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High performance mixing machine for new concrete manhole base production in Germany

Haba-Beton Johann Bartlechner KG headquartered in Garching, Bavaria has been synonymous with expertise and quality in civil engineering for nearly 100 years and is now a leader in the European pipe and manhole market. The founder's family is currently running the business in its fourth generation. The company employs 300 staff, is producing at 7 locations in Germany and Austria and also has a sales office in Poland for marketing prefabricated Haba products. A new production plant for monolithic manhole bases was put into operation at the Teising site in Bavaria in 2005 with the batching and mixing machinery supplied and installed by Gasus Dosier- und Fördertechnik GmbH from Würzburg, Germany. The scope of delivery also included a mixer from Haarpur to supply the Perfect manhole base production machine from Schlüsselbauer with the correct mix of self-compacting concrete. The control system for the entire production plant was supplied by Bikotronic (see CPI 1/2006).

Haba-Beton used the same supplier for the East German concrete production facility in Großsteinberg near Leipzig and recently opened a new production plant for monolithic manhole bases which is spaciously accommodated in a new production hall erected especially for this purpose. The plant has an impressive layout where the hall and plant are well coordinated with each other.



Production site of Haba-Beton at Großsteinberg near Leipzig

■ Mark Küppers, CPI worldwide, Germany ■

When Haba-Beton Johann Bartlechner KG was founded in 1912, it traded in coal for the first few years. The founder, Mathias Bartlechner, was also producing concrete pipes although, of course, this was a much

more complex process than it is now – the production output was only one pipe per day with only one diameter, with the concrete being cast in a special wooden mould! These beginnings stand in sharp contrast to the operation of the greatly expanded company of today.

Haba-Beton's core business now covers four areas – pipes, manhole systems, monolithic cisterns and environmental technology. Haba Beton's production operations are controlled according to strict quality standards at its seven production locations in South and East Germany and Austria.



Haba-Beton's core business today is in four areas – pipes, manhole systems, monolithic cisterns and environmental technology



The advantages of the discharge conveyor belt are that it operates quietly and delivers the material at a consistent rate



The aggregates are taken from the bucket conveyor to one of the 8 concrete silo chambers via a subordinate distributor belt



The individual aggregates are individually weighed by a batching belt and then added onto a weighing belt

Consistent product enhancement guarantees compliance with the relevant European Union and national standards. With its committed and motivated team of staff, Haba-Beton has proved itself to be a reliable partner for engineering offices, construction companies and public clients. The name Haba-Beton is synonymous with skill, expertise and reliability and has been associated with numerous large-scale projects. These include new builds and extensions to airports inside and outside Germany, sewers for numerous European centres, and construction projects related to motorways and railways in Germany and Austria.

In line with its policy of continuous expansion, Haba-Beton opened a pipe production facility in Großsteinberg near Leipzig in 1993. As a location, Großsteinberg was almost ideal for the new production site. As well as the large open-air storage area, the property offered plenty of space for building a large-scale production facility in a strategically favourable position. After the successful production start in Großsteinberg, the plant was expanded in 1996-1997.

Working in close collaboration with Gasus Dosier- und Förder-technik GmbH, the plant was built using the latest technology. Two Haarpur mixers were supplied by the sophisticated Gasus system – the concrete was then distributed to each production station via a Rekurs skip conveyor. The production systems, which came from several manufacturers such as Schlüsselbauer and Pedershaab, range from machines for small pipes through manhole section production machines to the large pipe production system. The reinforcing cages for pipe production are, of course, produced in-house. These are made on MBK machines.

New manhole base production facility in Großsteinberg

The plans for a new manhole base production facility on the Großsteinberg site were implemented a good 10 years after the last expansion. Since the plant technology for this facility which was put into operation in Teising in 2005 proved to be fully satisfactory at Haba-Beton, the same main production technology supplier was also chosen for Großsteinberg. Gasus was engaged to supply the entire batching and mixing machine including 2 Haarpur mixers. For the actual manhole base production, it was decided to procure a fully automatic Perfect circulation plant from Schlüsselbauer. All the control technology for the batching and mixing machine came from Bikotronic.



The aggregates are transported from the batcher to the mixing machine via two long 1,200 mm wide conveyor belts



The 4 cement silos can hold 85 tonnes each



The filters ensure that the residual dust load in air is no more than 20 mg per m³

of concrete additives for the self-compacting concrete needed to produce the monolithic manhole bases.

Two planetary mixers are provided at the final stage of concrete production. These are used to mix both the required amount of self-compacting concrete and the zero-slump concretes for the adjacent production installations. In this case, the concrete is transported via a new Rekers skip conveyor.

Silo charging

The aggregates are taken to the on-grade tipping funnels by truck and tipped directly into them. The dust-sealed bucket elevator is filled from the funnel (which is fitted with a material pushbutton) via a discharge conveyor belt. The discharge conveyor belt has two advantages – it operates quietly and delivers the material at a constant rate. The material impact point where it is transferred to the bucket elevator is lined with rubber to dampen the noise. The aggregates from the bucket conveyor are then transferred to one of the eight 160 m³ concrete silo chambers via a subordinate distributor belt. The controller for charging the silo designed for a discharge rate of 200 m³ per hour is fully automated. Since the controller is linked to



Haarpur Type 3000 planetary mixer, first aggregate tank and cement weigher

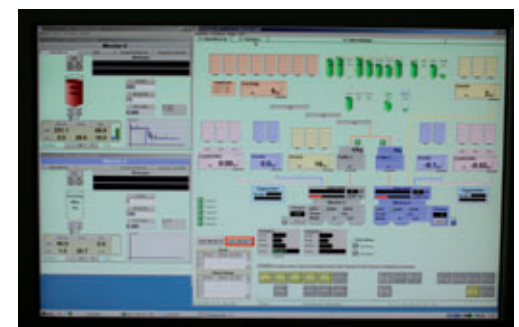


Dust-tight aggregate transport, water/sludge and cement weigher

High performance mixing machine produces 80 m³ concrete per hour

As with the many other Haba-Beton projects, Gasus Dosier- und Fördertechnik GmbH was there again as the expert partner for the batching and mixing technology. Gasus planned and installed an ingenious system for concrete production in the new production hall. The aggregates are stored in 8 large silo chambers and then transported from the tipping funnel all the way to the aggregate weighers by conveyor belts alone. The aggregates are taken from the

batcher to the mixing machine via two long, 1,200 mm wide conveyor belts, the first of which is 50 m long. It discharges its load to a 25 m long belt at 90° inside a dust-proof transfer station. Since the material is carried by a maintenance-free conveyor belt system, there is no need for the additional manhole and foundation work which would be necessary for a lifting system. Four silos integrated in the building are employed to store the cements. Gasus also supplied the other necessary measuring and batching technology such as the fluids batcher. This supplies the exact proportion



The control system for the entire batching and mixing plant was supplied by Bikotronic



View of the Perfect circulation system with approx. 100 moulds



The individual EPS bodies are made using modern sawing and cutting technology



Assembling the individual recess bodies

the level indicator, the silo chambers cannot be overfilled. All the equipment is protected with the latest safety devices. One example of this are the rip-cords on the conveyor belts for emergency shut-downs.

Aggregate batching

All aggregates are individually weighed via batching belt conveyors and then added onto a weighing belt conveyor at a rate of 4,000 kg/min. They are finally transferred to storage tanks via a system of several conveyor belts. The mixer is then supplied from these tanks. The entire batching system is enclosed and dust-tight.

Cement batching

The cement is brought via bulk transporters and blown into the four silos. Each silo can hold 85 tonnes. At the filling connections, there is a limit switch which switches on the filter and the maximum level indicator when the filling hose is connected.

The filter is a compressed-air-flushed cartridge filter which ensures that the residual dust load is less than 20 mg per m³ air. On the filter, there is a controller where the duty cycles can be adjusted. The filter operates while cement blowing is in operation. A horn sounds as soon as the maximum level has been reached. The tanker driver has time to turn off the supply, blow the line clear and remove the filling hose. The pinch valve integrated in the filling line closes automatically according to the pre-selected time.

The cement is batched into the cement weigher via screws and the weigher vents the air into the mixer. The entire batching system is enclosed and dust-tight.

Mixers

The two mixers are Type 3000 Haarup planetary mixers. They are also dust-tight and can be cleaned wet or dry. When the mixers are cleaned wet, the contaminated water is fed to the corresponding tank under the mixing machine.

The Haarup mixer is of strong, wear-resistant construction. The combination of rotating mixing stars and rapidly rotating mixing paddles makes for intense concrete processing with short mixing times. The mixer covers are secured with limit switches which shut down the mixer as soon as the covers are opened.

The mixer has a cartridge filter with a fan for ventilation which takes up the displaced air as it is filled with aggregates or cement and



All the production processes can also be monitored from the concreting station's control console

automatically flushes it back into the mixer. A pneumatic butterfly valve is fitted between the mixer and filter. Before the mixer is filled with aggregates, the butterfly valve opens and the fan starts. After filling with cement, the filter begins to be cleaned off. The cleaning time is entered via the controller and the fan switches off with a time-delay after the cement weigher closes. Cleaning ends and then the butterfly valve closes. This must take place during the dry mixing time so that the butterfly valve is closed for water batching. The concrete is either fed directly to the concrete tank of the Perfect production plant or transferred via the Rekens skip conveyor to other production stations.

Use of recycling water

The contaminated water from washing the mixer or moulds is collected in tanks and coarse particles are kept in suspension by automatic stirring. The recycling water is then transferred to other mixing processes via the water batcher system.

Monolithic manhole base production

The Perfect system is an industrial production system for individualised monolithic concrete manhole bases. It is designed for nominal sizes from 800 to 1,500 mm with variable wall thicknesses from 120 to 380 mm. The channel diameters can be to up to 1,000 mm and the slope of the channel can be determined on an individual basis. The number of connections and the finishing angles can also be decided individually.

The manhole bases at the Großsteinberg plant are mainly produced with an integrated seal. In this case, a solution is used which was developed jointly by Schlüsselbauer and DS-Dichtungstechnik.

Preparation of a concrete manhole base on an individual basis

Each manhole base is first designed on the computer which calculates the parameters needed for its production, such as the inclines or diameters of the channels. These parameters are then used to make the recess bodies from hard polystyrene foam (EPS). Each EPS body is then produced for each raceway using modern sawing and cutting technology. These bodies then give their shape to the channels which are produced later. The operator is given all the neces-



Concreting in one cast with self-compacting concrete guarantees consistent, reproducible concrete quality throughout the entire product

sary information via a touchscreen and the finished recess bodies are then installed in the moulds.

Bottom from top – concreting head down

At the concreting station, the individual manhole base moulds are filled with self-compacting concrete. Concreting in one cast with self-compacting concrete guarantees consistent, reproducible concrete quality throughout the entire product. The operating personnel at the concreting station can oversee the entire, fully-automated pro-

duction sequence from the monitor. All the information can be read off the Bikotronic controller directly, which means that the operator can keep a constant eye on the ongoing batching and mixing processes, concrete recipes and levels in the storage silos while the moulds are being filled. Because the system is networked, it is possible to access the controller from the concreting station for the manhole bases immediately if necessary so that the operators do not have to make a special trip to the control room.

Once filled, the Transexact crane system takes moulds from the concreting station to a defined place in the storage area and places them there to cure.

Demoulding and dispatch

The Transexact crane system of the circulation plant also takes over the demoulding process on the following day by picking up the individual moulds, rotating them 180° and taking them to the demoulding station where they are opened and the manhole bases removed. While the conveyor system carries the manhole bases from the production hall to the area outside, the moulds are taken to the cleaning unit and then returned to the production circuit.

FURTHER INFORMATION

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The Transexact crane system takes a mould to the demoulding station