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Innovative machine concept on the road to success – two plants commissioned in Thailand and England

The successful commissioning of two Rekers RS 1 machines at Sor Aroon in Thailand and PD Edenhall in England again confirms that the innovative design and engineering of the Rekers RS machine family has found very wide acceptance with customers. Features put into practice for the first time, such as a rack changeover trolley and core puller device, do not just offer customers extremely good benefits as regards efficiency; they also clearly demonstrate the wide range of production possibilities with the RS machine concept.

■ Franz-Josef Papen, Rekers GmbH, Germany ■

Sor Aroon, a company located in Pathum Thani (Greater Bangkok), is part of the Sor Aroon Group headed by Phasanon Chanaranon, the youngest member of the family. Up to now, the production range at Sor Aroon has included precast concrete components, like prestressed posts and piles as well as reinforced planks and slabs for foundations. This dynamic young businessman's intention was to expand his product portfolio, in particular with kerbstones and paving blocks. As a newcomer to the world of stationary block machines, he wanted to limit any technological and market-related risks as much as possible. However, this seemed only to be assured with machines of small or medium board size and capacity. But, at the same time, there was no question of compromising on machine quality or restricting production possibilities.

During his last visit to bauma in 2013, the head of the family was of the opinion that precisely all these requirements had been fulfilled in the new RS1KV machine presented there by Rekers for the first time. In addition, the entire family was greatly in favour of a complete system "Made in Germany", from its design through the manufacturing of all important assemblies and components and even also including assembly, installation and commissioning by the company's own expert personnel – as is still the core of company policy at Rekers. In any case, there were, of course, several layout variations to be worked out, the scope of the equipment to be talked through and the advantages and disadvantages of alternatives to be weighed up. The scales were finally tipped in Kosovo on viewing a first production facility – all their expectations were entirely fulfilled.

The result was an order for the installation of a complete block machine with a handling system using a mobile curing rack, as illustrated (Fig.1), in the spring of 2015.

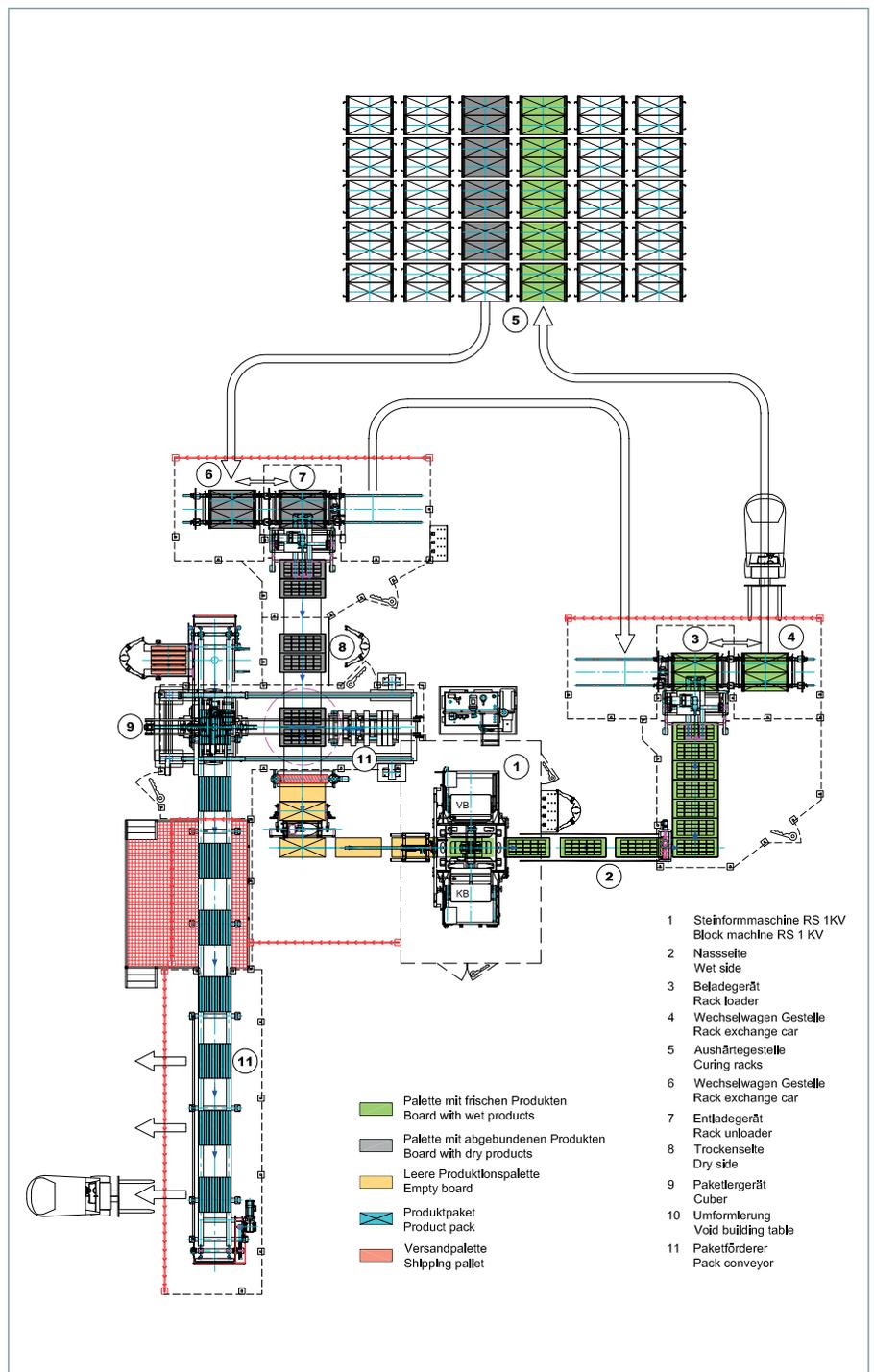


Fig. 1: Layout of the block machine at Sor Aroon

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Fig. 2: Rekers RS1KV block machine with tamper brush running transversely

Rekers RS1KV Universal Block Machine

The design engineering of this compact universal block machine is unique. Its feedbox runs transversely to the production board's (Wasa Woodplast) direction of travel; it has a new type of high-performance oscillating rake, high-precision mould and tamper guides, a newly developed vibration table plus extensive additional features.

Besides all these advantages, of paramount importance to Sor Aroon with their major focus on kerbstones was the fact that the plant is equipped with a facing concrete unit and that the feedbox is set up transversely to the tampering unit (Fig.2). The machine has been additionally fitted with a metal sheet withdrawal device for possible future products with a profile bottom. The machine obviously also furnishes all the necessary prerequisites and equipment for manufacturing top-class paving blocks.

Production Pallet Handling

Sor Aroon had taken the decision to operate the plant with mobile curing racks, which can be transported in and out of the curing area by means of forklift. Space constraints in the existing building did not permit a solution with a fully automated finger car group and permanently installed curing racks. On top of this, it is also quite possible to manufacture mobile curing racks locally in the precision needed practically everywhere. This naturally makes for a substantial reduction in the amount needed for investment. In any case, Sor Aroon insisted on their machine operating with great efficiency and as uniformly as possible. For this reason, rack changeover trolleys were for the first time employed in front of and behind the loading and unloading devices. These allow the racks on both the wet and dry sides to be changed over by forklift without interrupting the flow of production. During the time that one rack is located in the middle position during loading or unloading, a second rack position on the changeover trolley either to the right or left of this middle position is



Fig. 3: Loading and unloading device with changeover trolley



Fig. 4: Kerbstone package with voids for handling with a forklift

freely accessible and available for exchanging the mobile curing racks, without it interrupting the loading or unloading process (Fig.3).

Packaging and Layer Rearrangement

Sor Aroon were mainly concerned about packaging kerbstones, their primary product. Despite low wage costs, packing kerbstones by hand or packaging them using a pneumatic grab was not considered at all because of their great weight. The company also wanted to avoid packaging kerbstones on wooden shipping pallets. Wood is a valuable raw material in Thailand and logistics, such as those for Euro pallets in Europe, do not exist there. Relatively expensive wooden pallets, which are quickly recycled for other uses and never come back to the manufacturer, were not going to be utilised for the kerbstones.

At Sor Aroon, block packages were agreed upon (Fig. 4) consisting of a complete layer (six kerbstones), a layer with gaps (three kerbstones) and again a final full layer. With appropriate strapping, these packages can be handled by any forklift even without a wooden pallet.

The packages were created in a very simple and inexpensive way. The packaging cuber sets down a complete layer on the marshalling / separation table; a motor displaces one half of the table to separate three kerbstones off from the full layer; at the same time, this table half opens up thereby drawing the three kerbstones away from each another to the required extent. For the layer with omissions in the next package, the three remaining kerbstones are transferred by the packaging machine to the moving table half, which then opens up again to generate a new void layer.

Once the package has been created, a heavy-duty slat conveyor with profiled slats brings it to an area secured with safety light barriers in which the necessary strapping can be applied. This procedure is not employed, however, for most paving blocks and slabs. As for example in Europe, packages of paving blocks are created by the packaging machine without any special

rearrangement on wooden pallets (Fig.5) and then strapped round manually.

Installation / Commissioning / Training

Although the design and planning stage took quite a long time due to the many different questions that cropped up, the installation and commissioning of the complete system progressed rapidly. This can be



Fig. 5: Packaging with the realigning table



Fig. 6: Kerbstones – first products during commissioning



Fig. 7: Pentagonal slabs – first products during commissioning

attributed to good preparation, particularly by Sor Aroon. On their arrival in Thailand, the Rekers installation and commissioning team found everything as expected and according to requirements. The project benefitted from the young businessman being himself a civil engineer, so that the work on the foundations and preinstallations had been carried out very accurately. Particular mention must be made of the fact that the machine's foundation – whose importance is quite often underestimated when it comes to being able to manufacture high-class products – had been properly assessed and tended rather more to be oversized.

The installation had been completed within a few weeks with the active support and creative improvisational abilities of the Sor Aroon employees as well. The technical briefing and basic training were also carried through in a short time. The first production cycles soon displayed very pleasing results (Figs.6 +7). Good teamwork leads to good results.

Prospects

In the meantime, further and more detailed training has taken place. A new stationary block machine of this quality level and with this broad range of manufacturing possibilities is an important technological step forward for Sor Aroon. The better part of expertise is nonetheless gained step by step

by learning on the job. Several new paving block moulds have recently been purchased that will considerably broaden their range of paving block products. This young businessman's dynamism gives grounds to expect good cooperation on a long-term basis with still more interesting questions in the short to mid-term.

PD Edenhall has also invested in a Rekers RS 1

The starting point in England was similar in many respects and yet still completely different! PD Edenhall has for some years now been one of the leading manufacturers of concrete facing bricks in Europe alongside many other concrete products. In principle, concrete facing bricks are facing bricks made from concrete and not fired from clay. Edenhall manufacture bricks from eight locations around the UK with most of these facilities using old machinery that has limitations in terms of product handling that can adversely affect quality and also high manpower needs relative to output levels"

A change in technology to cutting-edge, stationary block machines with reliable, state-of-the art handling devices was for this reason under discussion at PD Edenhall. As was the case at Sor Aroon, suggestions concerning high-performance machines with comprehensive handling operations

fell on unsympathetic ears – and not just because of the high cost of investment. Alongside diminished commercial risk, systems with smaller or medium output were reckoned to be more easily controllable especially on account of the great leap in technology from antiquated presses to an ultra-modern block machine.

A visit to the same reference production facility in Kosovo was, as in the case with Sor Aroon, important in deciding for a Rekers block machine. This furnished fundamental proof of the fact that the RS1KV universal block machine is able to produce high-quality concrete products and that Rekers can deliver top-class, reliable machines and equipment. The small, manageable installation in Kosovo was a convincing argument that reduced their misgivings concerning the controllability of the technological advance to nil. Any final reservations were dealt with when Rekers ungrudgingly and willingly agreed to a range of special preferences and wishes from PD Edenhall and did not simply insist on rigid standards even if these might have proved to be more cost-effective for Rekers. The result is a very greatly customised system, which has broken new technological ground in several details.

Rekers RS1K Universal Block Machine

The machine at PD Edenhall operates without facing concrete (Fig.9), as do most of the block machines in Great Britain. New, and in this form unique, is the direct filling of the feedbox without the fresh concrete first being held in intermediate storage in a concrete hopper. After each machine cycle, the conveyor belt from the mixer discharges into the feedbox a very small amount of fresh concrete, whose colour blending has been dosed underneath the mixer prior to this (Fig.10). Time has shown that the mould



Phasanon Chanaranon, Owner and Managing Director

I got more than a high quality machine which are technology and innovation.

Most importantly, I got sincere and reliable service since the sale, installing, commissioning and training. For my next machines I will choose Rekers again.



Fig. 8: The Sor Aroon team after the commissioning

can be better filled and indeed be filled more uniformly overall in this way and that a more striking colour blend attained.

One other new feature is that this machine is equipped with a core puller device. This has been installed under the apron plate on the facing concrete side (Fig.11). This space available with the RS1K machine concept gives great room for creativity, e.g. for equipment like the core puller device, whereas, with conventional machines, the space underneath the apron plate of the coarse mix section and automated board feed is mostly extremely restricted. The core puller device is needed in this case for manufacturing perforated bricks (concrete blocks with the three holes typical of brickwork). The advantages of this brick type are less material consumption, lower weight and, in particular, better binding properties between brick and mortar when compared with smooth bricks. Up to that time, perforated bricks had been produced in moulds with small cores. This can only work if the bricks are lying flat on a board - something that, in turn, only permits a substantially smaller number of blocks to be produced in each working cycle due to the greater surface area needed (as opposed to standing bricks / bricks on edge). The main problem is that striped or streaky textures caused by the demoulding process can appear on the bricks' facing side that then only meets the expectations placed on facing bricks in a limited way.



Fig. 9: RS1K Machine

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Fig. 10: Filling the feedbox directly



Fig. 11: Mandrel device

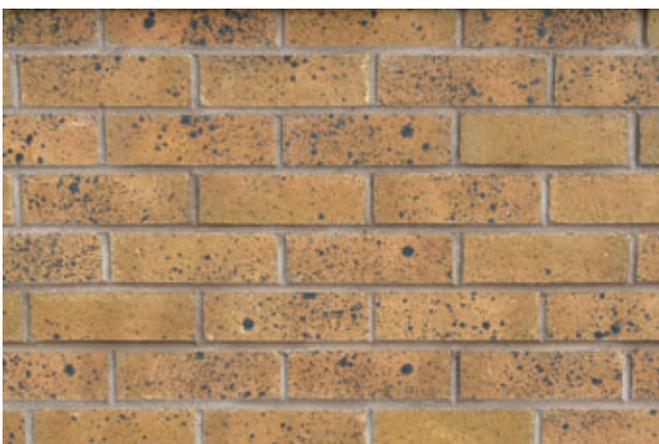


Fig. 12: Example of perforated facing bricks

With the RS1K, PD Edenhall has succeeded in producing perforated facing bricks with a top-class surface structure (Fig.12). Manufacturing this type of brick has been aided by the unique engineering design of this compact block machine with its feedbox running transversely to the production pallet travel direction, with its revamped high-performance oscillating grate and its high-precision mould and tamper guides.

Handling Production Pallets

PD Edenhall had made the decision to operate the system with mobile curing racks with a view to limiting the investment needed. Neither was their existing building especially suited to a solution with finger car and permanently installed racks. On the other hand, losses in efficiency or waiting times with the machine when exchanging these mobile curing racks were deemed unacceptable. So PD Edenhall decided, as Sor Aroon had done before them, to equip the system with changeover trolleys. The conveying technique on both the wet and dry sides can also be compared with Sor Aroon and is based on job-proven, robust and reliable latch conveyors.

Packaging and Realignment

Prior to and during the project stage, the packaging/rearranging area became a major matter of discussion at PD Edenhall as with practically every system developed for the English market. Block packages in England traditionally possess an almost quadratic layout with edge lengths between 800 – 900 mm. This means that individual layers can be turned through 90° to each other and stacked; the end result is the creation of a very stable package.

Pushed together, however, one layer of bricks (standing on their narrow end) manufactured on a production board (Wasa Uniplast Ultra) exhibits an area of approximately 1,050 x 390 mm. Even if bricks are taken simultaneously from two production boards, the result is still clearly far from being a quadratic area. This requirement was met by pushing the bricks together using a double-sided compactor mounted above the conveying device and then shifting them by means of a pusher onto a marshalling table (Fig.13). This action forms a closed stream of bricks with a width of approximately 780 mm (2 x 390 mm). The packaging cuber with its double-sided grab (Fig.14) can now separate off the necessary number of block rows (four rows of blocks, each 210 mm = 840 mm) from the front of this body and employ them as one layer in creating the package. Layers with voids are additionally quite common so that the package can be handled by a forklift. This requirement was fulfilled by





Fig. 13: Realigning



Fig. 14: Packaging

having the packaging cuber first set down a full layer on another realignment table. The voids are formed on this table so that the packaging machine can then remove this "void layer" from the table and insert it into a package.

The system's great flexibility can also be seen in the packaging line that can process packages with and without shipping pallets and is equipped with both horizontal and vertical strapping machines as well as with an automated stretchhooder. This means that the most varied packaging specifications can be carried out; the packages are made up in a very stable way and give an impression of top-class quality (Fig.15).

Installation / Commissioning / Training

The entire system was installed in a short time thanks to good planning, good preparation and a good team made up of employees from Rekers and PD Edenhall. The commissioning also took place without a hitch.

Yet, it is quite another and a challenging task to obtain the quality and appearance desired for these perforated facing bricks in a reliable way in day to day production operations. Some modifications and numerous trials and improvements in process parameters were necessary to this end.

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Fig. 15: Package conveyor with package

The results are really quite exceptional! The flawless appearance and outstanding quality of perforated facing bricks made by PD Edenhall are truly impressive.

Prospects

The RS1K machine concept proved to be a perfect match for PD Edenhall, even with the demanding requirements there. The next step envisaged is to install one more system at another production site. In this case, the company is considering greater output

since the minor investment costs for handling – handling on both wet and dry sides – packaging and realigning translate into almost the double output or system capacity. Reservations as regards the technology’s controllability no longer exist. The discussion involves the latest machine from Rekers. It is a type RS2K machine, the RS1K’s bigger brother, and possesses the same functionality and boasts all the innovative features of the RS1K as well. ■

FURTHER INFORMATION



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Bill Howe, Operations Director

The decision to install the Rekers RS1K concrete plant was made as part of Edenhalls ongoing investment in product development and we have, in conjunction with the Rekers team, pushed the boundaries of accepted block plant design in order to achieve our desired end product. Rekers have been supportive in this process and afforded us great flexibility throughout. This is the first new concrete facing brick plant in the UK for over 25 years and reflects all the knowledge and expertise that Edenhalls team have gathered over this period to produce the next generation of facing bricks for today’s housebuilders. The new range of products has addressed all of the practical issues associated with the traditional brick, to enable ease of laying, whilst retaining all the aesthetic appearances, durability and technical features required by the market.

The team at Rekers have provided professional and competent assistance in the company achieving all of the objectives from this investment, and we thank them for their help.