

Flexible plant technology provides a competitive advantage

After changing the mix composition for AAC products and modernizing the plant technology of the AAC production plant, Baustoffwerke Löbnitz GmbH & Co. KG are ideally positioned for the future. Above all, the active horizontal cutter, the green cake separation machine and the robot-controlled packaging line enable very flexible production and a large product portfolio. For monolithic construction in the spirit of the German Building Energy Act, the manufacturer plans to increasingly produce and sell XL block formats to construction sites throughout the country.

Baustoffwerke Löbnitz GmbH & Co. KG (Löbnitz Construction Materials) has a reason to celebrate. The North Saxon building materials manufacturer based in the Leipzig-Halle-Bitterfeld conurbation has been successfully asserting itself on the market as a manufacturer of sand-lime bricks and aerated concrete for 25 years now. And with the latest investment in the modernization of the plant technology, the AAC plant is now also optimally equipped for current and future market requirements.



Managing Partner Guido Wolff,
Deputy Operations Manager Reiko Nickel
and Operations Manager Enrico Droll
(left to right).

Prior to the modernization of the plant, two AAC cakes were positioned side by side on the autoclave cart and transported into the autoclaves; since the modernization, two cakes are now positioned on top of each other on the cart.





The station for oiling the moulds was supplied by Bernd Münstermann GmbH & Co. KG.

Change from lime- to cement-rich mix compositions

“We have made some fundamental changes to two aspects of our production: We have updated the AAC mix composition and we have replaced the majority of the plant technology,” says Guido Wolff, Managing Partner of Baustoffwerke Löbnitz GmbH & Co. KG, as he walks through the factory premises.

In the past, production in the plant was done with a lime-rich mix according to the Svanholm concept. Using the plant technology of the Swedish manufacturer of the same name, special moulds were used to create two identical AAC cakes. For a long time, the plant technology was considered as inexpensive to purchase and easy to operate; in addition, the cakes could be demoulded and subjected to the subsequent process steps after a resting period of only 45 minutes. However, as the market progressed, the disadvantages of this production method became apparent, namely the relatively poor frost resistance of AAC products based on a lime-rich formulation, the comparatively high densities and thus relatively low thermal insulation values of the AAC products, especially if taking into account the requirements of modern construction. Added to this was the lack of automation and the increasing frequency of repairs to the existing plant.

“The change to a cement-rich mix formulation and the new plant technology have a positive effect on both, the quality of the production process and the quality of the end products,” says Wolff. This modern plant processes the green cake. The resulting green waste is completely used as return sludge for production. After autoclaving the white cake is packaged without further processing, so that no “white waste” is produced due to the process. Thanks to the cement-rich mix composition, products with densities between 350 kg/m^3 and 600 kg/m^3 , which are stand-



Filling the mould with the slurry from the mixer (right in the picture).

Control unit for the mixing plant





After about four hours in the fermentation area, the mould with the green cake is rotated by 90°, so that the cake is positioned vertically on one of the mould walls.



The base of the mould together with a longitudinal wall and two transverse walls is lifted; the vertical green cake proceeds on the other longitudinal wall, which now serves as a cutting board, in direction of the cutting line.



ard in today's AAC market and have thermal insulation properties according to the German Building Energy Act, can now be produced.

Baustoffwerke Löbnitz found their partner for the planning and implementation of the extensive modernization project in WKB Systems, a leading plant manufacturer for the aerated autoclaved concrete industry, based in Hörstel, about 36 km west of the German city of Osnabrück.

90% of the plant technology was replaced

The intervention was profound: the foundations of the 110 x 30 m production hall were renewed, all rails for the transport of autoclave carts and moulds were replaced. "90% of the old plant technology was completely removed. Only the two mills and the four 32 m long autoclaves with a diameter of 2.00 m each, supplied by the German autoclave manufacturer Scholz, have been preserved," says Deputy Plant Manager Reiko Nickel, who accompanied the technical implementation of the project. The production hall was also extended by a new fermentation area, which with its floor area of 40 x 20 m can accommodate sixteen moulds.

According to Nickel, the most important components of the new production technology, which was planned and implemented by WKB Systems, are the active horizontal cutter of the new cutting line, the green cake separation machine, and the six-axis robot of the packaging plant.

Active horizontal cutter

The cutting line used in this modernisation project is of special construction, developed by WKB Systems especially for cutting of thin AAC blocks and panels. It implements vertical, horizontal and cross cutting of the AAC cake as well as milling of pockets and insertion of grooves and tongues.

There are no fundamental works needed to install this cutting line.

Before cutting, a crane tilts the mould with the AAC cake by 90° on one side of the mould and forwards it to the cutting line. There the mould with the AAC cake is fixed on the cutting carriage and the demoulding process takes place. As soon as the AAC cake stands upright and is ready for further treatment, the cutting process begins.

The cake proceeds through the vertical cutter, where the block is cut into the required length. At the next step the cutting carriage with the cake moves forward to the horizontal cutter and stops there.

The cutting line in Löbnitz includes the prototype of an active horizontal cutter specially developed by WKB Systems.



The cross beams of the green cake separation machine detach the rows of blocks from each other, thus preventing bonding and ensuring better penetration with steam in the autoclave.



While loading the autoclaving cart with grates the pin swinging device of the crane places the pins onto the right position to hold the second grate on the cart.

The active horizontal cutter, a prototype developed by WKB Systems especially for this project, moves through the cake to cut the required block thickness as well as grooves and tongues. The change from one block size to be cut to another happens in a completely automated way.

The block height as well as pockets are cut in the cross cutter.

All material waste is removed with a belt conveyor and returned to the production process to be reused.

The precise cutting of AAC blocks of various sizes, shapes and thickness from 50 to 500 mm is the crucial characteristic of this cutting line.

Green cake separating machine

In order to prevent sticking of AAC blocks during the autoclaving process, WKB engineers advised to use the green cake separating machine (GSM). Thanks to its application, the production waste is considerably reduced alongside with a significant rise in production output.

At the same time, the product quality improves thanks to better steam penetration between rows of blocks. The green cake separating machine used at the plant in Löbnitz is a stand-alone technical solution.

Customised solutions for plant logistics

Paying attention to the fact that the existing autoclaves as well as the existing plant building should be further used, the engineers of WKB Systems worked out special solutions for plant logistics:



The loading/unloading crane with folding bearings forwards white AAC blocks to the packing line.

The hardening grates and carts were made with a special low design to hold two cakes placed on top of each other and to suit to the autoclaves' diameters of 2.5 m.

The design of a loading/unloading crane was adopted to the low indoor height. Therefore, the crane was equipped with folding bearings. Furthermore, the pin swinging units were installed on the crane to make the loading/unloading process completely automated. The fundament works were waived in order to reduce project duration time.



The six-axis robot from Fanuc with WKB gripper of special construction performs the complex process of creating packages of products.

Packing area with six-axis robot

According to the modernisation concept of WKB Systems, the unloading and packing areas of the plant are equipped with a number of unloading cranes and a six-axis robot with a special gripper from German manufacturer Fanuc. The robot is able to pack items with a weight of up to 700 kg with an operating range of 3 m. In a single operation, the parallel gripper picks up two rows of blocks (double block height) from the hardening grate, tilts them by 90° and forwards them to the packing area.



Finally, a machine from manufacturer MSK wraps the packages on the pallets with shrink film, which contains the logo of Baustoffwerke Löbnitz, and stabilizes the packages for transport.

Packages with a height of 150cm (cake width is 120 cm) as well as small-sized packages for retail sale can be formed there.

The robot also enables upright positioning of large-format blocks on Euro pallets, which is of great advantage for handling on the construction site.

Monolithic walls with XL formats

"With the new technology, we can now produce the different products for our two main target groups – hardware store chains (retail) and building material suppliers (construction sites) – with a high degree of flexibility and with high quality," says Baustoffwerke Löbnitz Managing Partner Wolff. In particular, a product for the latter target group is to be supplied

with greater emphasis to construction sites in the region around Leipzig, Dresden and Berlin in the near future, namely XL blocks measuring 240 to 500 mm in width, 600 mm in length and 500 mm in height. According to Wolff, they are excellently suited for a monolithic wall structure with excellent thermal insulation values, in line with the German Building Energy Act. "Depending on the requirements of the structural design, the XL stones can be used to construct monolithic walls for buildings up to three floor levels high. Last year, we already successfully supplied a daycare construction site and other projects with our XL formats," says Wolff.

Following the example of the XL formats from the calcium silicate brick division of Baustoffwerke Löbnitz, the XL autoclaved aerated concrete blocks could also accelerate the construction process. "On the construction site, two blocks of 600 mm length can be picked up from the pallet in one operation and positioned in place next to each other, allowing to progress wall construction with a total width of 1,200 mm in one go", says Wolff. ●



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Baustoffwerke Löbnitz – the company

The history of Baustoffwerke Löbnitz is exemplary for the development of the AAC industry in the former East German federal states following the unification of East and West Germany at the beginning of the 1990s.

In 1993, the gravel plant was the first to be founded on the site bordering the village of Löbnitz, about 33 km north of Leipzig. In 1996, the calcium silicate brick plant and the AAC plant started operations.

The construction boom in the years that followed the German reunification, during which the manufacturers of building materials in the five East German federal states had built up considerable capacities, was soon followed by a phase of stagnation and finally market consolidation, which forced many production plants to close down again. Thanks to a determined strategic expansion of product distribution via suppliers of building materials throughout Germany and to the newly established sales market of the hardware store chains (retail), Baustoffwerke Löbnitz was able to secure their position on the market in this decisive phase. The product range on offer to the trade partners from the retail sector was then in the 2000s expanded by the commissioning of a sand refinement plant. Recently, the production technology for both calcium silicate bricks and AAC have been thoroughly modernized and brought up to the latest state of the art.

Nowadays, Baustoffwerke Löbnitz positions itself as a reliable partner for many regional and national suppliers of building materials as well as large hardware store chains, such as Hornbach and Bauhaus. Nevertheless, the core sales area of the company is located in the region around Leipzig and extends as far as Berlin and Dresden.

In a three-shift operation, the AAC plant currently produces up to 80,000 m³ of autoclaved aerated concrete blocks per year, with a workforce of 16 employees. The annual turnover of Baustoffwerke Löbnitz GmbH & Co. KG with all production facilities (calcium silicate bricks, AAC, gravel and sand) is around 20 million euros.