

Quadra, 74130 Contamine-sur-Arve, France

Short cycle time plus outstanding product quality: key arguments for commissioning a new plant in England

The Maen Karne Group is made up of Maen Karne Aggregates Ltd and Maen Karne Concrete Products (formerly Western Blocks Ltd). Recently acquired by the GRS Group, the Maen Karne Group has displayed sustained growth since its founding and is now one of the leading renowned suppliers to the precast industry in the southwest of the UK. The Maen Karne Group is active in several fields: supply of aggregates, manufacture of ready-mix and precast concrete, manufacture of concrete products (mainly blocks and pavers) and the supply of waste management solutions. Divided into four sites and equipped with two plants for the manufacture of concrete blocks, Maen Karne placed an order with Quadra for the upgrading of the existing production line and commissioning of a "high performance" block making machine at their Melbur site, located in the county of Cornwall. High production capacity, consistent and optimum quality in terms of height, compaction, durability and dimensions, and ease of maintenance - these were the main requirements for the new plant. The wealth of experience and proven skills of Quadra have finally convinced the Maen Karne Group, which has chosen to rely on the French equipment and know-how.

This new block machine type Q9HP, incorporating leading-edge technologies, enables the Maen Karne Group to manufacture very high outputs with a short cycle time and to efficiently cover the area with high quality products.



Maen Karne is equipped with two plants for the manufacture of concrete blocks - view of the storage yard.

State-of-the-art and highly productive plant

The "HP" (High Performance) production line relies on several patented systems. This is the most productive and efficient range of machines designed by Quadra. Its expertise in terms of vibration and mechanical development is combined with the latest technological progress and makes this range stand out through unique technical features.

The core component of the plant is the block making machine. Designed for versatile and multi-product production, the Q9 HP permits first-class product manufacturing at high output rates. This high-performance block making machine provides overall ease of operation, friendly maintenance and greater safety. This high-performance block making machine uses two steel pallets measuring 1100 x 510 x 12 mm and offers an impressive production rate of 18 blocks measuring 100 x 215 x 440 mm in 12 seconds.

In addition to easy integration in the existing environment, it was the association between the output rates and the production changeover that attracted the Maen Karne group. In ensuring the shortest mould changeover time, Quadra commits to the shortest downtime and provides high production flexibility. The technology offered by Quadra is very convincing since the mould changeover takes less than 10 minutes. The mould and the tamper head are mounted on a trolley and its forward and backward movements are controlled by geared motors. This operation is entirely remotely controlled by the operator who remains in the secured area. The production recipes are recorded and all setup parameters are directly applied for each group of products.

As for the rest of the range supplied by Quadra, the Q9 HP has a streamline configuration. Based on anti-vibration feet, the frame, which is designed as a massive and heavy one-piece steel structure, is protected from vibration energy input. No building work such as a pit or excavation is required for setting up the machine. No vibration is transmitted to the ground, and the elevated and ventilated design of the block machine allows easy cleaning and maintenance operations.

Concrete flows through a hopper, whose height above the feedbox is adjustable. It is opened by cylinders and a laser



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QUADRA

40 route de Findrol - 74130 Contamine-sur-Arve - France

Tel. +33 4 50 03 92 21 - Fax. +33 4 50 03 69 97

www.quadra-concrete.com

PUK Limited

Unit 1, Stratford Agri - Park -

Clifford Chambers - Stratford upon Avon - Warwickshire CV37 8LP

Tel +44 (0) 1789 721655 - www.pukservices.co.uk

sensor controls the concrete level in the hopper. Instructions for these adjustments are given from the control desk and displayed on the dialog screen. Two cylinders connected and synchronised by a balance shaft provide the forward and backward movements of the feedbox.

This machine operates fully automatically and permits reliable production and consistent quality.

Optimal filling and vibrating system for ensuring a short cycle time and high product quality: patented process

The vibrating features designed by Quadra are patented and make their block making machine stand out thanks to a faster and more uniform filling process, resulting in the manufacture of highly accurate products with a consistent density throughout the height of the product.

The system motors are located on one side of the block making machine for allowing direct and ample access to the motors. During the filling (pre-vibration cycle), the amplitude of vibration is high. The vibration system with modular force and frequency is patented by Quadra and provides a high amplitude of vibration. This is also crucial in order to obtain homogeneous and rational filling across the entire mould surface and results in improved product density. It also leads to a shorter filling time.

In addition, the block making machine is equipped with retractable static bars. These static bars are held in their low position during the filling process. The retractable static bars allow maximum vibrating amplitudes of the mould to also ensure shorter cycle times and more efficient filling. Then, during the main compaction step, the static bars move in an upward

direction to act as the bottom reference for the products. This leads to accurately sized products.

Finally, Quadra's range of block making machines guarantees a height accuracy of better than 1 mm and includes mechanical stops. The tamper head always moves down to the same position on a mechanical stop. When the tamper head reaches the mechanical stop, a final vibration is performed and allows calibration of the top references of the products. 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 provide innovative manufacturing conditions. The synergy between the electronic, mechanical, information and automation systems enables the setting of the optimum manufacturing conditions for each cycle time. This system is therefore pioneering and enables this machine to perform automatic regulation of each cycle between the filling settings and the final vibration. This system developed by Quadra enables the adjustment of the filling parameters from one cycle to another according to a final vibration time goal. If the final vibration time is different from the vibration time initially defined, the filling parameters are automatically adjusted from one cycle to another one by reducing the pre-vibration time.

Comfort and security of operators: supervision vs handling

The technological advances offered by Quadra's equipment are aimed at enhancing the working conditions of the operators as well as reducing manual operation.

The line is equipped with a noise-insulated control cab which is located in the middle of the production line. This configura-



A noise-insulated control cab is located in the middle of the production line and enables the operator to control the block making machine while watching the overall plant, from the manufacturing to the cubing.



This configuration enables the operator to control the block making machine while supervising the entire production line, from manufacturing to cubing, and all instructions are given by a PLC equipped with an operating interface.

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The unit has been installed with high-end control software designed by Quadra that displays the complete plant. The operator can monitor and supervise the entire production cycle easily and quickly. A touch screen terminal makes it possible to observe and adjust all parameters.

A clearly structured, intuitive and user-friendly interface permits easy modification of the block making machine settings without interfering with production. All modifications can easily be accomplished by the operator. The reasons for production shutdowns are described in detail and the program structure makes it possible to resume automatic cycles quickly and easily. Machine settings are stored and recorded by production recipe to easily retrieve manufacturing parameters associated with a type of product.

This control device is also a useful tool for managing the overall production process because it indicates operating data in progress (cycle time, filling level, daily production, output rates etc.), as well as other information such as production downtime and operations by mould. This production data is detailed, recorded and may then be analysed by the manufacturer to continuously optimise production output.

Conclusion

Having placed its trust in this new generation of machine that provides a big technological leap, Maen Karn is fully satisfied with its investment. The results achieved in terms of quality and production capacity are a good example of the integration of a state-of-the-art machine within an existing environment. The advanced features of the new plant enabled the Maen Karne Group to achieve outstanding productivity while taking advantage of cutting-edge manufacturing technologies for enhancing the quality of its products.

Having operated in the United Kingdom for more than 15 years, Quadra has several references in this area. Represented by the Stratford-based company Puk Limited, Quadra is regularly commissioned to handle numerous projects. Quadra's experience is indeed widely recognised, both in vibrating presses as well as in wetcast and precast machines that are designed and adapted in accordance with each production need. ■

FURTHER INFORMATION



Maen Karne
Melbur Works, Summercourt,
Newquay, Cornwall, TR8 5UA, United Kingdom
T +44 1726 862881
F +44 1726 860786
www.maenkarne.com



Puk Limited
Unit 1, Stratford Agri - Park
Clifford Chambers, Stratford upon Avon
Warwickshire, CV37 8LP, United Kingdom
Contact: Tony Child
T +44 1789 721655
F +44 1789 721654
www.pukservices.co.uk



Quadra
40, route de Findrol
74130 Contamine-sur-Arve, France
T +33 45003 9221
F +33 45003 6997
info@quadra-concrete.com
www.quadra-concrete.com