

Quadra, 74130 Contamine-sur-Arve, France

Wet-cast production line installed in Romania: a versatile & efficient plant

The Star Stone Company was founded by Cristian Pop in 2007. Specializing in the production of wet-cast products (slabs, pavers, concrete reconstituted stone and any kind of landscaping products), Star Stone has been growing exponentially since its beginning. Cristian Pop has recently decided to reach a new level by upgrading the plant. The continuing growth of Star Stone involves a high level of performance, which its existing facilities are not able to satisfy. Rather than a supplier, Star Stone was actually looking for a fully-fledged partner for proposing a new manufacturing solution: a major change for this manufacturer, who was basically manufacturing its products manually. Following a first contact during the Batimat show in 2011, where the manufacturer Quadra is always present, Star Stone took a closer look at Quadra by visiting several plants and studying the different technologies that might be applied for automating its production.

Star Stone was searching for production equipment that would expand its daily production, whilst coping with its wide range of products. Star Stone was requiring a modern installation offering low production costs, and including the latest technologies of the industry in order to provide its clients with very high quality products.

Trusting in the experience of Quadra as an equipment manufacturer and given the importance of the recommended procedures, Star Stone did not hesitate to entrust this new project to Quadra. Quadra, a manufacturer of turn-key production units, has therefore handled the complete installation from the raw materials to the finished products, with a customized definition of the entire equipment.



Type of products manufactured by Star Stone

This new production line comprises the following components:

- a concrete mixing plant, equipped with the latest probes and sensors for measuring the moisture content in the granulates and checking the concrete plasticity
- a concrete dosing system
- a colour dosing system
- handling and conveying systems

**Concrete mixing plant:
design and realization ensured by Quadra**

The concrete mixing plant and the selection of the components are important during the definition of the plant since the concrete preparation and the regularity and consistency of its composition play an important role in the final quality of the manufactured products. This is even more significant in wet-cast production as the concrete is complex, technical and its features vary according to outdoor conditions.

The design of the concrete mixing plant involved a thorough technical analysis. The configuration of the provided equipment has to completely match the current and future needs and manufacturing processes of Star Stone. The study focuses on the integration of all



The granulate storage hoppers comprise four different containers and provide a global storage capacity of 60 m³. Aggregate weighing is carried out on a belt scale installed underneath the containers. Each granulate is accurately weighed and dosed.

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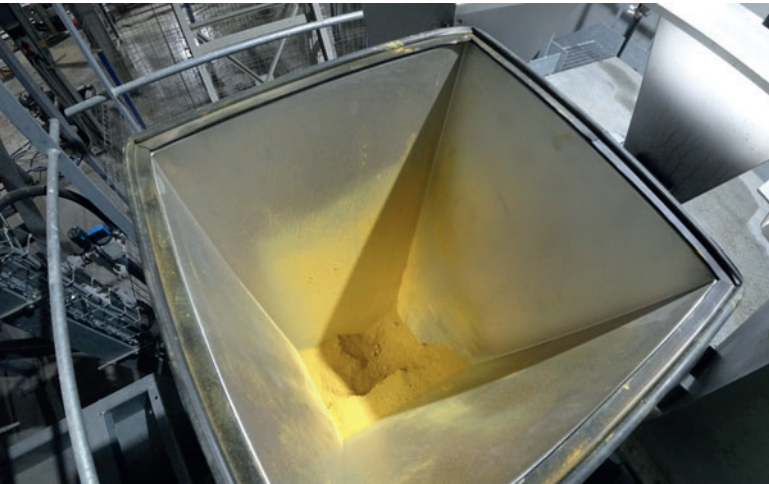
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This batching plant is equipped with four micro-dosing systems handling the colour powder.



Mixer platform in a cladding

safety protocols, easy access and maintenance, and the features of the machine that receives the concrete.

The storage hoppers contain four different containers, and provide a global storage capacity of 60 m³. Granulate weighing is carried out on a belt scale installed underneath the containers. Each granulate is accurately weighed and dosed.

Two probes of the brand HYDROSTOP are integrated in the granulates in view of measuring the moisture and correcting the weighing to ensure the right concrete formulation in the mixer. In fact, the amount of granulate discharged accounts for the moisture and the incorporated water quantity. The batch is then discharged to the skip hoist.

This concrete mixing plant is equipped with four micro-dosing systems handling the colour powder. Helical in shape, each dosing sys-

tem has a capacity of 20 kg. They are driven by motors for the fine and precise dosing of the colours to be integrated into the mixture. The colours are put directly into the skip hoist and complement the batch (granulate). Once filled, the skip hoist moves and loads the mixer.

Quadra has installed a robust, reliable and efficient planetary mixer of the brand OMG. As it is able to mix and homogenize raw materials quickly, the mixer allows uniform and high quality concrete manufacturing.

This mixer is also equipped with the latest micro-wave technology provided by Hydrostop, enabling the precise measurement of the moisture in the liquid concrete. This technology allows permanent regulation during the whole manufacturing cycle, taking into account all events occurring such as temperature variations, additive addition, etc, to obtain a concrete of consistent composition. The micro-wave and the regulation system ensure that the plasticity and features of the finished concrete are maintained.

The manufactured concrete is then directly discharged into the dosing system that moves below the mixer to receive the concrete. The cleaning of the mixer is realized separately from the production line and makes it easy thanks to only one point for the water flow.

The mixing system is computer-controlled, enabling the mixing process to be followed and manufacturing recipes to be chosen. It also provides information regarding the filling of the hoppers and the silo, and all other elements that affect the quality of the concrete. Finally, Quadra also provides fully galvanized equipment (hoppers and mixer block). The galvanization supports the durability of the equipment by avoiding quick deterioration caused by humidity and changing climate conditions.

Fully automated filling station

The manufacturing station comprises one dosing system, one elevator, one lowerator, one conveying system and two vibrating tables. The core component of the filling station is the dosing system. This dosing system allows quality, cleanliness, and high precision, whilst meeting the needs of high versatility and flexibility of Star Stone that provides its clients with a large range of products of different size, form and finish.

The polyurethane molds are fixed on wooden pallets. The support pallets, sized 1400 x 650, remain stationary while the dosing system is operating. It moves on two axes to feed the concrete within each single mould situated on the pallets. Each pallet has a different mould configuration. Indeed, the number of molds per pallet differs according to size and form. One pallet may receive molds of the same format, or of different sizes.

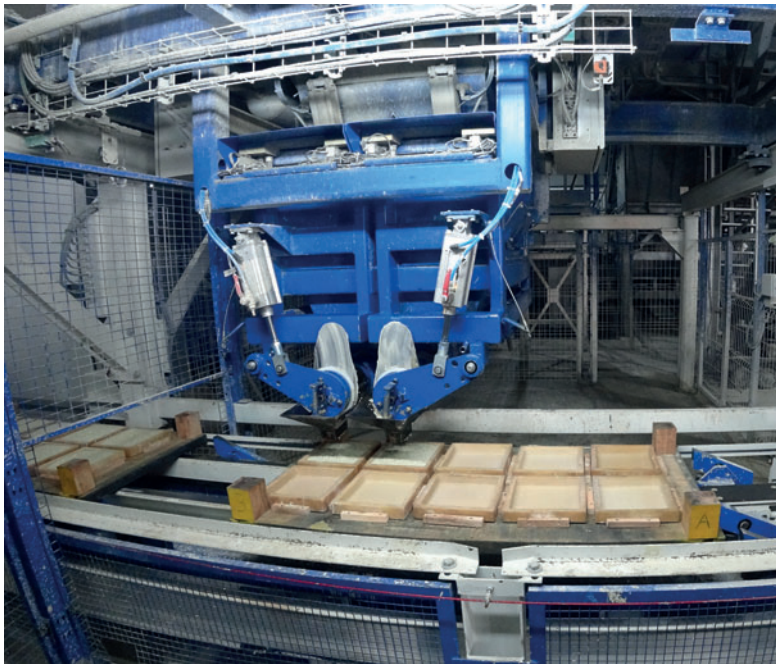
The dosing system is equipped with a hopper having a concrete storage capacity of 800 l. This hopper moves above the mould and ensures the automatic supply of concrete.

The concrete is stored in a reception hopper, which is discharged through two gates. Mold filling is performed by two independent dosing hoppers. They are positioned on an electronic weighing system, which enables them to discharge the exact quantity of concrete into the mould.

Depending on the mould to be filled, the PLC selects the exact quantity of concrete to be discharged with a precision of ± 100 g.



Fully automated dosing and filling system: quality, precision, cleanliness, versatility and flexibility



Each pallet has a different mould configuration. The pallet may receive molds with the same format, or of different sizes.



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Elevator and lowerator: transfer and handling system provided by Quadra

One vibrating table is located below the filling station and another one at the next step. Both of them ensure a homogeneous repartition of the concrete and allow a perfect surface throughout the mould.

Once filled, the molds are transferred by the conveying system and stored in the elevator. When the elevator has reached its full capacity, the stack of molds is transferred to the following position and retrieved by the forklift. The forklift retrieves the stack of pallets loaded with fresh products and moves them to the curing station.

The lowerator that ensures the supply of the demoulding line is charged by the forklift, which retrieves a stack of pallets loaded with dry molds and charges the lowerator with them. Demoulding is currently performed manually.

Following the demoulding, the molds are cleaned and oiled by means of the oiling ramp located in front of the filling station.

Automated equipment

This machine is driven by PLC (Programmable Logic Control). All mechanized movements are servo-controlled by frequency inverters to obtain progressive acceleration and deceleration.

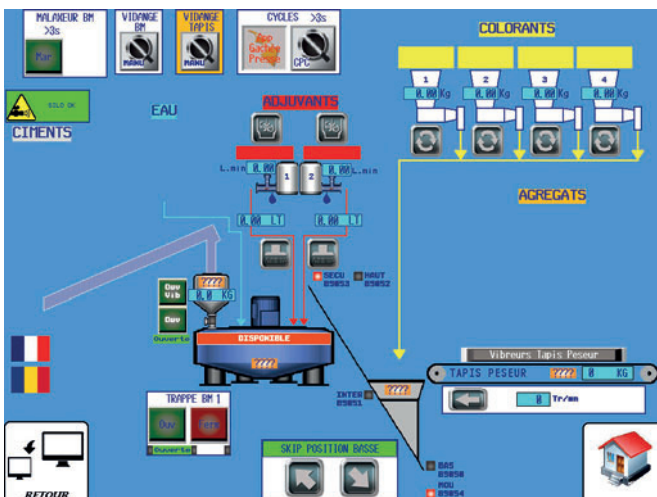
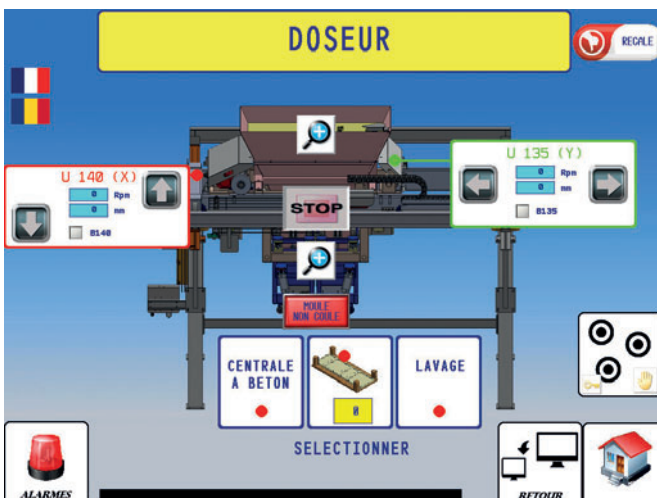
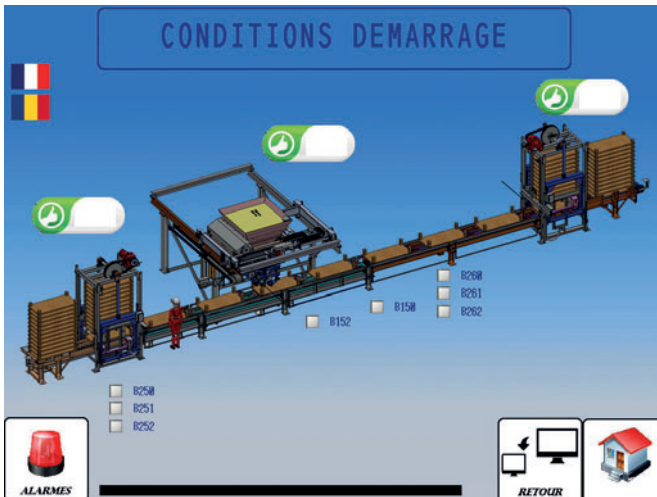
The terminal touch screen allows the visualization and regulation of manufacturing parameters. Machine settings are stored and recorded by production recipe, which is related to a type of product. Several products may use the same recipe, and more than 255 recipes can be recorded.

All operating parameters of the unit may be modified during automatic functioning without affecting production. All descriptions are detailed, straightforward and translate into many languages.

The whole plant is graphically displayed, which enables the operator to easily and quickly supervise the production cycle. All operat-



Demoulding line and storage area



This machine is driven by PLC (Programmable Logic Control).

ing data in progress are showed (cycle time, filling level, daily production rates, shutdowns etc.). This information is stored and can be viewed at any time. Recipes and production data are recorded in SQL format and analysed, stored and processed by most programs.

Conclusion

Star Stone is an excellent example of a manufacturer opting for the automation of its manufacturing process. This modernization enables Star Stone to significantly develop its activity, and to pro-

vide its clients with high quality products in terms of shape, texture, colour, resistance and durability. Star Stone is now equipped with a strong technology solution, capable of adapting to possible future innovations.

Quadra provides equipment that is custom-designed and tailor-manufactured according to manufacturing needs and kind of product. As a global manufacturer, the complete realization of the equipment is ensured by Quadra, right from the study through to the start of production. Following complete training by experienced technicians, Star Stone now benefits from a high quality after-sales service. The remote connection allows access to all machine settings and provides efficient and quick assistance. The equipment can be supervised and operated remotely from Quadra's premises, which offers the possibility of remote maintenance.

Specializing in this range of equipment, Quadra is today able to realize any kind of project in wet-cast or semi-dry production, both in Europe and worldwide. Quadra takes on the challenge of designing technical, effective and efficient plants within the existing environment. Production lines are completely customizable and may be evolutionary with manual operations, whereas others may be semi-automatic or fully-automatic. These coherent solutions and advanced solutions are proposed for all processing phases.

FURTHER INFORMATION



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