy transport. It develops customised solutions with 2 to 12 axles for special and exceptional applications, including earth-moving machinery, mining


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**The shot blasting area within the coating department.
In the background on the right, the prototype roll handler used to move the chassis.**

One of the 2 16 x 4.4 m booths integrated with ovens.

Inside one of the 2 coating booths, which can accommodate medium-sized parts measuring up to 13.5 x 2.5 m.

equipment, industrial plants, bulky construction materials, prefabricated buildings, tanks, boats, oversized loads, and vehicles for the logistics and military sectors. Its range includes versions for off-road, mining, and defence applications, as well as fully customised configurations. With a workforce of 70 employees, a total surface area of 40,000 m², and an annual capacity of approximately 300 units mainly manufactured to order, the company applies a lean production organisational model. It is certified to ISO 9001:2015, ISO 14001:2015, and ISO 45001:2023 and accredited by the Italian Ministry of Transport for mass production, an essential requirement for European type-approval of industrial vehicles. The technological know-how developed in-house enables Rimorchi Bertoja to manage the entire vehicle design cycle and operate even in the most strictly regulated sectors: it meets ADR regulations and manufactures vehicles that comply with NATO, MIL-STD, and STANAG standards for military applications. Its offering is completed by products designed to withstand extreme weather conditions and featuring special high-durability coating cycles, meeting the functional and logistical needs of each customer, particularly those operating in the defence sector. The company serves partners worldwide, but above all in Italy, which accounts for 85% of its sales.

Advanced customisation of trailers

In other words, this company can respond to any specific request by producing vehicles with features not available on the market. "Trailers and semi-trailers that are out of standard production are part of our normal business," explains Franchi, emphasising that excellence in exceptional production is the core business of Rimorchi Bertoja. "What sets us apart from our competitors is our ability to customise each project by developing means of transport that, from their design and smallest structural details to their finish, meet the specific needs of our customers, who are increasingly attentive to coating quality. Today, trailers are

no longer mere 'pieces of metal on wheels', as they were once seen: they are technologically advanced and aesthetically pleasing vehicles, designed to enhance the image of end customers." This transformation has led to significant developments in both aesthetics and technology.

Thanks to its R&D division, one of its main strengths, Rimorchi Bertoja can develop tailor-made solutions in-house using advanced 3D CAD systems, conduct feasibility studies, structural calculations, and dynamic simulations, and use specialised software for turning radius analysis and road performance testing. Upon arrival of the raw material, which consists mainly of steel, rigorous checks are conducted to ensure quality and compliance with product certifications. "Our policy also provides for the careful selection of our component suppliers, including axles, EBS braking systems, tyres, and welding products, but also grit and high-resistance water- and solvent-based coatings for our surface treatment operations."

The 2 Wagner Intellimix units for paint mixing and dosing.

The coating department

The company has an automatic roller conveyor shot blasting machine manufactured by company Carlo Banfi, now owned by OMSG-Officine Meccaniche San Giorgio, and equipped with 20 turbines, as well as 2 16 x 4.4 m booths integrated with ovens located at the rear of the shot blasting machine to optimise application times and ensure coating within 24 hours of mechanical pre-treatment, thus preventing oxidation. "All vehicles and their related accessories undergo SA 2.5-grade shot blasting, followed by mixed water- and solvent-based coating cycles using two-component products with controlled and monitored thicknesses. In the 2 primary booths, we manually apply an epoxy primer on medium-sized parts measuring up to 13.5 x 2.5 m and a standard acrylic paint on under-bodies." Accessories are coated in 2 separate temperature-controlled booths at up to 25 °C, with a solvent-based primer + top coat system, to speed up production.

The colour touch screen display.

"We carry out cycles with high-resistance primers and top coats, but also offer special treatments such as high-performance anti-corrosion coating, cataphoresis, hot-dip galvanising, metallising, anti-IRR (CARC) treatments for military applications, and the option to galvanise or metallise the entire vehicle, all of which are outsourced. In some cases, customers may also request the application of an additional zinc-rich primer before the epoxy primer."

"After primer application, the chassis components are assembled, including axles and braking, hydraulic, and electrical systems. The solvent-based top coat is applied only afterwards because during assembly, the chassis must be tilted into the driving position, which could damage the coating film if applied earlier. To avoid damage to the chassis, a prototype roll handler borrowed from the classic car restoration sector was installed in the department a few years ago. "This system, adapted to our production, can tilt chassis weighing up to 10,000 kg, eliminating the need for two additional heating cycles, with a clear benefit in terms of sustainability."

Coating application with Wagner equipment

In recent years, Rimorchi Bertoja has begun a transition towards sustainable coating cycles, gradually introducing water-based paints supplied by Sherwin-Williams. "The first attempt to switch to water-based coatings dates back to 2010, although at that time it was still at an experimental stage," recalls Franchi. "The main problems concerned the top coat and the maximum gap of 24 hours we must maintain between coating and assembly, meaning that our components must be dry at room temperature the following day."

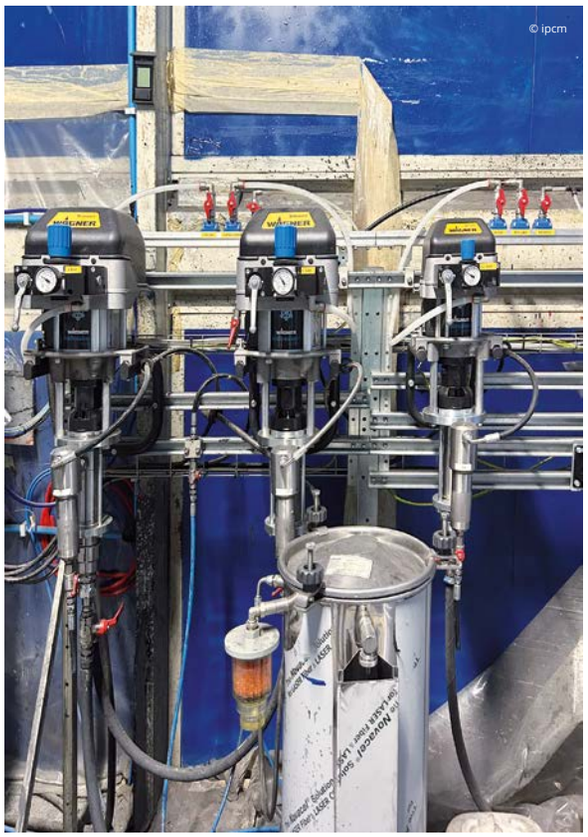
Today, manual application is carried out using Wagner GA4000 Aircoat spray guns. This technology combines the advantages of both air and airless atomisation, ensuring excellent finishing quality, lower spray pressure than airless solutions, faster application, and reduced overspray. "We have been supplying Rimorchi Bertoja with our equipment for over 40 years," states Venanzio Rosada, Wagner's sales manager. "We started when it only applied solvent-based systems. In fact, they are still using a device supplied by us for the only task that continues to require this type of paint – indeed, 2 out of 3 cycles are now completely water-based."

When the company decided to upgrade its application system, it conducted an in-depth market analysis to identify solutions suitable for both large components and accessories. "We were looking for an efficient system for both types of workpieces," notes Franchi. "We also considered some electrostatic solutions, but they were not suitable due to the risk of product entanglement, which could have re-wetted already painted parts."

The choice finally fell on Wagner's Intellimix and Twin Control systems, the latest generation of electronic mixing and dosing devices, leading to

The paint management unit with Wagner mixing pumps.

The first Intellimix system for water-based primers was installed in early 2023, whereas the second, intended for the application of solvent-based paints on accessory components, was installed in 2024.



Both systems are equipped with Leopard 35-70 high-pressure piston pumps, with a volumetric flow rate of 70 cm³/DH for the catalyst and the paint product.

A red-coated trailer ready for delivery: Rimorchi Bertoja is well-known for its high degree of product customisation, including coating in any colour requested by customers.

the installation of 3 machines: 2 Intellimix units for primer application and under-body coating, and 1 Twin Control unit for solvent-based epoxy paint. "The system configuration was jointly discussed by a team comprising Rimorchi Bertoja, Wagner, and Sherwin-Williams, the latter being a pioneer in the development of water-based paints in the ACE industry," Rosada emphasises.

A finally effective cleaning step

Both systems are equipped with Leopard 35-70 high-pressure piston pumps, with a volumetric flow rate of 70 cm³/DH for the catalyst and the paint product. A distinctive feature of this mixing system is the ability to carry out the cleaning of the guns independently. "Thanks to special valve configuration," illustrates Rosada, "they allow 2 guns to be used simultaneously: each operator has their own gun with an independent cleaning and refilling system. This prevents any production downtime if one of the workers finishes the operation before the other."

This aspect was decisive in Rimorchi Bertoja's choice. Franchi explains: "Previously, the amount of mixed paint and the cleaning of pumps and pipes depended on the operator's experience, as mixing was done manually. Cleaning the pipes, the dip tube, and the pump at the end of each shift was a laborious task. Today, with these automatic mixing machines, the cleaning process involves only the pipes and guns, while the pumps remain primed with fresh product, resulting in considerable time savings and reduced waste. Previously, about 5 litres of product and about 20 litres of cleaning liquid were wasted per shift; today, the consumption is reduced to a maximum of 800 cc of catalysed product and 2 litres of water for cleaning. In addition, these machines enable us to download all consumption data by interfacing with our management system."

This company produces an average of 300 trailers per year. Non-standard trailers and semi-trailers are part of the company's regular business, particularly vehicles intended for defence and military applications.

A safe and well-monitored application system

Rimorchi Bertoja's goal was to equip itself with a fully monitored application system capable of ensuring maximum operational safety. "To monitor the paint products and catalysts, we developed a system without meters in contact with paint: the measurement is detected by the pump through a Magnetic Stroke Meter," explains Rosada. "This is a significantly accurate solution, able to detect the flow rates of components A and B with very high resolution, thus eliminating the risk of clogging or wear on the standard measuring units. Together with Rimorchi Bertoja, we also defined a periodic program service activity to keep the equipment monitored and efficient through maintenance operations carried out by specialised Wagner technicians."

Recently, with Wagner's support, tests were conducted to take a final step towards sustainability: eliminating solvent use even in the top coat application phase. The results were satisfactory, and the transition will not require replacing the application system, which is already configured to operate with water-based products.

"Over the years, we have tested equipment from various suppliers," adds Franchi, "but in the end, we chose to rely on this international partner with consolidated experience and after-sales service that truly supports our production. Coating is a key element, and it must reach a high level of quality since it is the one most susceptible to damage. Our products often transport tracked vehicles with iron tracks, so the risk of abrasion is high."

No longer just 'a piece of metal on wheels'

'Quality' and 'sustainability' are the two watchwords at Rimorchi Bertoja. "As they are purchasing vehicles of a certain value, our customers expect them to be perfect when they receive them," notes Franchi. "That is why we have developed internal specifications that we use for verification tests and as a reference for our coating suppliers. This guarantees reliable results and marks a significant step forward from the old notion of trailers as mere 'pieces of metal on wheels'."

Rimorchi Bertoja has confirmed its role as a manufacturer of excellence in the industrial trailer sector, combining almost a century of experience with advanced technological solutions and a sustainability-oriented approach. Innovation, quality, and customisation thus translate into reliable, high-performance, and environmentally friendly vehicles that meet growing regulatory requirements and the expectations of customers who are increasingly attentive to the efficiency and aesthetics of their vehicles.