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One of the Soilmec drilling rigs at work on site.



FOCUS ON TECHNOLOGY

A Waterborne, One-Coat Metallic Top Coat: The Revolution in Coating Large-Sized Drilling Rigs

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Soilmec, a major international designer, producer, and distributor of ground engineering equipment, since the 1990s has been using waterborne coatings supplied by Inver, belonging to The Sherwin-Williams Company. During the lockdown due to the health emergency, the R&D laboratory of this American multinational company has developed the formulation of a new metallic water-soluble top coat to be applied in one coat.

Recalling the story of a company means to go back not only over history, but also over the evolution of the production technologies it has used and developed in time while growing. Davide Trevisani established Soilmec (Cesena, Italy), a company of the Trevi Group, in 1969. He was already the owner of Pali Trevisani, which had specialised in special foundations, tunnel excavations, and soil consolidation since 1957, that is, in the reconstruction period after World War II. "In our company, the story goes that Trevisani was not pleased with the machines used on his construction sites and that, therefore, he decided to build them himself," explains the firm's Product Marketing Specialist Pietro Manenti. "Given the excellent results, he created a company specialising in the design and construction of drilling rigs for large foundations. This is how Soilmec was founded." This firm was not only a pioneer in the creation of unprecedented,

technologically advanced equipment, but it was also among the first to apply water-based coatings on construction site machines' components. "Soilmec's paintshop was among the first to use waterborne paints," says Valentino Vallicelli, a sales agent of Grosscolor Srl, the distributor of Inver products in the Forlì (Italy) area. "This firm has always been open to innovation. Therefore, when we formulated a customised metallic coating that met the new market needs in terms of metallic effects, but also able to speed up the application cycle, after assessing its positive results they did not hesitate to use it immediately."

The advanced drilling systems supplied by Soilmec

With 90% of its production intended for foreign markets, Soilmec is one of the major companies in the world for the construction and distribution of drilling machines, machines for large diameter piles, cranes, and, since 2007, hydromills. "Initially, our company established itself on the market by

offering small and medium-sized drilling machines from 30 to 80 tonnes," says. "For ten years now, however, we have also specialised in the construction of large machines, that is, from 90 tonnes and up, whose technological and qualitative characteristics place our products at the top of our sector."

The Cesena plant assembles all equipment weighing more than 20 tonnes.

Soilmec has another production site in Asolo (Italy) where it builds microdrilling equipment, which is as technologically advanced as that built in Cesena, but uses piles with a smaller diameter and weighs 3 to 20 tonnes.

"Our factory builds, on average, 150-200 systems per year, which are then distributed all over the world, particularly in North America, Europe, Australia, and China, where the latest Soilmec product series, that of hydromills with a very advanced technological level and a weight of at least 300 tonnes, is highly appreciated."

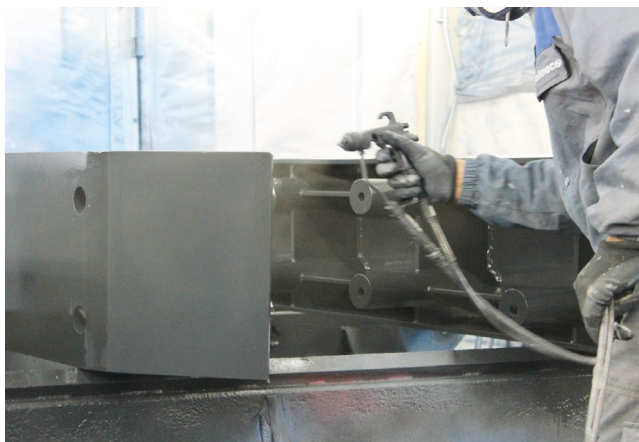


The coating booth.



The inside of the coating booth.

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Primer application.

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Primed parts waiting for the top coat application.

Products manufactured with attention to the smallest details

All Soilmec machines' components are designed in-house and manufactured by approved suppliers, which produce the parts according to strict specifications. "When we receive these individual components from our different providers," states Manenti, "if they are standard products we perform a simple visual check to assess compliance with our technical office's designs. On the other hand,

if they are special parts, we do not only check compliance with specifications, but we also have them controlled by our QC department or at the supplier's factory. After these initial checks, each component is classified with a code and allocated to a warehouse. Nothing can be left to chance, given the complexity of our machines." Some smaller-sized systems that require special coatings are then painted in-house. The company's

paintshop includes a workpiece preparation area and a coating booth applying waterborne primers and top coats.

Coating smaller equipment

"After a manual cleaning phase with a pressure washer, the components are placed on frames withstanding weights up to 45 tonnes," indicates Soilmec paintshop manager Enzo Camporesi. "In our department, we apply primers and top coats in five standard colours,

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Testing in the area outside the production factories.

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A machine during the manual touch-up phase.

that is, blue, white, grey, yellow, and red, or based on customer requirements."

"Soilmec's objective," says Manenti, "is to be open to any customer need, in terms of both product customisation and delivery speed. Therefore, the coating phase is crucial. At the same time, it can be hindered by long operational times and inadequate quality results due to the large size of the workpieces. This is why we turned to Inver¹, with which we have been collaborating since the 1990s, to find a solution to these critical issues and improve our application process of metal-effect coatings, whose demand is constantly increasing."

"During the lockdown," notes Vallicelli, "our R&D laboratory did not stop and, in a few weeks, it formulated a metallic top coat that can be applied in one coat, that is, without the need for any additional clear coat layer."

Characteristics of the new INVERPUR top coat

In the automotive sector, the metallised

effect is obtained by applying a base coat that enables the suspended particles to distribute evenly, thus avoiding any spots or defects in the surface film.

"The challenge was guaranteeing the applicability characteristics of pastel hues while meeting the need for shorter coating times on large-sized parts, such as those treated by Soilmec," states Vallicelli.

"The result was surprising: this two-component, waterborne, metallic top coat based on acrylic resins, belonging the INVERPUR series, is able to form a very hard and elastic film with excellent weather resistance and gloss characteristics. Thanks to proper adjustment, it also guarantees optimal applicability by favouring the uniform distribution of metal particles.

"The new metallic top coat can be applied on substrates treated with primers from the IDROXINVER, INVERPUR, and IDRAYON series. Soilmec uses the RAL 7035 grey INVERPUR primer. Since it has the same characteristics of the top coat, no waiting time is required, as is the case with epoxy

primers, which call for longer curing and flash-off times. Indeed, the top coat can be applied after only a short flash-off time, with viscosity (D4/25 °C) values of 50-70" and with dry thicknesses not exceeding 50-60 µm. In Soilmec's case, given the need for very short production times, drying occurs in the oven with a temperature up to 90 °C, but it can also take place in the air at a temperature of 20 °C and with relative humidity not exceeding 60%. The enamel is always over-coatable; however, after more than 24 hours of air drying or after accelerated curing in the oven, a light sanding operation is recommended before the subsequent application." After coating, the components are taken to area devoted to the pre-assembly of the drilling rigs.

The assembly of drilling machines

Soilmec machines' main components include hydraulic skids and electrical boxes. "In our hydraulic equipment," says Manenti, "the hydraulic system is crucial for powering the pump that sends the hydraulic oil to the various system parts through a diesel



Some macro-components in the assembly area.



A Soilmec machine finished and ready for delivery.

¹ A brand of The Sherwin-Williams Company.

engine, in order to enable the horizontal or oscillatory movement of the machine's arm. In our departments, we pre-assemble the hydraulic skids and electrical boxes that are going to be inserted into the machines during the final phase of our production process.

"Pre-assembly operations also involve two other main units that enable drilling functions: rotary tables for telescopic kelly bars, as well as the winches for the ropes that lower the excavation tools into the holes. After pre-assembling the macro-components, the machines are brought to our most recently built factory, completed in 2012 and equipped with a geothermal plant, for whose excavations our drilling machines have been used.

Here, the systems are subjected to the final assembly phase and, finally, to testing in the reserved uncovered area."

Conclusions

Soilmec believes that the events capable of subverting the world order, such as the recent ones, are always followed by equally significant reactions. "Soilmec was established to contribute to the post-World War II reconstruction," indicates Manenti. "In the same way, we are convinced that the global COVID-19 health emergency can be an occasion for revitalising our sector, which has experienced some critical historical moments, including this one in March 2020. The innovation implemented in our paintshop thanks to the support of Sherwin-Williams, as well as guaranteeing a faster process and a metallic effect that meets the taste of the market, can be a starting point for the development of new ideas to be submitted to our customers internationally." ●



From left to right: Pietro Manenti and Enzo Camporesi from Soilmec, and Mauro Tassinari and Valentino Vallicelli from Grosscolor Srl, a Sherwin-Williams General Industrial Coatings specialised distributor.