Topwerk Hess Group GmbH, 57299 Burbach-Wahlbach, Germany

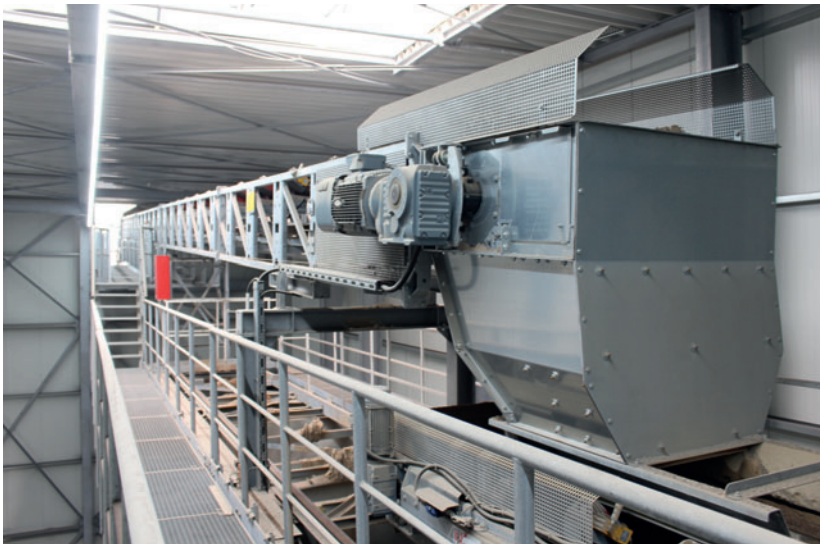
AHE invests in new concrete block plant with ultra-modern and efficient production technology

Mark Küppers, CPI worldwide, Germany

Genuine Weser gravel, which has been extracted for decades from the company's own deposits in the Schaumburger Land, is the perfect basis for the high-quality concrete and gravel products of the AHE Group, which consists of AHE Schaumburger Weserkies GmbH, AHE Transportbeton GmbH and AHE Verbundsteine Betonwaren GmbH. With a versatile range of products extending from sand, gravel and grit through to high quality paving systems, the company offers the entire bandwidth of products for road construction, landscaping and garden construction. AHE has now built a completely new concrete block plant at its headquarters in Rinteln on the River Weser. Ultra-modern and very efficient production technology was thereby installed. The main machinery supplier was the Topwerk Group, which supplied virtually the entire plant equipment, from the mixing plant through the stone production to the refinement. The heart of the new production facility is the Hess Multimat RH 1500-3MVA block making machine – a particularly powerful machine developed for the high-performance range. The use of Colormix technology and special high-quality colour pigments enables AHE to manufacture slabs and stones with a very special colour brilliance.

The AHE headquarters in Rinteln on the River Weser

Facing concrete aggregates are transported to the silos by a steep conveyor belt.



The core concrete aggregates are transported by a new conveyor belt from the adjacent original hall.

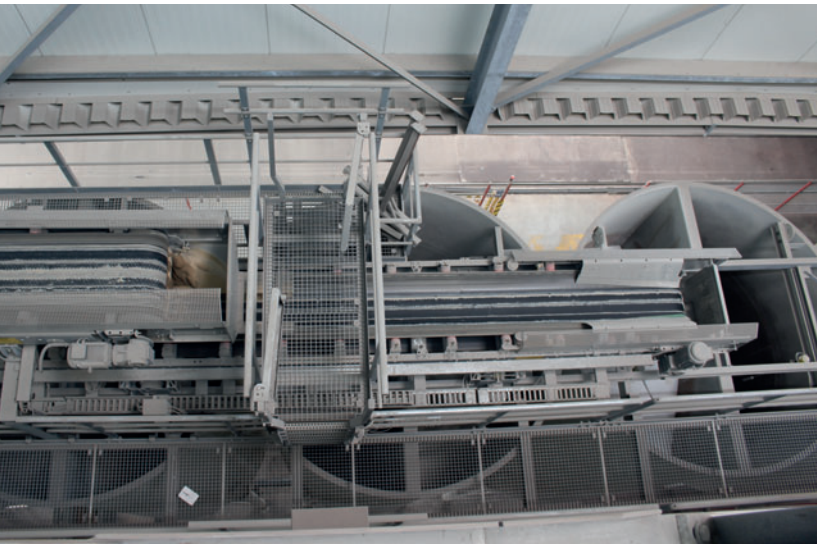
The products from the AHE Group are all characterised by reliably consistent quality created in harmony with nature. This is guaranteed by the extraction of the raw materials from its own sources, which takes place all year round with self-developed extraction technology. Experience on the one hand and constant technical development on the other are the basis for the AHE Group's development into one of the leading manufacturers in the gravel and concrete industry.

Experienced employees, modern production technology and high-quality natural raw materials are the bases for high quality. Concrete is a unique material that can be processed in an unbelievable variety of ways. That is proven by the large selection of stones and slabs that AHE can offer its customers. Barely distinguishable from nature in terms of looks, concrete blocks also convince through their capability to compensate the disadvantages of natural stone with their versatile properties.

Mechanical and manual treatment produces symmetrical stones or stones with an individual uniqueness. AHE's range offers both sturdy stones for a clear paving pattern and natural looks in a wide range of variants.

The entire production process at AHE is electronically controlled and comprehensible at all times. In the era of Industry 4.0, all goods deliveries are provided with QR codes so that the company has the possibility in case of doubt to trace every product back to its individual constituent parts in the production and logistics process.

Arrangement of the 12 core and facing silos



Here too, a distribution belt ensures the correct feeding of the individual silos.

All year round extraction of raw gravel also for the manufacture of concrete products

Raw gravel is extracted all year round using a ladder dredger developed and built by the company itself. Pretreatment of the extracted material takes place immediately through on-board treatment systems.

From the Weser to preparation without diversions

Pusher tugs and push barges transport the extracted raw gravel directly and in an environmentally friendly way to the main plant in Rinteln-Engern for preparation. There, in the company's own preparation plants on the bank of the Weser, a constant stock of around 120,000 tonnes waits to be processed further.

Refinement with state-of-the-art screening and washing technology

Modern computer-controlled technology classifies the raw material and prepares it for the manufacture of concrete products. The gravels and sands pass through several washing stages in each preparation step. High-pressure jets and an elaborate classification process result in refined end products of a consistently high quality.

Aggregate storage and dosing technology

Hess installed a total of 12 silos for the storage of the aggregates for the new concrete products manufacturing facility – 6 for the core concrete and 6 for facing concrete production. The larger silos for the core concrete aggregates are fed by a new conveyor belt from the adjacent original hall, in which ready-mix concrete is manufactured, and then over the silos by a distribution belt.
The facing concrete aggregates are tipped from the truck into a charging silo, from where they are transported up and over the silo level, first by an elevating belt and then by a steep conveyor belt. Here too, a distribution belt ensures the correct feeding of the individual silos.

The aggregates are dosed by dosing gates, a dosing belt and scales. In addition, there is a further dosing station for special aggregates.

Separate drives for a high mixture quality in a short time

Two compulsory mixers from the Hess SM series were installed on a mixer platform for the production of the concrete. The dosed aggregates are fed via a lifting bucket. Hess mixers from the SM series are suitable for the production of concrete for pavers, kerbstones, hollow blocks and slabs, or for pipes and manholes, as well as for the production of precast con-

Two compulsory mixers from the Hess SM series were installed on a mixer platform for the production of the concrete.

crete elements and ready-mix concrete. Thanks to their high mixing intensity, planetary compulsory mixers are particularly suitable for concretes with a low water cement ratio as well as for earth-moist concrete and self-compacting concrete.

The SM mixer has a central drive plus separate drives for the individual mixing stars. The fast-rotating, eccentrically arranged mixing tools execute a planetary rotational movement as a complete system and force the mix to form a homogeneous unit. All motors are located outside the mixing chamber. They are therefore protected and easily accessible. High drive reserves and the separate drives make it possible to stop and restart the mixer during production.
The Hess-SM 3375 was chosen as the core concrete mixer, while the Hess-SM 400 mixer produces the facing concrete.

The concrete is transported from the mixers to the block making machine by a double bucket conveyor from Hess.

Kimido powder dosing unit

The powder dosing machine type PFD WS from Kimido ensures the right hue. The machine can dose powder, compact pigments and granulates, which are transported pneumatically.

The entire plant consists of individual modules and can thus be extended as desired. A high dosing accuracy can be achieved with the patented dosing machine. The pigments are stored in height-adjustable big bag support frames with lifting crosses.

Precision with high performance – Hess Multimat RH 1500-3 block making machine

The large RH 1500-3 static board machine was developed as a particularly powerful machine for the high-performance range. Despite short cycle times the machine is characterised by a gentle movement process. This is achieved through special control technology and hydraulics. The intelligent interaction of these components thereby guarantees the reliable and very productive manufacturing of concrete products.

The RH 1500-3 MVA block making machine from Hess is equipped as standard with an oil-bath vibrator and an electrical table plate height adjustment. With a standard production board size of 1,400 x 1,100 mm, a manufacturing area of 1,300 x 1,050 mm results. The RH 1500-3 Multimat can manufacture products with heights of between 25 and 500 mm.
All the mechanical components are extremely robust and equipped with modern electronics. The innovative implemen-

The Hess SM 400 mixer produces the facing concrete.

Hess Multimat RH 1500-3 block making machine

Hess SM 3375 core concrete mixer

tations of the most diverse machine functions support the operator during production.

The Colormix system from Hess allows AHE to manufacture concrete products of a very special colour brilliance and colour variety.

Rotho dedusting system

The Rotho dedusting system installed extracts the dust at four positions directly on the vibrating table. In addition, the dust is extracted from the board brush with a separate pipeline.

Noise insulating enclosure from Rotho

The Rotho noise protection systems for the machine and hydraulics as well as the control room and control cabinet room are prefabricated. A removable floor is installed in the control booth and the control cabinet room. The floor can simply be removed with a vacuum lifter in order to install additional cables.

The control booth is set in a raised position so that the machine operator has an ideal view of the mould and vibrating table from above. From the control booth the machine operator can also view all the procedures on the wet and dry side on monitors and can access all production parameters.

R&W SHV500 stone height measuring unit

The fresh concrete products are subjected to a height check immediately after leaving the noise insulation enclosure of the

Despite short cycle times the machine is characterised by a gentle movement process.

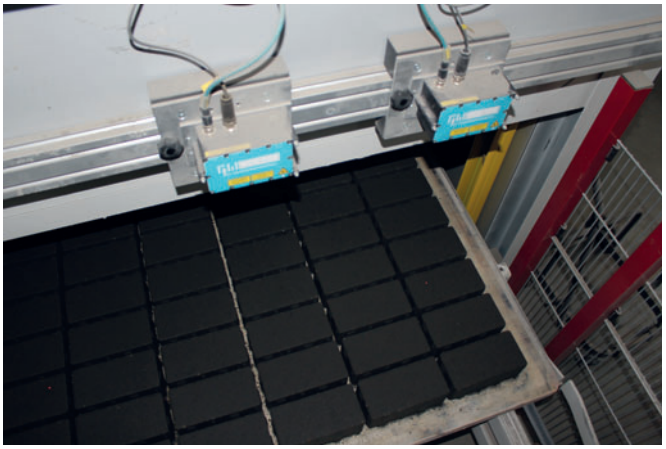
block making machine, because only uniform stone heights with very small tolerances meet AHE's high quality requirements.

The SHV500 stone height measuring system is a multi-talented unit for measuring all common concrete block products with a height range of up to 490 mm. Thanks to the very fast HSC500 sensors, products can also be measured accurately even at high conveying speeds.

The heart of the SHV500 is the HCS500 height sensor from R&W. This is a high-resolution laser distance sensor with a measuring frequency of 2500 Hz, which is equipped with a high-performance microcontroller. All components required for determining the block height are integrated in the sensor. The sensor only needs to be connected to a network and a power supply and can be operated autonomously. The measured values can be displayed using the integrated web browser, which provides the results in graphic form for a standard web browser.

Stone brush, double washing device and tipper

The fresh concrete products are transported on the production boards from the block making machine to the elevator



The fresh concrete products are subjected to a height check immediately after leaving the noise insulation enclosure of the block making machine.

The production boards with the fresh products are then collected in the elevator, which is located in the interior of the climatic chamber.

on the wet side by a V-belt conveyor. After passing through the stone height measuring system, a stone brush can optionally brush off the fresh concrete products, while the double washing device downstream of that can refine the surfaces of the concrete stones.

In the subsequent tipping station, for example, incomplete layers such as may occur at the end of the shift or when changing product can be removed directly from the circulation.

Elevator for up to 28 production boards

The production boards with the fresh products are then collected in the elevator, which is located in the interior of the climatic chamber. The elevator has a total load capacity of 14 t and is equipped with a maintenance platform. Depending on the product height, up to 28 production boards with fresh products are collected in the elevator. In case of higher products, only every second compartment is occupied and the number of production boards that can be accepted is thus halved.

Finger car for wet and dry side

As soon as the maximum number of production boards has been collected in the elevator, a Hess finger car takes up the fresh concrete products and stores them fully automatically in the storage rack. Accordingly, the finger car also organises the supply of the two lowerators on the dry side. Through simple adjustment of the forks, the finger car can accept 28 or 14 production boards and is thus flexibly usable with every product height.

Specially developed climatic chamber with air recirculation system

The fresh concrete products harden in a specially developed climatic chamber from Rotho. As a long-standing Rotho customer, AHE also put its faith in Rotho in this demanding project.
Particularly durable concrete properties are achieved through optimised environmental conditions with regard to temperature and humidity in conjunction with continuous air recirculation.
The Rotho curing rack system has a capacity of 6,720 production boards and is implemented as a free-standing building with roof and walls. With an additional partition wall to the machine and an air recirculation system, a climatic chamber is created with very good curing conditions.

The fresh concrete products harden in a specially developed climatic chamber from Rotho.

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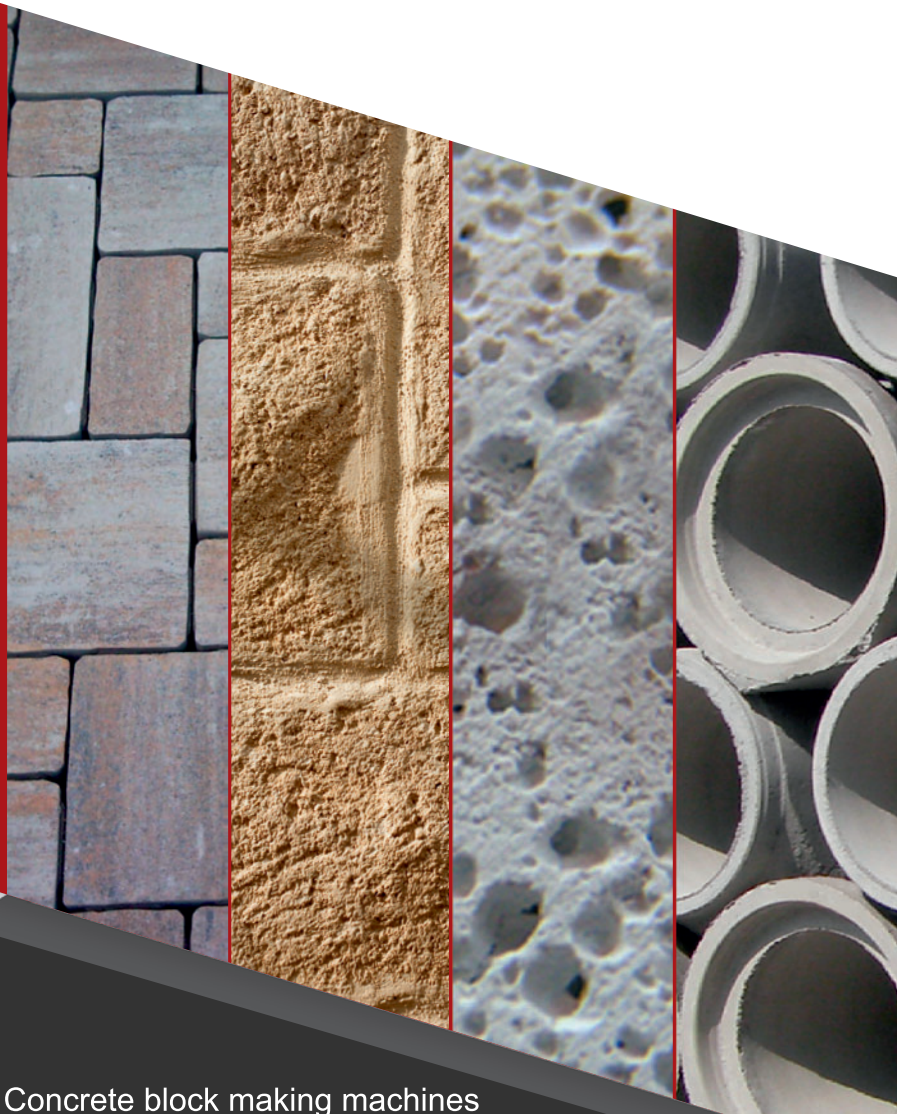

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Hess finger car

Two lowerators and bypass

Two lowerators are located in front of the dry side; like the elevator, each has a maintenance platform and a load capacity of 14 t. Depending on the product, the cured products on the production boards are placed alternately by the two lowerators via a bypass onto the walking beam conveyor on the dry side. This results in good mixing of the products, which is particularly advantageous with Colormix products.

The first cuber is located behind the bypass. This either releases the stones and pushes the stone layers together or picks up the complete stone layers and sets them down in front of the aging machine from SR-Schindler, which is arranged in parallel. Furthermore, the cuber offers the possibility to feed stone packets from the storage yard to the aging machine.

If no refinement takes place, the production boards with the released concrete product layers are transported directly onwards to the second cuber.

SR-Schindler Mega 6000 Duo

A Mega 6000 Duo aging machine from SR-Schindler was integrated as a bypass system on the dry side for the refinement of the concrete products. As name suggests, this aging machine has two aging units and is thus particularly efficient. The Mega 6000 Duo is suitable for the bush hammering and aging of the cured concrete products.

Overview of the plant – dry side with board buffering

The first cuber is located behind the bypass. This either releases the stones or supplies the refinement machine from SR-Schindler with concrete products.

A Mega 6000 Duo aging machine from SR-Schindler was integrated as a bypass system on the dry side for the refinement of the concrete products.

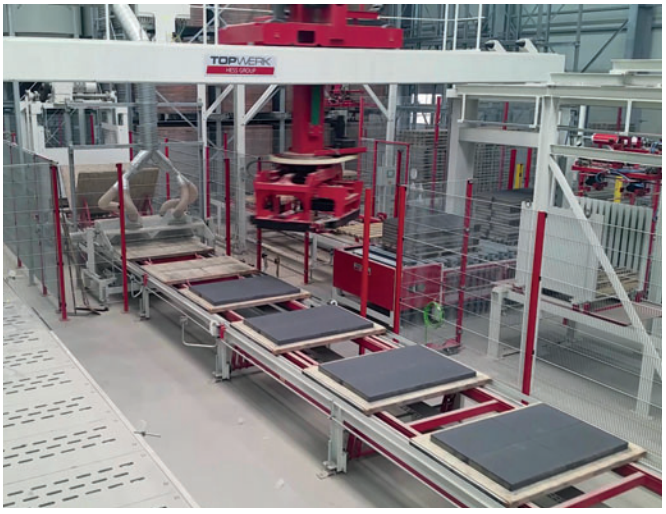
One machine, four products

The stones to be processed are taken off the production boards in single layers by the Hess cuber and set down on a table, where they are pushed together by a layer pusher to form an endless processing stream, as is required for the bush hammering and aging process. This stream passes through the SR-Schindler Mega 6000 Duo on a conveyor belt, which is implemented in an extended version for the later retrofitting of 2 curling tunnels.

The belt speed and processing supports are frequency controlled. Quality checking takes place after bush hammering or aging. The conveying equipment allows the simple exchange of individual stones here. After that the stone layers are separated again into the desired packet length by layer separators and assembled into packets on wooden pallets by means of Hess layer transfer units.

The external input also allows the processing of products from the storage yard. The line is designed such that a splitting line can be installed in parallel with the current processing line at a later date.
Four different products can be produced by the SR-Schindler Mega 6000 Duo:

- Paving stones with a chamfer are only bush hammered on the surface so that the chamfer is retained and forms a frame, giving the stone a classier look.
- Paving stones without a chamfer are not only bush hammered on the surface but also treated on the edges. This produces broken edges that give the stone a rustic, antique look.
- The use of round hammers creates a surface that is comparable with tumbling/aging in a drum. One of the great advantages of the Mega 6000 is that the stone layers are retained and do not have to be sorted again for transport following the treatment. The facing layer of the



The second cuber has access to both the finishing line and the "normal" line.

products always faces upwards and makes manual turning superfluous. Spacers, edges and underside are retained, and thus the ease of installation also.

- If round hammers are used, an automatically running film placed on the product surface during the treatment protects the surface from traces of machining by the hammers. Only the edges are knocked off – the surface remains untouched by the hammers.

Various optical effects are achieved by the treatment methods, depending on the grain size of the products and the settings of the bush hammering frequency, oscillation and belt speed parameters. As this is a dry process, only dust extraction is required.

Cuber and a transport pallet transfer unit

The second cuber can access the finishing line and the "normal" line and takes up the refined or unrefined concrete products in layers, stacking them on a transport pallet on a slat conveyor arranged at an angle of 90 degrees. The concrete stones are stacked here, after which they can optionally be provided with a cover sheet and horizontally and vertically strapped. The finished stone packets are subsequently transported on the buffer belt to the outdoor area, where fork-lift trucks take care of the onward transport to the storage yard. After each finished stone packet, a transport pallet transfer unit with a large buffer places a new transport pallet on the slat conveyor so that continuous packet assembly is possible.

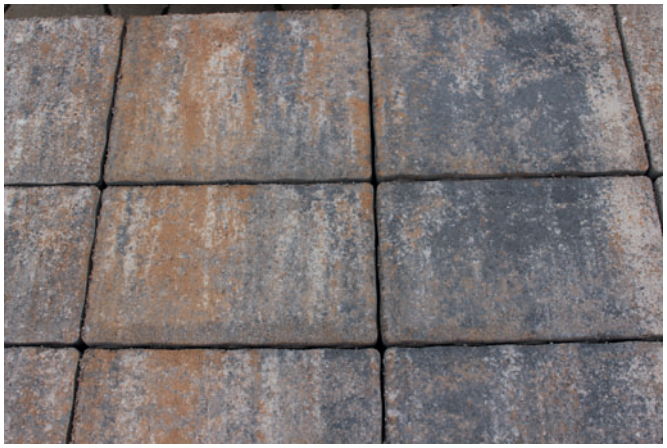
Cleaning and transport of the production boards

Once the second cuber has removed the stone layers from the production boards, the empty boards pass through a board brush, where they are cleansed of concrete particles. The boards are then turned over in the turning station to ensure even wear and subsequently collected in the board stacker.
Depending on requirements the board stacks are then stored by the board finger car in the board buffer rack, which was also supplied by Rotho, or fed directly back to the production and set down in front of the block making machine, where they are automatically separated and fed cyclically into the block making machine.

Board buffer rack

3,510 boards are intermediately stored in the Rotho board buffer rack when manufacturing high products. On account of the brackets for the fastening of the level profiles, a greater clearance between the board packets and the columns is possible when putting into storage, which ensures the best possible process reliability, even with old boards that are already worn or damaged.

Rotho Dust-Control dedusting system



The Colormix technology employed, the aging machine and the use of special high-quality colour pigments enables AHE to manufacture slabs and stones with a very special colour brilliance that will satisfy its customers for many years to come.

CPI tv

Watch a video about the new concrete block line at AHE. Simply scan the QR code with a smart phone and start the video.

FURTHER INFORMATION

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