



When Automatic Shot Blasting is a Recipe for Quality: Ideal System's Automatic Mechanical Surface Preparation Line for Maximum Finishing Quality of Earthmoving Machinery Components

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In order to increase productivity by eliminating a bottleneck upstream of its painting process, but above all to improve the quality degree of its coating systems – combining cataphoresis and powder primers and top coats – Ideal System (Gambettola, Italy) has created an independent, automatic mechanical surface preparation line. This includes a new-generation, automatic tunnel shot blasting machine supplied by OMSG (Villa Cortese, Italy) and a manual sandblasting and blow-off chamber, connected by a Power&Free conveyor designed by Futura Convogliatori Aerei (Robecco Pavese, Italy) with a 2.5 tonne capacity. The result? The removal of the production bottleneck and the achievement of smooth, pit-free surfaces that guarantee excellent coating film distension.



Ideal System has specialised in the one, two, and three-coat finishing of components for heavy and construction machinery.

The Italian contract coating sector is a highly diverse market that includes micro, small, and medium-sized companies with very different specialisations in terms of processes, products, and target industries.

Unlike in other European markets, especially those of Central and Eastern Europe, in Italy there are only a few large, structured businesses that offer contract coating services alone. These are the companies that were the first to focus on providing more than mere labour, by offering services for which they had developed technical skills, made continuous investments in technology, implemented highly automated procedures, and even experimented with and developed processes capable of subverting traditional treatment technologies – for example, by replacing liquid with powder paints even in those markets where it seemed they could have never taken hold.

In other words, these firms have become not only market but also opinion leaders in the field of liquid and powder coating. One of them is Ideal System (Gambettola, Forlì-Cesena, Italy), already featured in an ipcm® report in 2016¹.

History and evolution of one of Italy's largest contractors

This company was founded in 1989 by dynamic entrepreneur Marco Sfienti, its current owner, as a Technogym supplier. It has then grown rapidly, soon replacing liquid coating with the powder technology and implementing cataphoresis processes.

Since the beginning of its activity, Ideal System has provided not only high quality-coated products, but also complementary services, such as pre-assembly and packaging of parts with their related assembly kits. In short, it can manage its customers' entire orders.

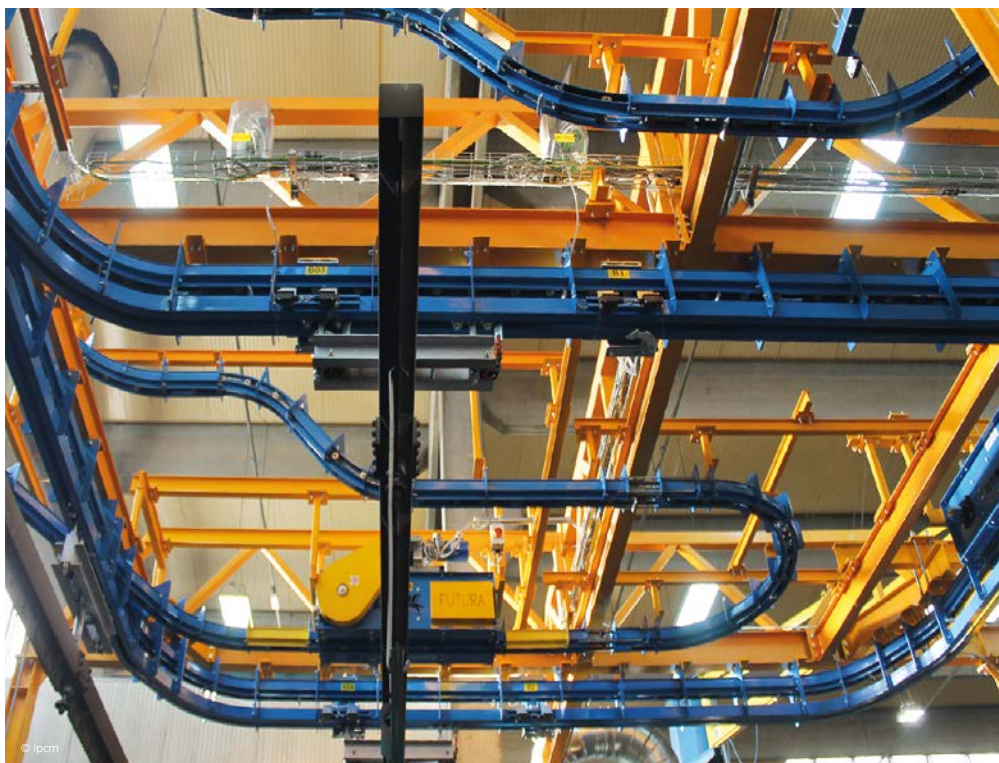
Over the last ten years, at the same time, this company has never ceased to evolve, gradually growing by upgrading its coating systems, offering new services, and even expanding its factory. What has determined its success, however, is its passion and will to experiment with new processes towards a goal shared by its whole staff, from managers to operators: guaranteeing a visible, tangible, measurable, and lasting quality level. Meanwhile, Ideal System's core business has moved from the finishing of sports equipment to that of heavy machinery.

Currently, it treats large components, frames, rotating turrets, telescopic booms, and other parts of earthmoving and construction machines, which it paints with three different coating systems: two

¹ Monica Fumagalli, "The Development Of Nanotechnology Processes: A Plus For Optimising Painting Cycles" in ipcm® 40, Vol. VII, July-August 2016



A general view of the new automatic mechanical surface preparation line.



The loading and unloading elevator of the Futura Power&Free conveyor connected to the shot blasting line (top photo). Within the OMSG machine and the blow-off chamber, the parts are handled by the Futura overhead Power&Free conveyor using the same load bars as the coating line's conveyor.

two-coat systems (epoxy primer + polyester powder top coat or cataphoresis + polyester top coat) and, for maximum outdoor durability, a three-coat system including cataphoresis, an epoxy primer, and a polyester top coat.

Surface preparation: the magic word for perfect coating

It is obvious to anyone with a basic knowledge of industrial finishing that, in order for complex coating cycles such as those used by Ideal System to be of high quality and resistant, surface preparation is of the essence. This does not only ensure excellent adhesion and durability of the coatings when subjected to mechanical and chemical stresses, but it also produces smooth, homogenous, and glossy finishes. In fact, such aesthetic features are now also a must in the off-road vehicle sector. Ideal System's latest technological investment was aimed at maximising quality precisely in this area: an automatic shot blasting and sandblasting line that treats every product to be painted before it reaches the chemical pre-treatment phase.

"With the help of OMSG, which supplied us with a new automatic shot blasting machine, we have solved a major bottleneck," explains Ideal System production manager Angelo Baldacci. "Today, the market demands mechanical surface preparation by shot blasting or sandblasting for all the components we are asked to coat. The old set-up of our mechanical preparation department, equipped with an old generation automatic hanger machine and a manual sandblasting chamber, did not allow us to meet such demand despite working in three shifts. Our coating plant often had to stop because it was not being adequately fed by the shot blasting department, which, on the contrary, was constantly overworked." "Not to mention that the quality of our manual shot blasting operation was not

even remotely comparable to that offered by our new OMSG automatic tunnel machine with 12 direct drive turbines, in terms of both treatment uniformity and surface roughness," adds Marco Sfienti. "In other words, such major investment has both increased our productivity and raised our treatment quality degree."

The layout of the new mechanical surface preparation department

With this investment, Ideal System did not just install a new automatic shot blast machine, but it rather created a truly independent and autonomous mechanical preparation line, which integrated all existing equipment with the new OMSG plant through a Futura Convogliatori Aerei two-rail conveyor with a loading and unloading elevator.

The line is structured as follows:

- Power&Free conveyor with 5 loading units storage buffer with 3 spaces before the tunnel
- shot blasting machine
- manual sandblasting and blow-off chamber (created by upgrading the existing manual chamber)
- hoist and tumble shot-blasting system.

"With the creation of this department, separate but perfectly integrated with the coating plant's flow, we have improved our product quality, our overall productivity, and even the quality of the operators' work," comments Angelo Baldacci. "This does not mean that we have replaced our workers or reduced our staff, but that our operators can now carry out cleaner and more comfortable operations."

"Two key aspects of increasing our powder finishing quality level were the improvement of metal surfaces after shot blasting, i.e. the creation of less rough and pitted surfaces, and the achievement of more complete and consistent treatment coverage," notes Sfienti.



Hung workpieces entering the OMSG automatic tunnel shot blasting machine type TUNNELBLAST 1525/12 SP. OMSG's 12-turbine machine is combined with a 20,000 m³/h self-cleaning filter and it has wear-resistant rubber slats at both the inlet and outlet to prevent metal abrasive from escaping.



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"Indeed, we have also seen a noticeable improvement in terms of film distension. Therefore, we are very pleased with the investment in our shot blasting department. OMSG's machine is easy to use, effective and efficient, sturdy, and fully digitalised. The choice of the Futura Power&Free conveyor was a winning one as well, because it enabled us to replicate our coating line's part coupling device, thus being able to use the same load bars.

"We have maintained our existing manual chamber, of course after retrofitting it and integrating it on the line, to perform three operations: cleaning all parts by blow-off after the automatic shot blasting treatment, treating any oversized parts, and helping handle any maintenance-related downtime needed by the OMSG's shot



Vespa Sabbiatrici's manual blow-off and sandblasting chamber placed in line with the shot blasting machine.

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blasting machine and the Futura's conveyor" Stenti ends. In fact, we have made it automatic in its operation, as it receives all commands from the OMSG automatic shot blast machine. Finally, we have maintained the historic hoist and tumble shot blasting machine, which was installed in 2003, and treats all small parts that can be processed in groups."

Features of the new automatic shot blasting machine

OMSG supplied Ideal System with a tunnel shot blasting machine type TUNNELBLAST 1525/12 SP, with a maximum workpiece size of 1500 mm in width and 2500 mm in height.

The plant is equipped with 12 7.5-kW turbines with one-disc



Ideal System is currently testing the implementation of a pair of Lesta articulated robots on its powder coating booth.

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impeller and self-locking vane insertion system.

The shot blasting machine is combined with a 20,000 m³/h self-cleaning filter with 24 antistatic polyester cartridges, which guarantee a maximum emission of less than 5 mg/Nm³.

The workpieces are moved inside the machine by an overhead handling system made by Futura. At both the entry and exit of the shot blasting machine, wear-resistant rubber slats with a steel core prevent metal abrasive from escaping. A Vespa Sabbiatrici manual blow-off and touch-up booth is placed downstream of it. The whole flow is controlled by a PLC and the shot blasting plant is Industry 4.0-ready.

All turbines are controlled by individual inverters and special two-pneumatic piston feed valves to guarantee as follows:

- avoiding possible deformation of the most delicate parts;
- if needed, reducing the grit's impact on the workpieces (milder shot blasting); saving energy.

A bright future for Ideal System

As mentioned at the beginning of this article, Ideal System has never stopped evolving since 1989.

In fact, after the investment described here, two others are in the pipeline: one is already underway and the second, much larger one is due to be completed in 2023, when ipcm® will visit Ideal System again. "The first investment will be completed early next year," says Marco Sfienti. "We are building a new car park with 90 spaces and a new warehouse to have our loading and unloading yard finally cleared and made fully operational. With the second, most significant one, we will replace the current coating booth for applying the corrosion protection primer with a new full recovery one, which will be equipped with last-generation applicators, and four



more articulated robots supplied by Lesta. This continues the powder application automation project we have started a while ago by testing two opposing Lesta robots on one of our two existing coating booths. In future, each booth is going to feature one robot at the entrance and one at the exit, with the aim of further improving the powder coating application. The first robot will carry out the initial 3D painting operation, then the 16 guns mounted on the reciprocators will coat the parts' entire exterior, and finally the second robot will carry out the post-retouching phase, while the manual workstation will be used mainly for quality control."

"However, the most important news I want to share with you is that Ideal System is going to expand to a new production plant, located 500 m from the current site, where we will install a new powder coating plant. The semi-automatic line with manual application booths and a static oven will coat even larger parts, with masses of up to 3 tonnes, which we currently cannot treat because our cataphoresis + powder coating line can handle a maximum of 50 parts weighing up to 2.5 tonnes," announces Marco Sfienti. "It will be an autonomous plant, which will carry out a paint treatment from A to Z like the current one, with its own shot blasting line, a chemical pre-treatment unit, and an independent application and curing area. We are very proud of this achievement, because it shows that what has always seemed unfeasible, that is, powder coating parts with such large masses, is actually a piece of cake... if you know how to do it!" 

In the operational configuration of the booth, the Lesta robot at the entrance will apply a layer of paint, which will then be completed by the automatic guns mounted on the reciprocators and touched up by the second Lesta robot at the exit.