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Opening photo: Tipping body fit for the quick-change system ready for delivery.



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Pre-treating Large-Sized Workpieces: Shotblasting for Hookloaders, Tippers and Bodyworks in General to Increase Their Long-Term Corrosion Resistance

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A truck equipped with the quick-change system may be used combined with different types of bodyworks (such as tipping bodies, tanks, flatbeds, hooklifting systems and so on) that can be removed from the lorry on which they are mounted. With a few simple operations, these structures can be detached from the chassis in order to let another one be installed. In this way, the same lorry can be fitted with

different equipment, for instance depending on the season. Obviously, these structures require a significant surface protection degree to offer a long service life despite the severe operating conditions. And, as is well known, the better the preparation of the surface – which must be degreased and free from any oxidation and machining residue – the more effective and high performing the coating system (**ref. Opening photo**).

Pris-Mag (Cambiago, Milan, Italy), a global leader in the production of hook-lifts and quick-change systems, has experienced a dramatic rise in its clients' demands for coatings with higher resistance performance. This has led the company to invest in an automatic turbine shotblasting system able to ensure an SA 2½ finishing degree in compliance with the current international standards. Designed and built by OMSG - Officine Meccaniche San Giorgio (Villa Cortese, Milan, Italy), it is one of the largest hook shotblasting machines operating in Italy (Fig. 1).

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Pris-Mag: from a local business to an international leader

Alessandro Sala, who is still managing this industrial vehicle bodywork business together with his children, established the company in 1975. After specialising in the production of hook-lifts and gaining several clients in its area, at the beginning of the 2000s Pris-Mag managed to give added value to a product it had been manufacturing for thirty years, i.e. its quick-change system, and meet the users' needs for multi-functional lorries thanks to structures that can be easily detached from chassis frames. The international patents protecting these unique applications and the approval of the Italian Ministry of Transport, as well as its uniqueness on the Italian market, make Pris-Mag an industry leader even on foreign markets (Fig. 2). “In the last seven-eight

years, we have made a leap forward in terms of production, reaching an export share of almost 50%. This was possible thanks to the integration of our

hookloaders with our quick-change system, a mechanical-hydraulic device that is mounted on the lorry itself and that enables to detach any kind of bodyworks from its chassis. This makes the lorry a multi-functional means of transport, thus reducing downtime and increasing flexibility,” says Chiara Sala, the founder’s daughter. “Pris-Mag is therefore able to provide complete bodywork solutions, adapting various structures to its quick-change system.”

This productive improvement has made Pris-Mag an internationally renowned manufacturer, in particular in the northern European countries. Due to their climatic and environmental conditions, however, these markets require higher quality and outdoor resistance standards than the Italian one, which can be only met with a high quality anti-corrosion coating system. “We were aware of our corrosion protection limits and we knew that we were not able to meet the needs of countries where ice, snow and salt are a daily issue. Our structures were solid and well manufactured with first quality raw materials, but we could not guarantee their long-term resistance in such harsh and cold environments,” states Chiara Sala. “When a big Swedish company turned to us for the provision of a number of hook-lifts, we decided that it was time to invest on the factor that my father has always considered as



Figure 1: The huge shotblasting machine provided by OMSG.



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Figure 2: The container building phase.

the key to obtain higher quality products: the surface preparation and treatment processes before assembling and painting. Until that moment, we pre-treated our workpieces with a manual sandblasting operation that did not ensure optimal cleanliness and roughness values in terms of long-term corrosion resistance,” says Chiara Sala. “That is why we installed an automatic turbine shotblasting machine (Fig. 3).” To achieve its goal, Pris-Mag relied on OMSG - Officine Meccaniche San Giorgio SpA, a company specialising in the design and construction of shotblasting, automatic sandblasting and shot-peening systems.

“When a big Swedish company turned to Pris-Mag for the provision of a number of hook-lifts the company decided to invest on the factor that founder Alessandro Sala has always considered as the key to obtain higher quality products: the surface preparation and treatment processes.”



Figure 3: The shotblasting machine can also treat semi-trailer containers.

A “big” challenge

Pris-Mag builds hook-lift systems of various sizes, the biggest one also fit for application on semitrailers. “The main challenge was designing a shotblasting machine able to treat such large workpieces in the limited space available. A horizontal plant would have covered a considerable portion of the production area, so the only viable alternative

was a vertical system,” explains Enzo Dell’Orto, the CEO of OMSG (Fig. 4). “The shotblasting machine installed is a one-hoist system with a hook maximum capacity of 6 tons. It can treat parts with a diameter up to 4 m and a height up to 12.5 m. It is equipped with 13 variable power wheels patented by OMSG. It meets all the customer’s requirements, ensuring a final finishing degree equal to SA 2_{1/2}.”

“With such complex workpieces,” says Dell’Orto, “in agreement with our supplier we had to design a special PLC-managed hoist (Fig. 5) able to keep containers and chassis in a fixed position for a pre-set time. In this way, OMSG has managed to solve the shotblasting homogeneity issue that is very common with such large-sized parts. Of course, as well as staying in pre-set positions, the hook can rotate and move inside the chamber to subject the surfaces to the action of metal abrasives, which are launched by the turbines mounted on the sides of the machine (Fig. 6). “This is an OMSG standard hook shotblasting system with manganese



Figure 4: A container waiting to be shotblasted.

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Figure 5: The touch screen shotblasting machine.

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Figure 6: A large container being placed inside the shotblasting machine.

“The coating process has benefited from the investment made on the pre-treatment phase in terms of both quality and yield. The cycle, developed by Alcea, includes the application of four layers: two layers of epoxy primer and two layers of two-component epoxy enamel.”



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steel and nickel/chrome cast iron linings and special wear-resistant rubber protections for the shotblasting chamber. However, it also stands out from any other standard plant because it is 12.5 m high – 20 m if we also consider the recovery hoppers that collect the abrasives and send them to the base of the elevator through screw conveyors (Fig. 7).”

“Another critical issue was the assembly phase. All OMSG machines are assembled and electronically, electrically and mechanically tested at our premises. In this case, however, we did not have enough space to assemble the shotblasting plant in our factory. Therefore, we only mounted the hoppers and pre-assembled some components, while everything else was done on site. Height was actually one of the biggest problems: at a height of 20 meters, even solving the simplest issues can be complicated and time-consuming,” states Enzo Dell’Orto. “The complexity of this project has certainly been a challenge in terms of design and logistics, but this vertical plant has entered the history of OMSG as the largest hook machine we have ever built and among the largest ones operating in Italy.”



Figure 7: The inside of the shotblasting chamber.

The coating cycle

“Our coating process has benefited from the investment made on the pre-treatment phase in terms of both quality and yield,” explains Chiara Sala. “Our cycle, developed by Alcea (Senago, Milan, Italy), includes the

application of four layers: two layers of epoxy primer and two layers of two-component epoxy enamel. Generally, Pris-Mag chooses the coating system to be applied on its products, although some customers specify thickness and gloss values. The coating application is now performed manually in an oven chamber (Fig. 8). Our next investment to further improve our products’ corrosion protection performance will be aimed at automating this surface treatment stage (Fig. 9).”

Effective collaboration

“OMSG addressed our demands professionally and enthusiastically, completely customising its plant for us. The installation times proved to be quite long because of the size of the plant, which even required us to raise the height of our factory’s roof to make room for the shotblasting machine. Thanks to the collaboration of OMSG, however, we managed to make the quality leap needed to enter even the most demanding markets,” states Chiara Sala. ●



Figure 8: The large oven chamber has three workstations.



Figure 9: A shotblasted frame ready to be coated.