



Sustainability and Lean Production: The Two Pillars of AB's Transition to Totally Water-Based Coatings

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AB, a leading company in the design, construction, installation, and maintenance of on-site power generation plants, has recently revised and updated its production flow with a view to lean manufacturing. One of the main points of its revamping project was the switch to water-soluble coatings, for which the company has relied on Inver, a part of The Sherwin-Williams Company.

“Lean production” is commonly defined as a production process management system that aims at reducing waste to the point of eliminating it, leading a company towards production excellence through efficient work organisation. Incorporating this philosophy within a multifaceted, complex production system such as that of industrial cogeneration or

biomethane upgrading plants is a challenge that AB (Orzinuovi, Brescia, Italy), a company specialising in the design, construction, installation, and maintenance of these particular products, has decided to tackle to improve its processes, including coating. In order to do so while maintaining a production capacity of about 140 plants per year and a high coating quality degree, currently equal to those



required in the ACE sector, two years ago the firm started a revamping project precisely involving its coating operations. In particular, the firm decided to replace its solvent-based paints with 100% water-soluble systems. It started by analysing the characteristics of the most innovative products offered by the market, in order to get to choose the coating systems that best suited its needs and each of its application phases.

AB chose as its partner in this delicate transition Gianmaria Guidi, a sales agent of Inver SpA, belonging to the Sherwin-Williams Company, and the owner of Germedia Srl, consulting company in the field of industrial painting and anti-corrosion products, who analysed the company's entire coating process together with the AB staff, with the technical support of Raffaele Stifani from Inver.

First of all, they identified the anti-corrosion and aesthetic performance expected by the AB's target market in compliance with ISO 12944, as the essential starting point for the development of a new coating concept. As a result, it was possible to suggest the optimisation of certain phases, such as pre-treatment or dosing and mixing in the paint management unit, and the use of new paint products.

AB: the experience of the leading manufacturer of cogeneration plants at the service of the development of green technologies in biofuel and emission treatment solutions

"AB's business was started in 1981 based on an idea of Angelo Baronchelli, a young specialist in the electrical sector who is still the president of the Group," says order management team leader Claudia Bosio. "In 1992, our company produced its first containerised natural gas and biogas cogeneration modules called ECOMAX®. This strengthened its market position and enabled its business to expand. In 2010, in the framework of a corporate restructuring process, AB began acquiring new production and logistics facilities, thus creating the world's largest industrial hub devoted entirely to cogeneration technologies."

Recently, the company has further confirmed its leadership in the cogeneration sector with the development of systems for siloxane removal and landfill biogas treatment. It has also strengthened its commitment to the use of biofuels by developing systems for the purification and liquefaction of biomethane. Such "green" philosophy has led AB to embark on new avenues – starting with the treatment

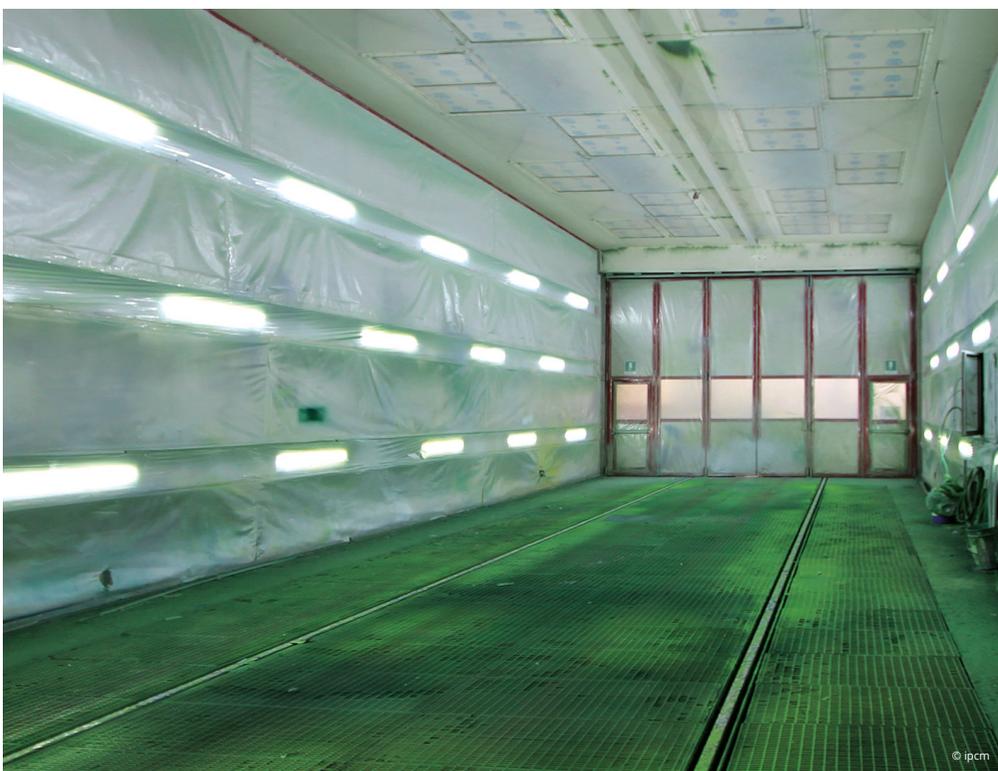


AB is a world leader in the design, manufacturing, installation and maintenance of on-site power generation plants. Cogeneration systems use the heat dispersed by industrial plants to simultaneously produce electricity and heat.

The internal components of cogeneration plants are also coated with Inver products.



The cleaning tunnel.



The inside of a coating booth.

of atmospheric emissions, with the strategic acquisition of a firm specialising in the design, construction, and installation of pollutant abatement equipment.

AB currently boasts some impressive figures: 1,000 employees, 1,450 plants worldwide, sales subsidiaries in more than 21 countries, and an installed energy production of 1,650 MW. "In addition to their modular structure, which guarantees great flexibility, rapid handling, and quick system installation," indicates Bosio, "one of the aspects that made the success of ECOMAX® and other products in its range is the fact that they are standalone machines, independent of the facility for which they recover and produce energy and, therefore, not subject to the binding building permit requirements of other types of energy production plants."

AB's production structure is complex: the company manufactures the containerised modules starting from the sheet metal in a plant located in Villachiara (Brescia, Italy) and it assembles its containers at its main site in Orzinuovi. The production flow continues with the setting up, cleaning, and coating of the containerised modules, the insertion of motors, the wiring and assembly of electrical and hydraulic elements, testing, and shipping.

AB's new water-based coating system passed all field tests

"In order to apply the lean management principles to our pre-treatment and coating processes as well," explains Bosio, "first of all, we carried out market analyses and research activities to find suppliers that offered suitable products to enable us to switch to fully water-based coating systems and characterised by a corporate structure that would ensure not only their solidity but also their international presence. Our quality department, and in particular our employees Jessica Gozzi and Leonardo Doldi in collaboration with our industrial director Franco Bonetta, identified

a number of important quality tests to be carried out, including salt spray, humidistat, and UV-condenser tests. They then had different metal sheets coated with the products provided by the selected suppliers, using the process traditionally carried out in AB; these were subjected to quality controls by an external accredited laboratory. The final choice fell on Inver's coatings."

"Testing products in the factory is different from doing the same test in the lab," notes Gianmaria Guidi. "In a laboratory, external conditions are always optimal, but it is on the job that one can see the actual quality results guaranteed by a coating. AB was clear about the quality degree it wanted to achieve and assessed which paints came closest to this value by testing them in its daily activities: there is no better way to identify the most suitable product for one's own needs."

AB's aim was to optimise its cycle while making it more efficient and, at the same time, more sustainable by replacing the solvent-based primer used up to then. However, this could not be achieved with the choice of new paint products alone. "This called for an overview of the whole process that AB traditionally carried out," states Guidi, "in order to be able to identify the most suitable solutions and technical measures. So we started from the beginning, looking at how to improve the entire coating process from the pre-treatment operations, that is, the preparation of metalwork in compliance with ISO 8501-3, as the cornerstone of the company's corrosion protection activities."

Subsequently, sheet steel is then chemically pre-treated by degreasing and phosphating in a tunnel. "The system is automatic, but some retouching is done manually due to the complex geometry of parts. Afterwards, the preparation phase prior to coating involves filling and sanding to eliminate any unsightly defects, such as external markings on the sheet metal due to tack welding operations."



A phase of coating a containerised module.



Manual coating of some components.



Coated parts.



Wagner's paint management unit.

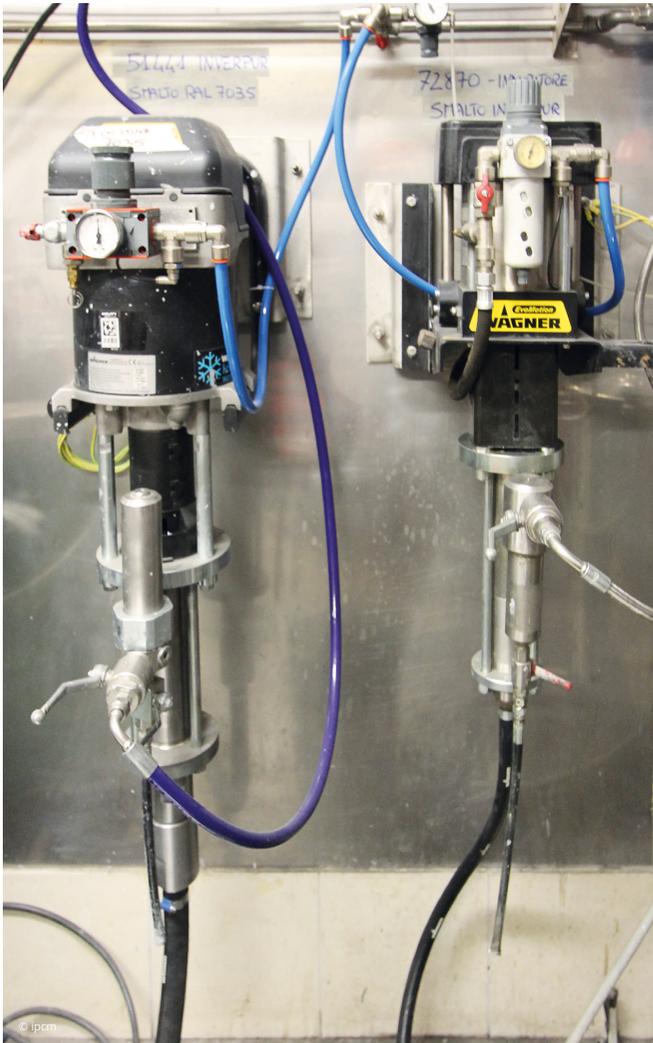
ACE level finishing quality

Implemented in January 2021, the resulting optimised coating process replaced the previous cycle, which included water-based primer + drying + one or two-coat solvent-based enamel, with a system consisting of a water-based zinc phosphate epoxy primer, a polyurethane enamel specifically formulated for outdoor applications, and a high-gloss finish (about 85 gloss). "With the help and experience of Raffaele Stifani from Inver," says Guidi, "we chose a two-component epoxy primer from the IDROXINVER series, which guarantees high anti-corrosion standards. We also selected the finish based on the outdoor resistance characteristics of the Inver products already approved by the major ACE manufacturers and we customised them to AB's requirements. After receiving the results of the laboratory tests carried out, the Inver team confirmed the formulation of its INVERPUR series, guaranteeing an only negligible coating degradation rate under solar radiation. The thicknesses applied in the three manual coating booths vary according to the program selected, ranging from 130-150 μm to 320-340 μm for the containerised modules intended for very harsh environments or that are going to be shipped by sea."

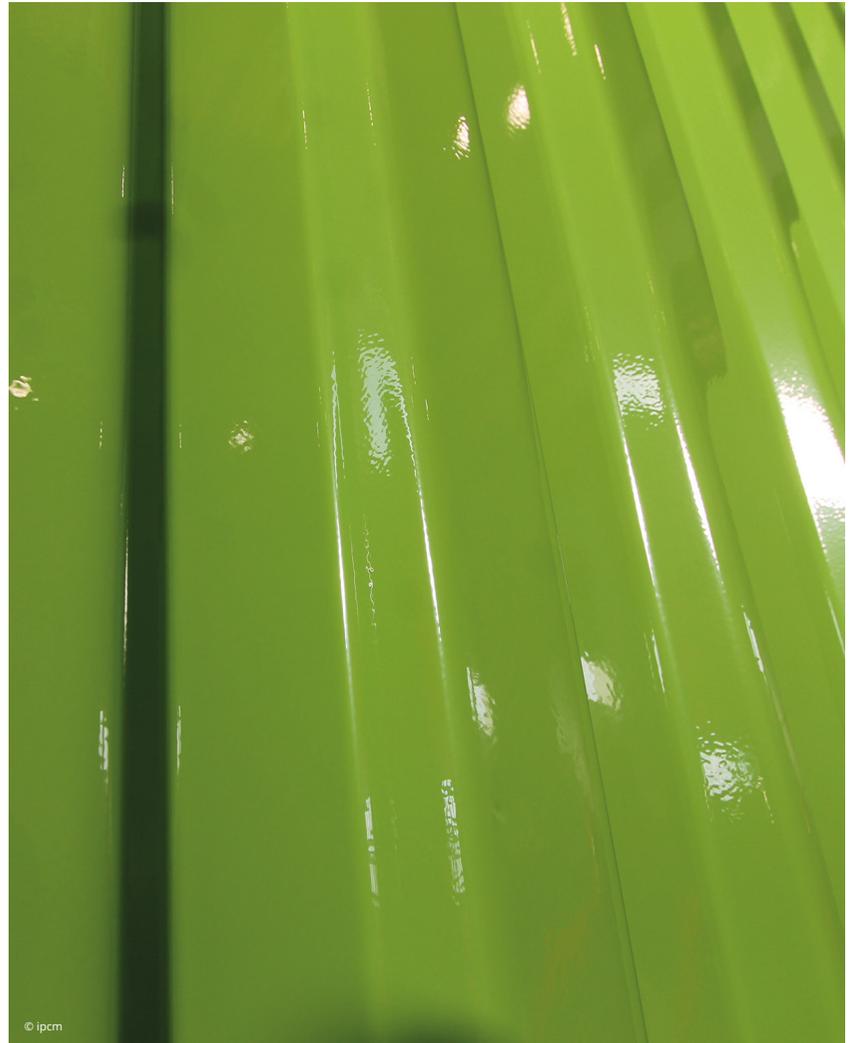
Following its overall revamping vision, Inver's team optimised not only the cycle used by AB's paintshop, but also those of the external contractors that process and coat a few parts of the containerised modules on behalf of AB. "As these external carpenter's shops are not equipped with ovens for curing water-soluble coatings, we supplied them with a super-high solid, solvent-based, anti-corrosion primer," adds Guidi.

The revamping of the mixing system

Once the coating cycle had been defined and optimised, the mixing system also had to be modified to meet the new requirements because, as Guidi explains, "using the best paints available is not enough: all devices must also be improved to achieve complete application efficiency. I therefore suggested that AB upgraded its application equipment and I personally supervised the whole revamping project. I worked closely with AB coating department manager, Stefano Meleddu, and with Wagner S.p.A., AB's chosen partner



A detail of the pumps.



Green is one of the hues that Inver has customised for AB's workpieces.

and the supplier of the original plant, to achieve this goal." The application system was thus automated and adapted to the new water-soluble coatings. The plant was updated by integrating each booth with a Wagner Intellimix Touch Plus 2K DFS panel, which allows managing both fluid sections by separately proportioning the epoxy primer and the polyurethane enamel. The products come from a circulator that keeps them properly mixed inside 200-litre containers, featuring a lid equipped with an agitator and a lifter. The switch from the previous low-pressure device to an Aircoat system made it possible to increase the thicknesses applied in a single coat, which was one of the project's primary objectives, in order to ensure the best possible performance degree. "The benefits of this change were also evident from the reduction in our consumption, thanks to the greater transfer efficiency level that is typical of the Wagner's Aircoat system, as well as from the increase in our productivity, thanks to greater speed of

execution," explains Wagner area manager Fabio Mandelli. Finally, the coating booths are connected to a water treatment plant designed and supplied by Hydro Italia Srl (Medicina, Bologna, Italy). "This Hydrofloty 12M system," indicates Enea Bignami, sales technician at Hydro Italia, "was devised for continuous removal of paint sludge through a coagulation and flotation process and it treats 12 to 20 m³/h of waste water and approximately 35 kg/h of overspray. The removed sludge is further dewatered with a fabric filter Hydrofilter 810 placed immediately downstream of the floater, in order to guarantee maximum performance."

The next project phases

"We are currently defining the next phases of our coating process' revamping project," states Bosio. "The first one concerns the optimisation of energy consumption. We are assessing whether the



The assembly of components into a cogeneration plant.

energy produced by the cogeneration plant that powers our entire Orzinuovi industrial hub can also serve our coating department and, specifically, its drying oven. By increasing the oven temperature, we can reduce the drying time and further speed up production, thus meeting another of our objectives. "Thanks to the collaboration of Inver's staff and Guidi's proactive advice, we have achieved our goals and made our coating department leaner. Furthermore, thanks to our totally water-soluble coating cycle, we have improved our working conditions to protect the health of our employees and we have reduced the environmental

impact of our processes. For a sustainability-oriented company like ours, it was more than a duty: it was almost a mission. We have also simplified the management of our paint application operations, which have become easier thanks to our new automatic system, and the treatment of the waste water generated by our booths through a plant supplied by Hydro Italia. Finally, both our quality control division and our customers are very pleased with our coatings' resistance and quality degree. All this contributes to confirm AB as the world's leading engineering and manufacturing hub in the on-site power generation sector." ○



The water treatment plant provided by Hydro Italia.