Frandent Limits Production Costs and Increases the Sustainability of its Agricultural Machinery Coating Process with Waterborne Paint and a Biomass Power Plant

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In 2006, long-established agricultural machinery manufacturer Frandent was the first in Italy to implement a biomass power plant for heating its factory and feeding its water-based coating system, which treats the power harrows, tedders, and rotary rakes that it distributes throughout Europe. By collaborating with paint manufacturer Inver, part of the multinational Sherwin-Williams, it also optimised its coating application process, achieving higher durability and excellent aesthetic quality.

Agriculture and industry are two seemingly distant worlds – the former characterised by the slow pace of the land and the changing seasons, the latter marked by the swirling rhythms of production workflows. However, in the course of history and, in particular, from the mid-19th century onwards, industrialisation has been affecting the agricultural world, at first quietly, with the introduction of tools that were no longer built by farmers and increasingly automated mechanisms to generate the driving force previously provided by draught animals, and then more and more predominantly, helping increase not only productivity, but also specialisation in specific crops.

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Nowadays, according to data reported by American consultancy firm Gran View Research, the global market for agricultural equipment accounts for a business volume of $155.68 billion in 2021 and it is expected to grow at a 5% annual rate between 2022 and 2030[1]. Its technological development remains one of the most significant in terms of specialisation of cultivation techniques and performance.

"Ever since our foundation in 1977, our mission has always been to build machines that make farmers' work easier and more productive." This is how Alessandra Berardo, the commercial & financial manager of Frandent Group Srl (Osasco, Turin, Italy), describes the mission of its company, specialising in the design and construction of agricultural machinery and, in particular, power harrows, tedders, and rotary rakes.

"Contrary to what one might think, the sector of agriculture is not in decline, but it actually requires constant updating and innovation to meet the ever-increasing demand for food. As suppliers of means for cultivation, we have to keep up with the pace thanks to a production system that is both adequate and, especially in this period, attentive to the use of energy sources. Back in 2006, when we built our current factory, we opted for two strategic environmentally friendly solutions: the adoption of water-based coating systems and the installation of a biomass power plant to replace gas for heating. Whereas the latter is now proving to have been a winning choice, also in the face of recent events, we recently had to rely on Inver[2] in order to solve some critical issues and optimise the performance of our water-based paint."

Frandent's vision: giving value to the land

This company's history began in a small workshop for repairing and selling agricultural machinery, where Maurilio Bruno, the father of current president Ezio, perfected and patented a new model of power harrow. Following this experience, he established Frandent in June 1977, whose name derives from the combination of the two main components of a harrow: crushers (in Italian, frangitori) and tines (denti). The first versions of this product were a huge success, so much so that, at end of the 1970s, the company started exporting to other European countries.

From top to bottom: The 4-stage pre-treatment tunnel, primed components, and the paint management unit.

[1] https://www.grandviewresearch.com/industry-analysis/agriculture-equipment-market

[2] A brand of The Sherwin-Williams Company.

"This embryonic export activity," says Berardo, "allowed us to deal with a higher level of technology than our own, which in turn prompted us to further improve our products and transition from a small artisan company into a full-fledged manufacturing business. We have spent the last few years coming up with numerous ideas and designs. Some of them have already become international patents, which, thanks to talented human resources and significant investment in innovative technologies, have turned into increasingly high-performance and reliable agricultural machinery: today, our products are appreciated throughout Europe for their excellent quality and long service life."
Since July last year, the company has had two "souls": on the one hand, it remains a family-run business that is deeply rooted in its area; on the other hand, it is now part of a French multinational company, the Burel group, specialising in the production of seed drills, thus confirming

From top left clockwise: The drying oven, top coat application and a coated power harrow.

its international scope. “For over twenty years now,” adds Frandent operation manager Matteo Racca, “we have been supplying Burel with our power harrows, which are then mounted on its seed drills. This partnership recently led to an agreement that turned Frandent into the first non-French company to join the group.”

From wood to energy for the company

The project for the new factory started in 2004: new growth requirements were an opportunity for Frandent to review its production structure and identify new solutions for reducing its energy costs and the environmental impact of its operations. “When it came to choosing the energy source for heating,” proudly explains president Ezio Bruno, “we decided to avoid conventional sources and opt for a solution that was almost unknown to Italian companies but already established in northern Europe: a biomass power plant. The heat produced by the combustion of the raw material, namely wood chips that we purchase from a dealer 10 km from our premises, is transmitted via a district heating network to our factory and to our automatic coating line, which only applies water-based catalysed paints. It was a brave choice at the time, but today it repays the investment that we made also to the benefit of our surrounding territory, to which we are very attached: the agricultural landscape where our factory is located and the presence of an organic farm near our plant call for sustainable choices, including the installation of photovoltaic panels for the production of electricity in 2005 and their enhancement in 2010. This is why we also pioneered the installation of a biomass power plant, which initially had high commissioning costs, but which has enabled us to create an even more comfortable working environment, then further improved through the implementation of lean production parameters.”

A lean production system adapted to the rhythm of the land

Frandent designs and manufactures two types of agricultural machinery that can be attached to tractors for complementary farming operations: machines for haymaking, such as tedders that prepare mowed forage for windrowing, and fixed and folding power harrows to prepare the soil for sowing. Currently, the line with the highest productivity is that of power harrows, whereas the haymaking machine line is being expanded and developed.

“One of our main bottlenecks,” indicated Berardo, “was the management of orders, concentrated in particular periods of the year. For example, haymaking is a seasonal operation that takes place in a short period starting in May; based on this timing, we have always adapted the production and delivery of our machinery, which we complete in about three weeks. However, sustaining a production flow linked to agricultural times is very complex; although predictable, those production peaks were not easily manageable with our previous corporate organisation. In 2006, at the same time as opening the new factory, we also implemented a new approach based on the parameters of Toyota’s lean production system. The main concepts are producing only when needed, i.e. when customer demand arises, and eliminating waste. The application of this method at Frandent has had several consequences:

The biomass power plant.

Wood chips are the Frandent plant’s heat source.

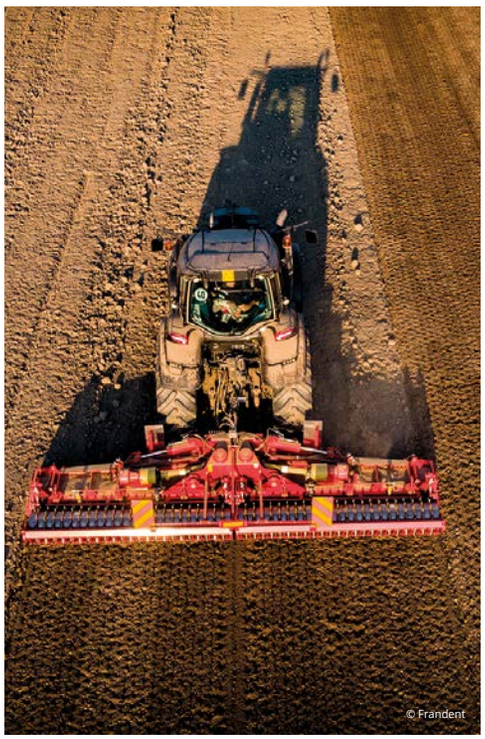
the layout of the factory was designed to create as linear a route as possible for our production flow, robotic stations were installed to achieve higher quality in conditions of total safety for operators, and we eliminated all stocks, which we now manage thanks to a vertical automatic warehouse designed to reduce footprints in terms of square metres. Thanks to this system, we have optimised our workflow and evenly distributed the production of our farm equipment throughout the year, so that we always have machines ready to be delivered when demand peaks, thanks to planned inventories."

The right coating partnership

With the construction of the new factory, Frandent also implemented a new coating process.

"The power harrow's assembly line and metalwork line converge in the coating system designed and installed by Eurotherm (Volpiano, Turin), equipped with a one-rail conveyor featuring 20 load bars and specially designed for the application of water-based paints with Wagner equipment. Initially, the coating was of perfect quality; however, the paint film flaked off after a few months due to inadequate substrate preparation prior to painting. We therefore decided to rely on a shot blasting contractor and, subsequently, to install a system to carry out this operation in-house. Our shot blasting machine currently treats 100% of parts, which then pass through a 4-stage pre-treatment tunnel (phosphodegreasing, cleaning, rinsing in demineralised water, and drying) and reach the coating plant."

"The paint system," notes Alessandro Conconi, a general industrial senior sales representative



Operators in the agricultural world demand ever-higher product performance and aesthetic quality.

at Sherwin-Williams, "includes an epoxy primer from the IDROXINVER/R/E series with excellent adhesion and corrosion protection properties and an INVERPUR/X polyacrylic top coat to achieve a thickness of 120 microns. Both products have VOC percentages below the requirements of Italian regulations and, in particular, the regulations of the Piedmont region, which are among the most stringent in Europe. The system has excellent resistance characteristics against corrosion (over 600 hours in salt spray tests), humidity, and UV."

"The support of the Sherwin-Williams staff at a time of operational difficulty, when we felt the need to make a quality leap, was crucial. Thanks to their advice, we decisively improved some critical application aspects and perfected every detail, from paint viscosity to nozzle characteristics. Our operators are now able to paint as no one has ever done before at Frandent. Our company is not inclined to change its suppliers, in the name of long-standing relationships of mutual trust. However, in this case, we could not make a better choice. Our goal is to produce long-lasting machines, because that is what our demanding market requires. The coating of agricultural equipment has become key to the satisfaction of the entrepreneurs who turn to us for ever-higher product performance and aesthetic quality. Currently, we are working with some of Burel's experts to further improve the consistency of our coatings, also through constant collaboration with Inver's technicians."

"Operators in the agricultural world," states Ezio Bruno, "have proved to be very demanding when it comes to the efficiency and quality of the tools they need for their crops. And they are going to become more and more so. Concern for the environment is also inherent to our industry, precisely because of the context in which it operates. In the not too distant future, they will come to demand a guarantee that the machines they use are manufactured through environmentally sustainable processes, as is already the case in other sectors, and Frandent is ready to provide it. In these times of wars over non-renewable sources and serious environmental crises, we have been focusing on policies to reduce waste and use renewable energy sources. We consider this as the first step towards independence from anything that is too dangerous for us and for the environment in which we live and work."