

Quadra, 74130 Contamine-sur-Arve, France

Full-scale plant set-up in Mexico: innovative manufacturing conditions as decisive factor

The company Abastecedora de Materiales Garcia is a family-owned company, which is a leading player in the industry of manufacturing, commercialisation and distribution of construction materials in South America. Specialized in concrete blocks manufacturing, this company is widely recognised within this industry, and currently achieves a monthly output of 7 million of concrete blocks. This company ensures this production with state-of-the-art equipment. Equipped with 7 units of American brand, this manufacturer has solicited for the first time a French equipment manufacturer for the replacement of one of its production line. The final decision naturally relied on the advance and pioneering features provided by the plant supplied by Quadra, who is the leading French machinery supplier with plants operating worldwide. The company Abastecedora de Materiales Garcia was indeed attracted by the high flexibility of the plant, which currently enables them to enhance its product range. However, this is the winning combination between the technical advance of the plant and the high output rates achievable that led making Quadra the obvious choice as their preferred supplier.

Productive line with high operational efficiency

The production machines type « HP » (meaning High Performance) include several patented system. This is the most productive and efficient range of machine designed by Quadra. The expertise in terms of vibrating and mechanical development is combined with latest technological progress, and make this range stand out through unique technical features.

The core component of the plant is the block-machine. Designed for meeting versatile and multi-products production, the Q12 HP allows first-class product manufacturing with high output rates. This machine ensures high efficiency whilst giving overall ease of operation, friendly maintenance and greater safety. Highly performing, this block machine offers an impressive production rate of 13 seconds per pallet of 18 blocks (20 x 20 x 40).

As per the rest of the range supplied by Quadra, the Q12 HP has a streamlined configuration. Mounted on anti-vibration feet, the frame (large and heavy one-piece

steel structure) is protected from vibrating solicitation. Thanks to the lateral position of the motors, no civil engineering such as a pit is required for setting up the machine. No vibrations are transmitted to the ground, and the elevated and ventilated architecture of the block machine allows easy cleaning and maintenance operations.

Optimal filling and vibrating system: patented process

The vibrating features designed by Quadra are patented, and make their block machine stand out thanks to a faster and uniform filling resulting in accurate products manufacturing (height, weight, density, and strength).

The vibration motors are located on one side of the block machine allowing direct access. The components are isolated from vibrating solicitation and concrete projection, which ensures the reliability and the longevity of the equipment. This configuration also enables to differentiate the vibration settings between the front and the rear of the mold. During the filling process (pre-



The vibration motors are located on one side of the block machine allowing direct access.

vibration cycle), the vibration amplitude is indeed higher in the front of mold, thereby allowing an optimal filling of the front part of the mold. This pre-vibration system with "flexible force and speed" is patented by Quadra, and enables to produce a uniformed and homogenous filling on the whole surface of the mold (density and strength are enhanced), whilst achieving a shorter cycle time.

In addition, the block machine is equipped with retractable static bars. As they are not used during the filling process, these static bars are moved into low position during this operation. They are not in contact with the pallet or the mold for avoiding any heavy and repeated impacts. The retractable static bars allow maximum vibrating amplitudes consequently giving shorter cycle times and more efficient filling. Then, during the main compaction, the statics bars move up to play the bottom reference of the pallet.

Finally, the range of block machine provided by Quadra guarantees a height accuracy of less than 1 mm. The tamper head always goes down at the same position, and meets on a mechanical stop. When the tamper head reaches the mechanical stop,



Abastecedora de Matériaes Garcia: Head office based in Monterrey, Mexico



Block-machine type Q12 HP: rugged and ventilated architecture that allows high-quality product manufacturing within high rates.



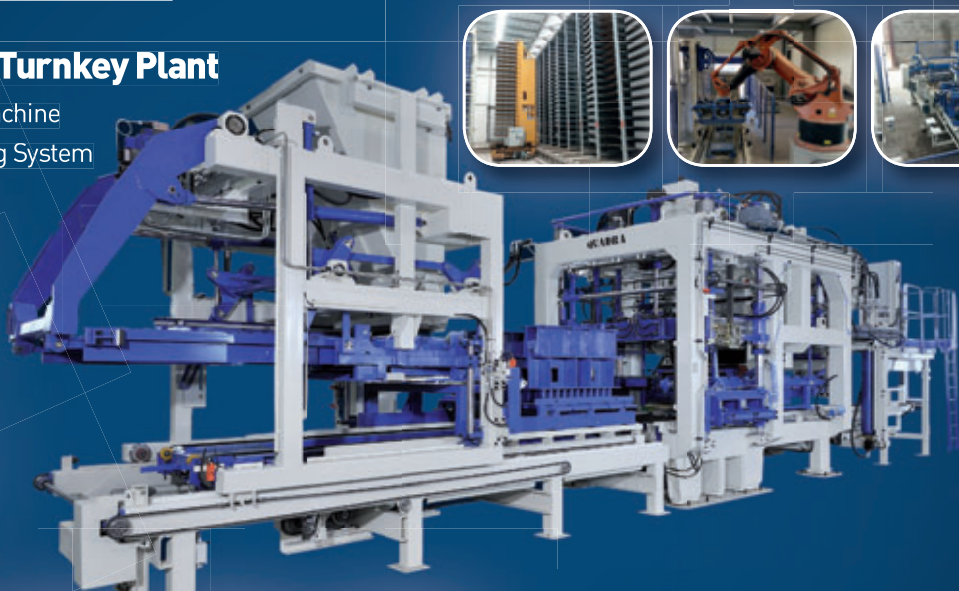
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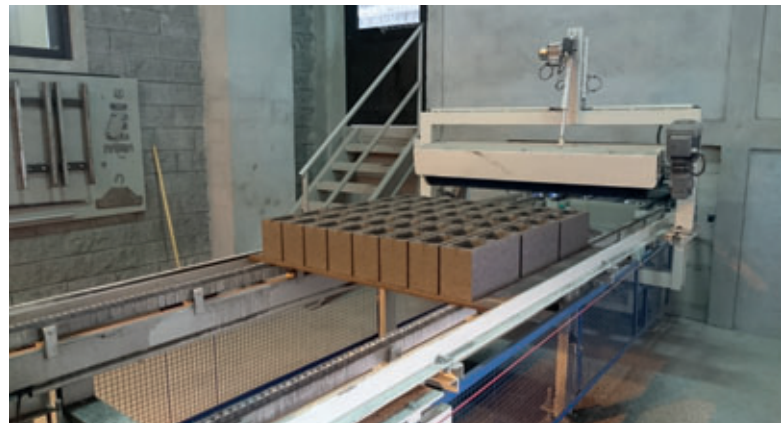
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Rational configuration: frame (massive and heavy one-piece steel structure) based on anti-vibration feet. Optimal filling and vibrating system: patented process



The finger car with rotating platform: The curing solution is engineered to give the optimal utilisation of space



Following the curing and the transfer to the lowerator, the pallets loaded with products are finally transferred to the cubing station via a walking beam conveyor. This type of conveyor lifts and moves the pallets without any friction. It also means no wear, and no noise.



Cubing robot type Kuka KR 1000 equipped with 6 axes: maximal load of 1300 kg



a final vibration is performed and allows calibration of the top references of the products. As for the bottom references, they are ensured by the static bars that go up at the fixed height. Whatever the height of the products, the tamper head always stops at the same position, thereby achieving consistent height accuracy. These unique technical features developed by Quadra offer innovative manufacturing conditions. The synergy between the elec-

tronic, mechanic, informatic and automatism systems aims at adjusting, for each cycle, the manufacturing conditions, which will be optimal for producing a first-class product. This system is therefore pioneering and enables this machine to enjoy an automatic autoregulation of each cycle between the filling settings and the final vibration time. This is thanks to the mechatronic integrated in this range of block machine. For example, if the final vibration

is different from the vibration time initially defined, the filling parameters are automatically adjusted from one cycle to the next one by reducing the pre-vibration time.

State-of-the-art handling system

The finger car with rotating platform performs the storage operations. This equipment, able to receive 20 production pallets, has the advantage of saving floor space



The settings and recipes are easily changed from the control desk. The operator inputs the number of layers, the number of products per layers, and their position on the pallet.

within the building. The curing solution is engineered to give the optimal utilisation of space. The curing area may receive 4500 pallets, and is equipped with a ventilated and humidity-controlled system that ensures consistent and uniform curing environment.

The position of the finger car is continuously monitored by laser probe and driven by servomotors for accurate positioning of the platform in front of the rails of the curing racks, elevator and lowerator.

Efficient tailor-made cubing solution

One cubing robot type Kuka KR 1000, equipped with 6 axes, may load 1300 kg. The settings and recipes are easily changed from the control desk. The operator inputs the number of layers, the number of products per layers, and their position on the pallet. The cuber clamp is designed and manufactured by Quadra. The use of servomotors and continuous monitoring of the position of the clamp allow very accurate placement of the blocks as well as very high production rates.

The specificity of the robot, which was integrated in this production line, is the way of cubing products. Indeed, this robot enables the customer to palletise products without any wooden pallet as overall support. The lower row of the pallet is made from products placed horizontally. The finished packs will be then directly retrieved by the forklift on the slat conveyor.

This robot proceeds as follows: he makes the pallet called "virtual" that will be used to form the lower layer. When this pallet is completed (consisting of 6 ranks), the robot retrieves one line of products and put them horizontally in view of implementing the first row of the pack. Then, the robot makes the pack from the products supplied on the pro-



1) The robot is cubing the «virtual» product pallet.



2) The robot is retrieving one row for creating the low rank of the product pallet.



3) The lower rank of the pallet is formed from the product settled in the «virtual» pallet.



4) The robot is making the product pallet from the product on the production boards.

duction board and completes it to get 6 layers of products (+1 lower row). When the pallet is finished, it starts a new cycle until it uses all the "virtual" pallet.

This cubing solution allows the forklift to pick up the finished pack from the convey-

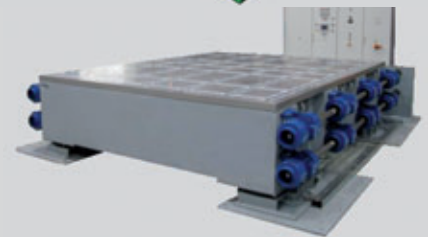
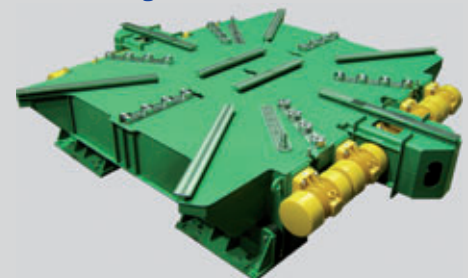
■ Mobile block making machines



■ Laboratory / Sample block making machine



■ Vibrating tables



■ External vibrators



■ Special machines

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Equipped with glazed windows, it enables the operator to control the block-machine while watching the overall plant.



Clear, intuitive and user-friendly interface allows easy modification of the block machine settings

or, eliminating the use of wooden pallet. The cubing cycle follows the rate of the block-machine with the view of thereby reducing any production downtime.

Comfort and safety conditions: supervision vs. handling

The technological progress by Quadra aims at improving work conditions as well as reducing heavy manual handling.

A noise-insulated control room is located in the middle of the production line. Equipped with glazed windows, it enables the operator to control the block-machine while watching the overall plant, from the manufacturing to the cubing.

This factory is controlled with high-end controlled software designed by Quadra displaying the full plant. The operator may watch easily and quickly the whole production cycle. A touch screen terminal allows adjustments and observations of all parameters throughout the production process.

Clear, intuitive and user-friendly interface allows easy modification of the block

machine settings. Any interruption in production are fully described, and thanks to the program structure, automatic cycles are quickly and easily resumed. Machine settings are stored and recorded by production recipe in order to retrieve easily manufacturing parameters associated to a type of product.

This control-device is also a pertinent tool for managing the overall production since it indicates operating data in progress (time cycle, filling level, daily production, rates etc.), and other information such as production shutdowns, number of cycles for each mold. These production data are detailed, recorded, and may be then analysed by the customer in order to continuously optimise rates.

Conclusion

Quadra has build up a highly respected reputation as expert in automated process and cutting edge vibrating system. Quadra has been a leading supplier for the precast industry for more than 20 years, and now has a large and growing worldwide pres-

ence with more than 300 plants set-up in the world.

The company Abastecedora de Materiales Garcia is a new reference in Mexico. Apart from the quality of both the relationship and the support displayed from the study of the project, Abastecedora de Materiales Garcia is particularly pleased with the innovative manufacturing features provided by their new Quadra plant. This generation of machine offers a technological leap. They enable them to achieve extremely high outputs whilst continually optimising the manufacturing conditions for producing high quality product in terms of dimension, weight, density and strength. Finally, Quadra provided its expertise as robot integrator. These solutions are increasingly being used in the concrete industry, allowing new handling opportunities (speed, flexibility, and precision) by simplifying equipment and reducing the maintenance. Quadra integrates the robots supplied by Kuka, a leading manufacturer of industrial robot. Quadra uses then their own expertise to design and manufacture the handling clamps as well as the automatism programs. Quadra has become a major partner for integrating robot within the concrete industry, with more than 100 robots operating worldwide for multiple applications.

Watch a video about Quadra's packaging solution:



Simply scan the QR-Code with your smart phone and watch the video!

FURTHER INFORMATION



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