



How to Eliminate a Bottleneck in the Two-Coat Powder Finishing of Heavy Machine Parts: Cassetto's Experience

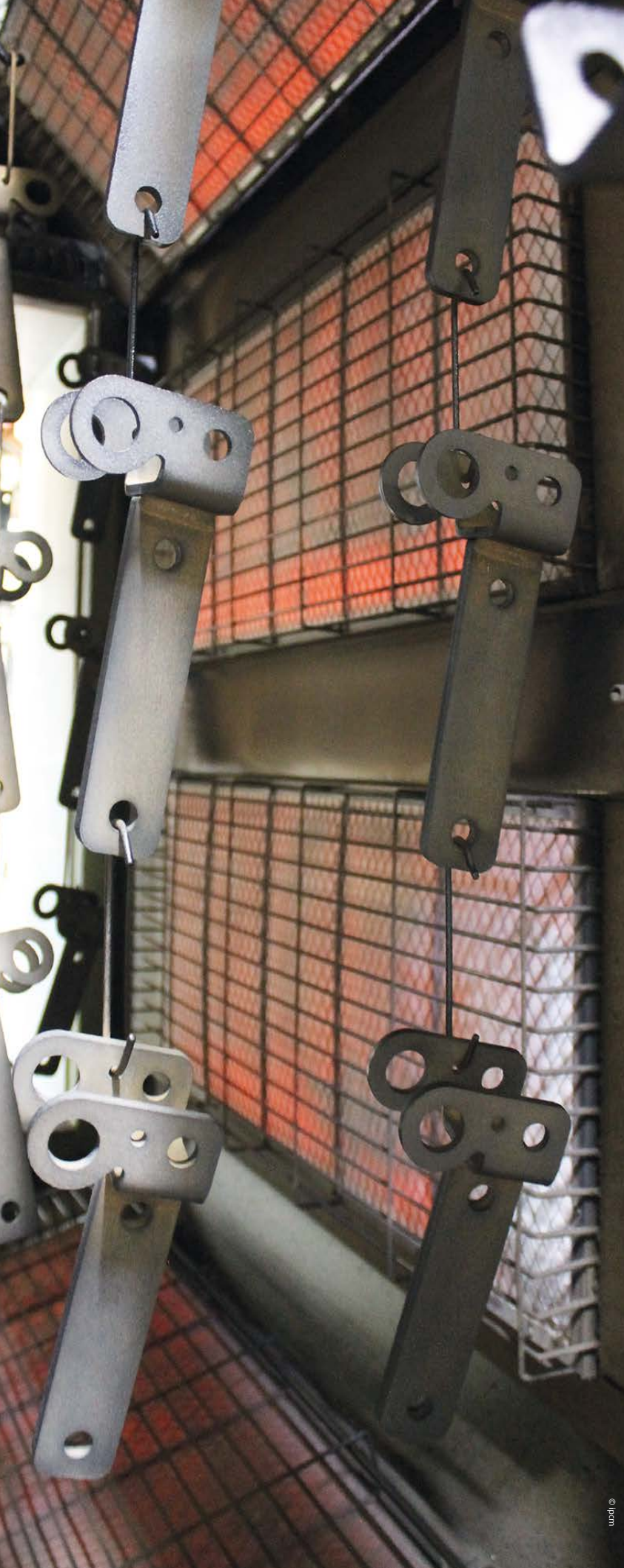
Alessia Venturi **ipcm**[®]

When the finishing requirement for its agricultural and construction machinery components changed from a one-coat to a two-coat powder system, Cassetto Srl, an Italian supplier of components to major companies in the ACE sector, acted on two fronts to avoid creating a bottleneck. It upgraded its powder application equipment and it integrated Infragas Srl's catalytic IR technology to gel the first layer before applying the second coat.

"When times are bad is when the real entrepreneurs emerge."

This quote from American entrepreneur, writer, and businessman Robert Kiyosaki perfectly reflects the history of Cassetto Srl over the last decade. Based in Lugnacco (Turin, Italy), this company traces its roots back to 1966, when it was founded as a workshop producing frames for galvanic plants. At the beginning of the 1980s, the desire to expand progressively led Cassetto Srl to enlarge its factory and implement new processes such as laser cutting, bending, and punching with numerically controlled machines. Such transition from an artisan to an industrial business laid the foundations for the firm's future.

The panels manufactured by Infragas Srl.



The actual turning point came twenty-five years ago, when it crossed paths with Caterpillar, the world's leading manufacturer of construction and mining equipment, with whom a partnership was established that grew so much so that, in 2014, Cassetto began to work exclusively for this American multinational.

In 2016, when Caterpillar decided to rationalise its sites and close one of the factories that Cassetto had been supplying for some time, the Turin-based company suffered a bigger crisis than the one that had just passed in 2009. However, it is in moments like these that true entrepreneurs unleash their skills: in 2017, Cassetto decided to change its industrial target. "We have embarked on a completely new path, which has led us to a different customer base from the previous one, although still concentrated in a particular industrial sector," states Gianfranco Calabrese, the Plant Director of Cassetto Srl. "As a result, we have experienced very significant growth. This has entailed a series of strategic changes involving all areas of our company, from logistics to technology, with substantial investment in new machinery and production equipment."

Such progress was crowned by an increase in turnover and the doubling



From left to right: Andrea Spinelli, Gianfranco Calabrese, and Francesca Marabotti.

of the workforce at the Lugnacco plant to over seventy employees. "One of the things we focus on, and of which I am very proud, is the significant generational growth within our staff. We have both experienced employees who have been with us for over twenty years and new, very young employees who we are improving their skills with us, but above all we are seeing roles being passed on from father to son," adds Calabrese. "Now, Cassetto is a major supplier to leading companies in the ACE sector such as Caterpillar, CNH,

Liebherr, Manitou, Mecalac, and Merlo. Our target market is that of agricultural, earthmoving, and road paving machinery. We have greatly expanded our production range, focussing on machine components and avoiding bodywork or large parts, which are not in our industrial DNA. Our manufacturing process is complete, from 2D-cutting sheet metal to selling assembled and coated workpieces to customers. For each machine, we produce several hundred components, all of which are welded or bent metal parts.

"We have equipped ourselves with a station including numerically controlled machining centres to meet customisation requirements and we have adopted management software that takes care of the entire



The coating plant.

manufacturing process, from acquisition of the raw material to delivery of the end parts. We work with external partners for the galvanising operations, but we have chosen to manage the coating process in-house. This accounts for just over half of our production, the remainder being sold raw to customers.”

Coating: a very important sales lever

“For Cassetto, finishes have a mainly functional purpose, protecting components and extending their service life,” states Purchasing Manager Andrea Spinelli. “However, the expansion of our product range has also increased the number of colours we apply from our classic 3 (black, yellow, and grey) to around 15. While acting as an important market lever, this choice of aesthetic customisation has brought a number of critical issues to manage, such as the timing of colour change operations and the optimisation of work shifts. In addition to these requirements, we also switched from a one-coat to a two-coat powder coating system (epoxy primer + polyester top coat) in order to increase our components’ outdoor durability and corrosion resistance.”

The evolution of coating systems and a few necessary plant upgrades

Cassetto’s path in coating faithfully reflects the evolution of finishing in the ACE sector over the last twenty years. “We started with conventional

solvent-based liquid systems, which were later replaced by water-based ones. It was in 2014, with the advent of Caterpillar, that we switched to powder finishing and converted our existing water-based paint line into a powder application one – first with one booth and then with two, applying black and yellow, respectively. The latest step was the implementation of a two-coat powder system to meet the growing demand for this technology, able to give a more durable finish to components,” explains Gianfranco Calabrese. “It was a challenging transition, which meant we had to upgrade our plant to maintain high productivity and coating quality degrees. LEM Impianti Srl managed the line upgrade. After analysing our new work cycle, they introduced us to Infragas Srl (Mappano, Turin), which worked four-handedly in synergy with the manufacturer and helped us remove the bottleneck that had been created in the coating phase and that was slowing down our entire production process.”

“The problem was that, in the absence of a suitable coating plant, after the application of the epoxy primer the parts had to move around the entire chain to reach the curing area, then returned to the same booth to apply the polyester top coat, and finally went back to the oven for the final curing stage,” explains Spinelli. “Productivity was practically halved, even when one of the two booths was assigned solely to primer application and the other to top coat application. This, in turn, forced us to manage all colour change operations on an outdated



Workpieces entering one of the powder application booths.



The powder centre.

booth. With the advent of new customers and new colours, even this solution was no longer manageable. The first step, therefore, was to dismantle our old application booths in favour of two new fibreglass booths with a semi-automated colour change process, which we are now able to complete in an average time of 7 minutes."

"In order to overcome the bottleneck that had reduced our productivity by 50%, together with the manufacturer we decided to integrate a tunnel with gas catalytic infrared panels provided by Infragas Srl, which gels and pre-cures the primer and prevents the parts from having to move around the chain twice," says Calabrese. "With LEM and Infragas, we carried out various tests and analysed our production dynamics in detail. We then concluded that a 1.5-metre IR tunnel was the right choice for our needs. Infragas also tested different temperatures in order to find the ideal one for gelling our epoxy primer. At the end of such research process, we started up our IR tunnel, which now enables us to paint our products with two coats of powder in a single run while, at the same time, providing durable products that can pass the stringent cyclic corrosion tests of the American standard ASTM D1654." "As the parts leave the IR tunnel at a temperature of almost 150 °C, in order to cool them down before the application of the polyester top coat, Infragas and LEM suggested we install a series of fans at



The gelling oven has a length of 150 cm.



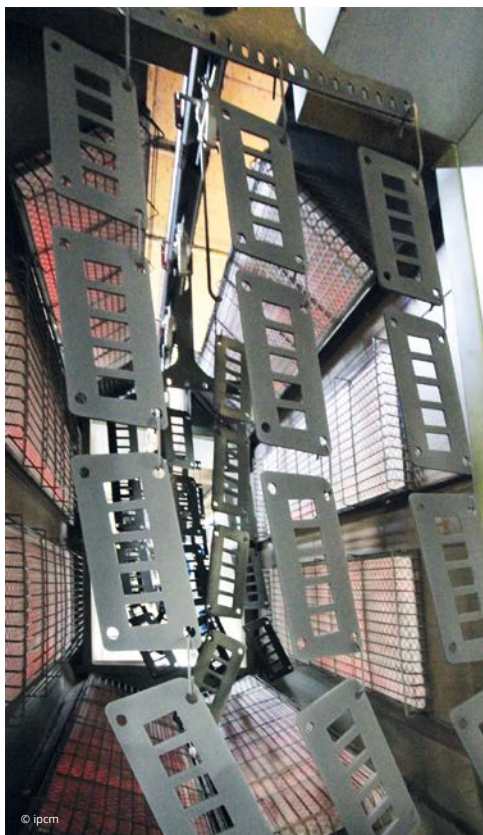
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The gas catalytic panels of the primer gelling oven.



After pre-curing with IR, the parts pass through the cooling zone before entering the booth for the application of the second coat.



Some components at the end of the coating cycle.

the exit of the tunnel itself, which lower their surface temperature to around 60 °C before they reach the entrance to the finishing booth,” adds Spinelli. “After application of the second layer, the coating process ends with the curing stage at 180/200 °C for 12 to 15 minutes.” Infragas Srl has been manufacturing catalytic panels and gas radiant systems for industrial ovens since 1971. Its main strength is its R&D laboratory, where it tests the most suitable plant solutions for each requirement together with customers.

“We supplied Cassetto with static infrared panels, called Infracat® to emphasise the combination of INFRARED energy and CATalytic technology and characterised by a surface temperature that can be adjusted from 180 to 550 °C,” explains Francesca Marabotti, the Marketing Manager of Infragas.

“With the catalytic technology, the gas is converted into infrared energy without developing flame. The Infracat® panels allow IR irradiation with a medium to long wavelength, between 2 and 10 microns. The infrared rays are concentrated on the surface of the exposed workpiece, i.e.

on the powder coating to be cured, without stressing the component: indeed, the radiation is completely absorbed by the organic material and the treatment times are short to optimise the process and save energy. The Infracat® 16.40 panels installed at Cassetto’s premises by manufacturer LEM Impianti, in particular, are 1000 mm x 400 mm in size.”

Future projects

“The installation of the tunnel with Infracat® infrared panels has enabled us to maintain the same coating times as we had before we started using a two-coat powder system,” comments Gianfranco Calabrese. “Our future goal is to further expand both our clientele and our product range. Today, however, we are still in the consolidation phase of what we have achieved so far: we aim at concluding it in 2023, when we intend to be efficient enough to trigger a development phase. The investment in our coating plant and the optimisation achieved with Infragas’ technology have been a significant step in this direction.” ●