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A special project: SVI Amsterdam

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It's not very often a block plant manufacturer receives an enquiry with all the technical drawings already included. When project manager Mr. Erik de Graaff sent out the enquiry for a new block machine in Amsterdam he had all the technical, product and installation specifications already in place. His reasoning behind these well executed plans was that the project was very complicated, and the production plant should not stop longer than absolutely necessary.

Struyk Verwo Infra (SVI) is part of the CRH group and has several production units in the Netherlands. One of the productions units is SVI Amsterdam, located in the industrial zone "Westelijk havengebied", focusing on making kerbstones in all varieties, with the ability to make block paving as well. SVI Amsterdam is known for the very wide production range of kerbstones, up to 5000 different products, with a large proportion of these directly available from stock. Bespoke products or specials are custom made and available on short notice, very important for a company that is working nation-wide.

When the decision was taken to replace the existing block machine, the machine had done its time and a lot of love and care was necessary to keep it in production. Hess Group was awarded the order to replace the complete wet side of the block plant, consisting of the block machine, washing station and elevator system. The complete project for SVI was large, including changes to the existing board buffer, changes to the finger car system controls, modifications in the batching plant and the work on the building.

The block plant was originally designed as a double plant, having two block machines each with their own packaging line. One of the plants had already been removed some years before, so within the existing building was some free space. The idea of building up the new plant in the available space and to stop the old production line when the new one was ready, was quickly adapted. The objective was to come up with a plan that would enable the plant to run efficiently and as long as possible. The biggest challenge was to organize

Bird's eye view of the SVI Amsterdam with the port in the background

Concrete block plant

the logistics in such a way that any new equipment installed, would not block the removal of the old equipment. This was the beginning of a complicated puzzle which Erik de Graaff had to solve.

Projects like this always start with the questions; what products is the plant to make, what are the volumes the plant should produce and what are the possible limitations in that process? A company does not have that many changes to renew the production facilities so the requirements must be defined very clearly before the new project starts. The first requirement was that SVI wanted a plant in which safety was more than just a word, the plant had to be safe, accessible, easy to maintain and durable. Another clear point of improvement was that the effective time for the washing station should be increased compared to the old one, resulting in a higher quality of washing. At last, but certainly not at least, the overall quality of the product always comes first, speed of production of course always plays a role, but never overrules the quality requirements of the finished product.

Before any of the block plant manufacturers had got the chance to review the specifications, the layout had already been scrutinised and optimized, enabling the first quotations to already be in full specification detail. With this in mind, Hess Group was challenged because every component had to specially designed to suit the project.

Side view concrete block machine RH 1500-4 MVA

Quality inspection of freshly produced concrete pavers

The beating heart of the plant is a Hess Multimat RH 1500-4 MVA with a production board size 1.500 x 1.100 mm with the capability of a maximum product height of 500 mm, although the highest product is a 400 mm high kerbstone. Concrete is delivered to the block machine by an overhead skip system, coming from a batching plant that is serving several other users. The Hess plant is consuming the highest volume of concrete between these users, so the RH 1500-4 MVA block machine can hold a high volume of concrete by using an additional silo extension for the hoppers. For the face mix section is an extraction belt used to ensure that loose concrete is dosed in the filler box, instead of pre-compacted concrete. Quality of the product is vital, during the production cycle the quality of the product is monitored in many ways. The first steps are taken in the batching and mixing plant to have equal quality concrete, batch after batch. Within the block machine different kinds of monitors are available. Every production board is lifted twice out of the conveyor for weighing, first without product and then with products. The difference in weight is an exact indication of the overall product weight. The height is also measured exactly, first through the system functions and later by a R&W laser height measurement system.

The block machine is a M-version machine, so every hydraulic function in the block machine has a linear encoder which feeds back the exact position of the (hydraulic) movement. A separate PLC is controlling the length of the stroke with extreme high accuracy. Before a movement starts, the PLC knows the starting and stopping point, with that it calculates the optimal acceleration, highest possible speed and smoothest deceleration for this movement. With the highest possible speed, minimal use of energy and no operator influence, every hydraulic movement in the block machine is spot on.

For additional quality tests, a production board can be taken out of the walking beam conveyor in a specifically designed testing area. Several conveyors are used to lift a production board out of the walking beam conveyor into the quality inspection area, leafing a gap on walking beam conveyor. This gap is filled one position later, with the previous board which was taken out for quality control testing. On the quality control position all the necessary quality tests can be done without interruption to the production process. When the quality inspection is complete, the quality manager confirms this by pushing a release button. The board moves one position closer to the walking beam conveyor into a waiting position and is ready to fill the gap on the walking beam conveyor when the next board is removed from the walking beam conveyor for quality inspection.

The next step in production is the washing station, to power wash the products. The concept of the washing station in this plant is not very often seen, but necessary for the products made in this plant. Traditionally the production boards are lifted one-sided out of the conveyor, offering the products to the washing station against the conveying direction. At SVI this system will not work properly because the majority of kerbstone are made, and placed, in the production direction on the production board. As a consequence of this, the washing also has to be done in this direction. As a result, the production boards are lifted into the production direction with the negative effect that it is not possible to increase the washing time by washing 2 production boards at the same time, as normally is done. The system at SVI is built with two washing stations and a separate drying station, which are all independently controlled. Every washing station has the option to high pressure power wash in two directions or flush the product on the return. With these options, the washing station is very flexible and has enough effective washing time available to ensure high quality washed products. An additional advantage of the design is that the washing unit can move alongside the conveyor for cleaning, maintenance or changing the nozzle bars, which is done in a separate area without stopping the production.

Washing machine with kerbstones on it

At the finger car system is the handshake between the new system and the existing situation. The existing finger car collects the fresh products out of one of the two elevators. Both elevators are mounted on a mother car that can change position sideways, when the first elevator is fully loaded with boards the elevator mother car moves over and production can continue. The side shift movement is done within the cycle time of the production machine, without causing any delay for the production machine. This method is not a commonly used buffer system, the advantage is that the system makes more effective use of available space. Especially when a plant is going to be built within an existing building, or even

Elevator system; photo taken from the curing chamber side

Production board buffer conveyor with destacking crane and board hopper

in an existing plant, this solution can offer more space in a creative way. At SVI Amsterdam this system saved us at least 5 meters of length on the wet side, compared with the traditional buffer rack in front of the elevator.

Buffer racks are usually placed at the dry side when a plant is built with a buffer, but when a very versatile production programme is in place, a large (especially wide) curing chamber is used, it is profitable to have additional buffer capacity to increase the availability of the finger car. In Amsterdam an extreme wide product portfolio is made, with sometimes small production runs so an additional buffer was very welcome.

This project was organized with military precision with the objective of minimising downtime. Still under normal production, the area for the new block machine and wet line was prepared and some of the curing chambers were closed for pending production. That part of the curing chamber was opened up and a new foundation was made for the mother car of the elevators. Prior to the delivery of the block machine, etc. the mother car and the elevators arrived in Amsterdam and were put in place so the curing area could be closed again, with only the necessary opening for the walking beam conveyor. With a location in the port of Amsterdam, SVI required extreme pumping capacity to keep the working pit dry, this made it possible in the next step of making the massive foundation for the block machine. After completion of the foundation, the first part of the sound enclosure was made, again something specially designed so that the roof can carry a high load.

The foundation for the washing equipment was made so the preliminary works were done. The equipment could be transported and placed directly to its final position. Unfortunately, at this point the Covid-19 virus really started to have an effect on society and the world went into lockdown.

As all parties involved wanted to complete the project, special precautions were taken to enable the installation teams to continue doing their work. The rest of the new equipment came on site and was installed, Hess had a team of people forming their own 'working bubble' so that they could build the new production line. The new Hess line was installed to the point that SVI Amsterdam had to stop production on the old line in order to make the transition over to the new line. The old machine was removed, the overhead skip was rerouted to the new machine and the pallet buffer was upgraded. At the end the shopfloor was cleaned and reorganised. All done by different teams all working within their own 'Covid-19 safety bubble'.

A week before the system was ready for the first concrete, an intensive training session was held at SVI's premises as part of Hess Group's Training Academy. This training week was specially organized for the unusual circumstances the world had to cope with. All the operators, mechanical and electrical engineers were trained according to the training programme that the Hess Academy has developed. The aim was to especially help the operators to cross the technology bridge of

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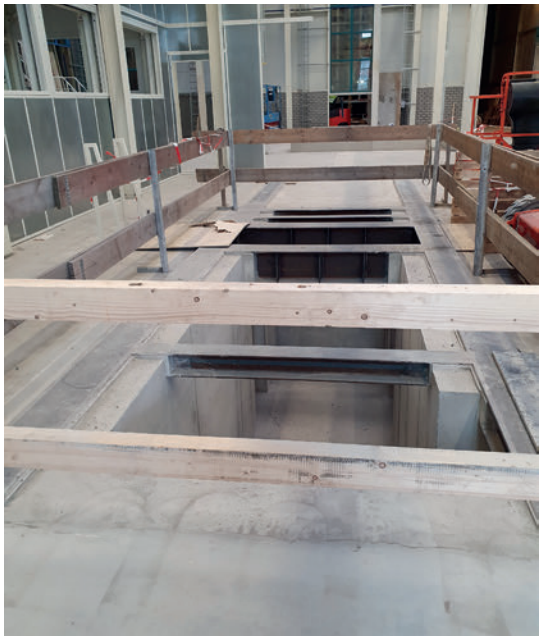
Machine pit under construction before pouring of concrete



Machine foundation shortly before installation

almost 30 years between the old machine and the new one. Within a week the operators were already familiar with the machine controls, the mechanical principles and the theory behind it. Although every start-up of a new plant has its highs and lows, the team managed to make quality products on the first day of the commissioning. The fine tuning of the very complicated project took some weeks, but this plant is ready for the future!

Looking back, the key for success was the carefully prepared specification from the customer SVI with a project team being creative and adaptive to meet our customer's expectations. All with the same end goal in mind; A plant built within the existing confines of the building, with improved speed, innovative design, safe, robust, quality products, staff confident in using machines built for the future. In other words: "SVI Amsterdam a special project …" ■

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Training academy picture with operators only shown from behind

FURTHER INFORMATION

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