

Topwerk Group, 57299 Burbach-Wahlbach, Germany

Quality concrete products for the U.A.E. market

In the growing field of precast concrete manufacturing in the Middle East, Raknor name is marked as an innovating market leader, manufacturing and supplying pavers, tiles, curbstones, masonry blocks, ready mix concrete and customized precast solutions. Raknor earned its pioneer place with dedication, innovation and hard work that was put in over four decades, making them one of the oldest manufacturers in the region. With their raw material drawn from their sister companies, Stevin Rock and Rak Rock, Raknor focus was on evolving the production processes by providing the latest technologies available while maintaining the environment with the best sustainable approaches.

Raknor's vision "To build and maintain our position as a leading supplier of concrete products in the Ras Al Khaimah and beyond and to act as a leader in improving the sustainability in our industry." Can be witnessed as it is leading the highly advanced and demanding market of U.A.E, both in quantity and quality. This could be achieved by increasing their own expertise and sophistication to get ahead of the market demand.

In 2014 Raknor invested in a new fully automated concrete block machine RH 1500-3 MVA with Mac 8 hydraulics and oil bath vibration table technologies and an SM 2250/SX 500 mixing plant from Hess Group. The complete plant was installed and commissioned in 11 weeks, thanks to the local support by the Raknor team and professional project management. Four years later, in 2018, Raknor approached Hess Group again to develop a concept that can utilize the latest technologies in concrete products production and processing with the local resources and experience to take the Middle East market to the next level with new premium products.

Under the umbrella of Topwerk Group, SR Schindler and Hess Group could present a fully automated and integrated plant, consists of RH 2000-3 MVA, SM 3375 with 2x SM 400 mixers, advanced multicolor system, shot-blasting, curling, coating and grinding and a fully automatic handling system, that is flexible and allows the production of pavers with the single or combined finish.

In September 2018, the Topwerk Group headquarters was honored by a visit of the senior management of Raknor to discuss the further steps in the project, visited the production halls of Hess Group and some reference plants that produce

the targeted quality of products in Germany. The professional approach of Raknor led them to partner with a premium German producer for know-how transfer.

A few weeks later, and after checking different proposals, layouts and options, Raknor finally placed the order with Hess Group and SR Schindler. The plant is unique in the GCC and one of the biggest of its kind in the Gulf region.

Exclusive color mix technology for high-quality concrete products

Raknor has chosen the standard aggregate hoppers to be loaded by wheel loader but in addition a 6 stations big bag dosing system for special face mix aggregates. Face mix and coarse mix aggregates are dosed and precisely weighed by separate aggregate buckets which run on the same rail track for maximum flexibility in dosing. Aggregates are conveyed to the separate skip hoists.

A special pigment dosing system, sub-supplied by the German Company Würschum, had been installed by Hess. Powder pigments are dosed and collected in two separate small weighing hoppers, which are movable. One hopper is installed for supplying the face mix pigments and the other one for the coarse mix. The hoppers have a quite unique outlet system, which is an extendable duct. The meaning is to



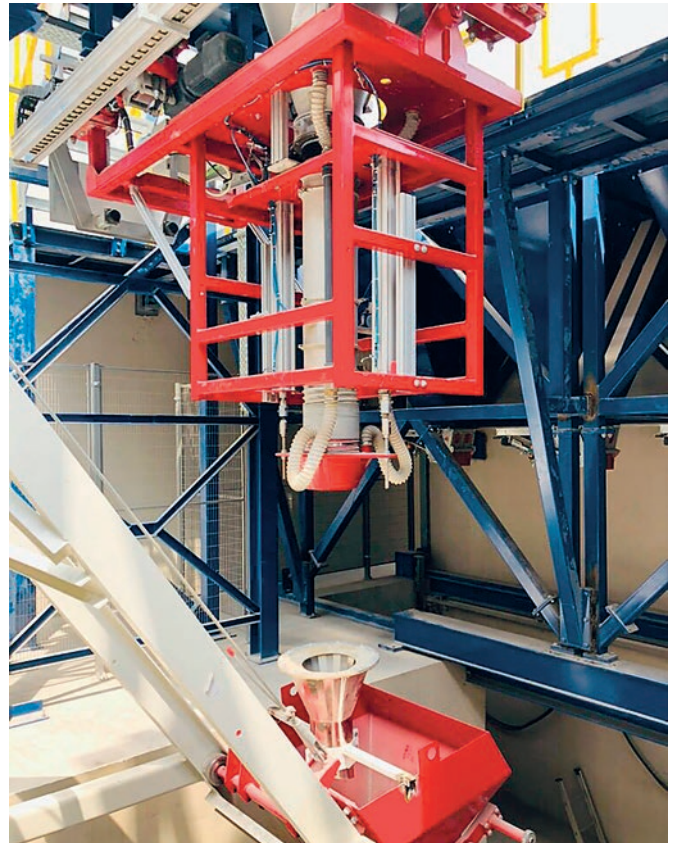
Aggregate weighing

embed the powder pigments into the aggregates in the skip hoists. By this solution the pollution of the powder pigments is controlled to zero level.

Raknor has decided to install two separate premium face mix mixers SM 400 from Hess Group to achieve a production of superior color mix products. The coarse mix mixer SM 3375 is also manufactured by Hess Group. A flying bucket system delivers the concrete directly to the block machine.

Since Raknor had made their experience with the Hess SM 2250 mixer in plant 1, their choice was easily done to install in plant 2 also the Hess mixers. Hess Mixers are a very good choice in terms of mix results, easy maintenance and cleaning because of the huge doors.

The face mix concrete is conveyed via a 4-compartment flying bucket to the color mix station. The color mix station has also 4 compartments, this is essential to achieve a very high quality of multi-colored concrete products in the face mix and of course to avoid contamination with other concrete colors before being transported via belt conveyor to the block machine. Underneath each compartment is a movable belt installed, in order to lay a string of concrete onto the belt going to the block machine.



Pigment dosing system



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Mixing plant with two face mixers SM 400

Each dosing belt can be controlled individually, in positioning and speed. The possibility of placing the material on the conveyor belt one after the other, on top of each other, or even in wave form, creates an extraordinary range of color designs. By this process, the multi-color product will be unique to each other, which give at the end the look of the products, once it is installed in the yard.

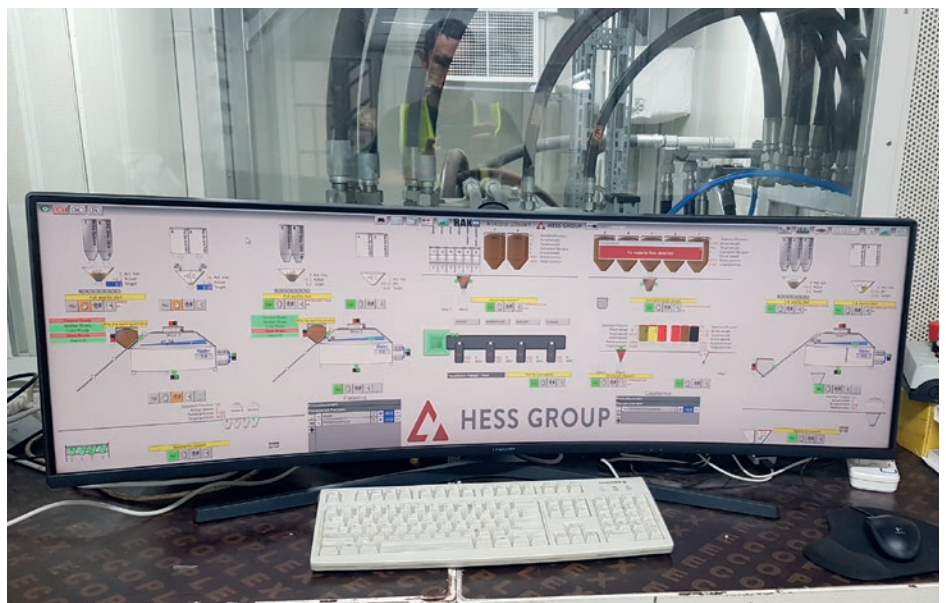
The mixing plant is controlled by Siemens S7 and the huge, curved screen set up in the control room of the block plant. Manual control of the mixing is executed by a mobile hand-held tablet, which the operator can carry around and control each part of the system as close as possible regarding to safety.

Concrete pavers production with RH 2000-3

The next step of the system is the RH 2000-3 MVA block machine. A special feature of the RH 2000-3 machine is the Hess Variotronic, an amplitude-controlled vibration with a 2-part oil bath vibration table technology utilising 1400 x 1300 mm pallet size. The oil bath vibration is a feature of Hess machines that provide permanent lubrication of each bearing of the counterweights because they are mounted in a housing filled with long-life lubrication oil. Therefore, maintenance of the bearings is reduced almost up to zero level. Even changing of the bearings is simple, since the housing can be taken off the vibration table from underneath the machine, the need of



Color mix dosing



Control panel mixing plant



RH 2000-3 MVA concrete block and paver machine



Quality control station

taking out the complete vibration table is no more required. The production pallets in Raknor plant are made of steel, which is mostly standard in the Middle East, due to the climate conditions.

Raknor had chosen in plant 1 already the Mac 8 hydraulic system in the block machine, therefore it was no question that the new RH 2000 must have the high-end technology implemented in the hydraulic system of the machine, as well. The Mac 8 system, developed by Hess engineers, is a servo-controlled hydraulic system.

Advantages of the Mac 8 system are:

- Very high speed of the hydraulic movements.
- overlapping movements of the filler boxes, tamper head and mould lifting, which counts in less cycle time.
- much smoother movements of the hydraulic operated parts develop less maintenance.

- very accurate positioning of the tamper head and mould up to a 10th of a millimeter.
- separate pressure control on each tamper head cylinder, therefore more accurate stone height results.

The face mix filler box has a built-in planning roller that provides several benefits when producing paving stones. It prevents the "digging" of concrete from the mold during reverse movement of the filling box. Production of face mix with higher water content contributes to the higher color intensity of the facer mix. As the next advantage, the planning roller also secures quicker cycle times due to the omission of the reversing operation. Worth mentioning that the achieved product surface is significantly smoother as well as better bonding between coarse mix and face mix concrete.

The block machine is equipped with the Hess Group electric mould change system. The mould can be exchanged in a limited time of a maximum of 15 minutes to achieve maximum flexibility and efficiency in production.

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The production by RH 2000-3 with the mentioned production pallet size reach a steady rate of 3040 square meters pavers in 8 hours, therefore a fast-controlled handling system (V-belt conveyors, 24-ton elevator / lowerator, and finger cart) is required.

On the wet line Hess has installed a quality control station in order to take a full production pallet out of the production line for checking. Raknor installed a Qaver system here for checking the density and other important Quality aspects of the produced paving stones. All Collected dates from the Qaver system will be stored in the Hess statistic system and transferred together with all relevant production data, starting from the batching, mixing and block machine production to the Raknor ERP System.

Curing / cubing system

The 24to capacity finger cart with 22 layers and a total height of 8570 mm is enclosed in the big chamber room system from HS Anlagentechnik, with a total loading capacity of 7128 production pallets. To accelerate the curing of the stones, the air needs to be circulated inside of the curing chamber for establishing the same temperature in all corners of the big room. For this purpose, the curing chamber was equipped with the air circulation system from the company CDS.

When the curing phase is over, the finger cart takes the cured products out from the curing chamber to the lowerator. The production pallets are conveyed on a 30m long walking beam conveyor under the stone squeezer and further to the Hess Servo Cuber 700. Raknor had installed in plant 1 already

the Servo Cuber 700, in order to have the same spare part available at the side, they decided to install the same equipment in plant 2.

Stone cubes are built by the cuber on the 28m long frame conveyor for strapping and conveying to the storage yard.

SR Schindler value-adding treatment

A SR Schindler cuber takes off the cured layers from the production boards transported by Hess conveyor to feed the SR Schindler value-adding line. The value-adding line concept allows Raknor to a large extent the inline treatment of the products.

There are 2 finishing lines running in parallel. The first line is equipped with shotblasting, curling and sealing system. The second line consists of calibrator and grinder with the necessary handling technology.

In-between both lines a long return belt conveyor is placed, to provide the flexibility of grinding and afterward shotblasting or curling and sealing. A further cuber is in place for transporting the products either to the separate SR Schindler packaging line or to the return conveyor. An offline feeding system is rounding up the value-adding solution.

Essential production pallet buffer

After the products output, the next step is to clean the empty production boards, turn them so that the production boards are used on both sides and then stack them so that the board



Value adding line

finger always picks it up in a board stack. This stack is either stored in the buffer rack or is moved directly back to the concrete block machine. The board buffer has a capacity for 3500 production pallets.

Potential for subsequent upgrading in the future

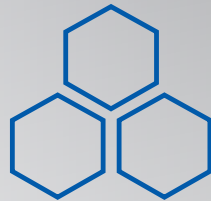
The plant is designed in such a manner, that it might be converted later as a "first in first out" solution. This means that the products that are first entering the curing chamber are also the first to be removed from there. This will be handled by a second finger car on the backside of the curing chamber. A lowerator besides the back of the curing chamber is foreseen including a second dry line conveyor. The cuber number three in the value-adding line has already the extension to pick up from the future dry line. This will make the complete handling system of the inline value-adding line as efficient as possible.

All in all, this concrete production and refinement system at Raknor is a high-end line that is unique in this set-up in the Middle East. The value-adding solution, that enables Raknor to finish all the concrete products in the line, exists nowhere



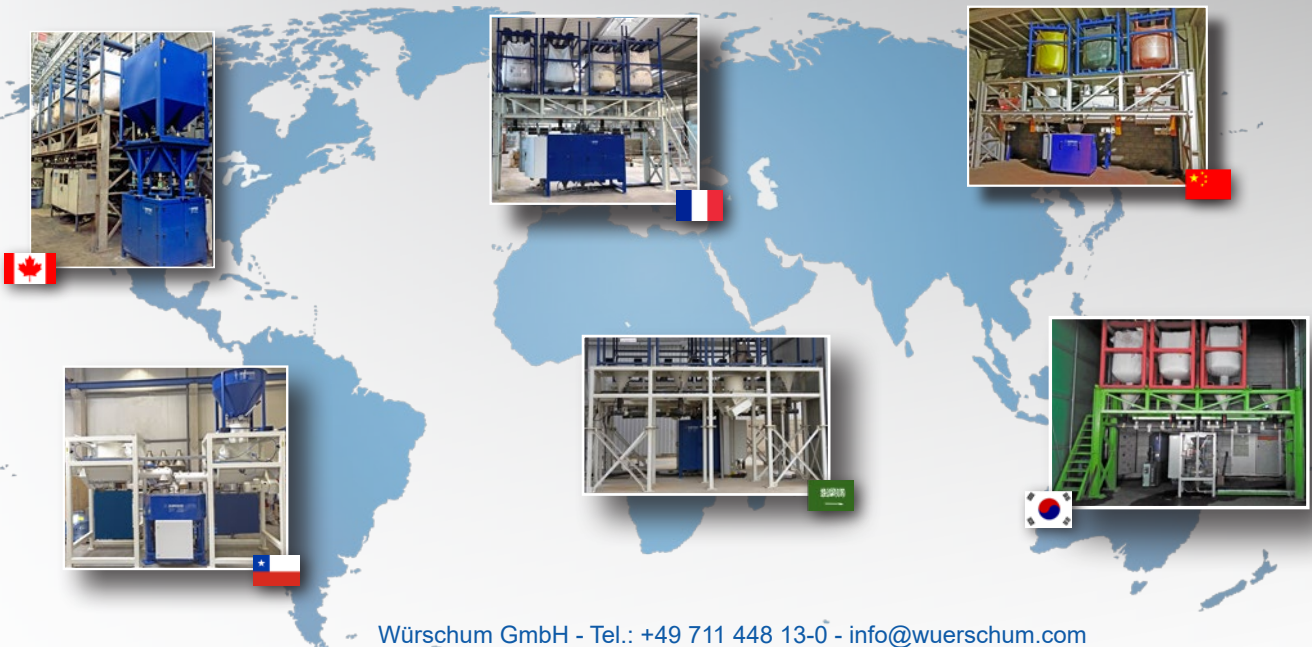
Pallet buffer finger cart

else in Middle East in this form, that you can do everything, no matter if blasting, curling, brushing, grinding. Usually, in the Middle East, the production facilities are placed separately so that the stone cubes must transfer them to another hall where surface finishing is processed.



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Remote handheld control

Raknor has decided on such a huge setup, after they visited Hess and SR Schindler installations in Germany, with the since of producing exactly the same products with the highest class Quality compare to the German superior suppliers.

There has been considerable interest in the new product range that Raknor can offer since the new plant was commissioned in 2019. A number of high-profile exhibitions were attended where a vast array of Raknor finished products were displayed. The feedback from clients has been overwhelmingly positive in terms of the quality and design options available for customers to create their own bespoke paving solutions. In particular, the products have been well received by the architectural consultant community, who are eager to collaborate with a manufacturer with the ability to fulfill their client's design ambitions.

Raknor's ambitions are not limited to the UAE. The consistent quality and wide range of design options have attracted inquiries from further afield, notably Saudi Arabia, Malaysia & Bahrain. Indeed, it is this proven technical strength, the wide range of finishes and attractive pricing that has been instrumental in Raknor securing a large order in Bahrain for a high-profile project.

As part of a larger group of Ras al Khaimah Government owned companies, Raknor has the capacity, longevity, financial security, and flexibility to supply projects of all sizes from small to mega-sized. Its close proximity to Saqr Port in Ras al Khaimah means that it can easily supply paving solutions to other countries regionally and internationally. ■



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FURTHER INFORMATION



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