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## France: Bonna Sabla launches fully automated production system for manhole components

A minimum of personnel, consistently perfect product quality and an average of 25 risers in one hour was the challenge set for Schlüsselbauer by the French precast concrete manufacturer Bonna Sabla in the summer of 2010. After a short, intensive planning phase, the answer was found and Bonna Sabla went for the manhole component production system known as Magic 1501. It can be used to produce large quantities of manhole components like rings and cones. In August 2011 the fully automated system went into production at the precast concrete plant in Bruz near Rennes in France at its most advanced level yet worldwide.

■ Michael von Ahlen, ad-media GmbH, Germany ■

Bonna Sabla is one of the leading producers of pipes and manholes for sewage systems in France and has around 1,700 employees at 35 locations spread across the country. And this is by no means the first time that Bonna Sabla is using Schlüsselbauer machines. In fact, the oldest production system for manhole components still running in Bonna Sabla is a system from the Exact series built back in 1989.

The 1997 merger of the two companies Bonna and Sabla founded in 1892 and 1893 saw growth not only in the production capacity but also in the diversity of products on offer. Bonna Sabla today offers a wide range of concrete pipes and manholes and well rings along with special components for the wastewater industry.

Following restructuring in early 2011, the Bruz site is to become the production centre of the Bonna Sabla group in Western France and at the same time the largest precast concrete plant in the waste water sector in Brittany. The delivery area extends from Normandy to La Rochelle in a north-south direction and from the west of Brittany as far as Le Mans going from west to east. The company, part of the Consolis group since 2006, supplies the entire French market and has a dominant share of the wastewater sector.

Planning the restructuring of the precast plant in Bruz involved setting some tight restrictions with the motto being how to create high production capacity with the least possible use of personnel in existing production facilities; a challenge indeed for any machine or system builder. With the

Magic 1501, at its most advanced level yet, Schlüsselbauer can offer a fully automated production system for manhole components where one operator can control and handle the entire production process. From the transfer of the concrete to the hopper to the removal of the hardened manhole components to the final store, the whole thing runs fully automatically.

The concrete is produced at the start of the chain and in this case is provided by a Skako concrete mixing and transport system. The concrete used for the production of the manhole components is made with Portland cement and corresponds to compressive strength grade C 40/50. This is transferred earth-moist to the Magic 1501 and fed straight to the system via a conveyor belt. After the mould is filled, a vibration unit provides for uniform compression of the



The new Magic 1501 production system at Bonna Sabla in the precast plant in Bruz



The moulds are filled depending on the dimensions in considerably less than 2 minutes.

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*A new feature in precast concrete production: the transport anchor magazine with a capacity of about 25 anchors per mounting side*



*The robot fully-automatically takes two anchors and positions them into the mould*

concrete. The smoothing and pressing bar guarantees the dimensionally accurate finish of the head of the concrete ring. After the fresh blank comes out, preparation is made for the next manhole component with the programme-controlled insertion of the bottom pallet.

**No manhole component without a transport anchor**

The anchors built into the manhole rings for transport to the building site are now stan-

dard at Bonna Sabla. However, the installation method that is operated by the robot on the Magic 1501, is not standard. A totally new feature in this system is the lifting anchor magazine, which can store about 25 anchors per side. The robot takes two anchors from the magazine and positions them into the mould.

**Step by Step**

During a run, and depending on the component, the operator inserts up to four steps

for the next manhole into the equipment of the Stepmaster, which in turn sets these in the mould equipment. The steps are transferred at the right time from the Stepmaster into the mould core and fixed automatically. The preparation and the insertion of the components, like the transport anchor and steps is done during a production run for the next manhole and means there are virtually no waiting times.

**The transport and storage system manages the entire production process**

The support ring is set on the joints of the freshly cast concrete ring manually with the help of the support ring manipulator, which is operated by the only operator on the system. As soon as three risers are completed and provided with support rings, follows the removal on the automatic transport and storage system Transact. A crane runway spanning the full hardening area with gripper robot provides seamless transportation and storage of the fresh concrete products in the hardening chambers, the so-called kilns. After storage in the kilns, the support rings are removed from the concrete components and fed back into the production cycle. This process also is done automatically.

Here too, the Transexact is used. It is worth noting that due to the complex control system, the crane robot has no empty runs, i.e. each path travelled contains one working stage. The operator can identify the storage



*The automatic unit for fitting the moulds with steprungs is called the Stepmaster*

The automatic transport and storage system "Transexact" is the essential element of the fully-automated system in the Bonna Sabla plant



Storing the fresh manhole rings in the kilns



The hardened manhole rings shortly before removal by the crane robot



The rotating gripper bars allow the cover sections to be moved without the need to change tools



Steel brushes removing concrete residue from the pallets



Sponges for oiling the pallets apply the oil extremely efficiently



The latest development from Schlüsselbauer: the quick change unit for grippers

space, hardening status and component group for each component on one of the monitors on the central control panel.

### Cleaning, oiling and feeding back the pallets

As the name suggests, the pallet is separated from the concrete component in the pallet removal and cleaning station, the pallet fed to the cleaning system and the concrete product passed on to the delivery belt, from where it is then moved by forklift into the external storage area. Feeding the steel pallet back into the production cycle runs automatically and starts with the cleaning by the Cleanmaster. During this working stage, rotating steel brushes remove the concrete residue from the pallets and this process occurs in a fully enclosed cabin, so that no dust is created that could affect the working environment. The next step involves oiling the pallets, likewise in a sealed cabin. Two sponges located opposite each other apply a thin film of oil to the cleaned pallets and this method ensures the oil is applied very efficiently and sparingly. The pallets now prepared for the production cycle are fed back via a transport system. The Magic 1501 can be used to produce not only rings but also cones and so the grippers

must of necessity be changed regularly. This also occurs fully-automatically with the computer control system knowing exactly where each component is in what hardening stage and changing beforehand to the appropriate tools.

### High throughput, short cycle times

What Bonna Sabla was looking for was clear: short cycle times, short changeover times and the greatest possible production output. In negotiations an average production capacity of 25 No. DN1000 standard manholes per hour was agreed. As the system currently stands, manhole rings can be produced in three different heights and two different joints, along with manhole cones in six different heights from 450 - 1,200 mm and production can also be extended to other product categories as well.

### Short changeover times enhancing flexibility

To ensure maximum flexibility, short changeover times are a must and here too the customer's specifications had to be adhered to. 20 minutes to change the product height and two hours for a full product change, for example, from riser to cone



Transfer to the product conveyor belt. The concrete components leave the production hall in the next shift



All the work sequences between the concrete mixer and removal of the products are so highly automated that one operator looks after them all.

production was the target. Initial test runs gave the plant management cause for confidence both in terms of the conversion of product heights, as well as completing a changeover in smaller time frames. Each working day it should be possible to make two height changes and one product change in two shifts without significantly affecting the overall output. This leaves enough flexibility to respond to the needs of customers.

**The one stop solution**

The one stop solution! That is exactly what was so important to the technical director, Mr. Arnaud Deheul of Bonna Sabla Group in setting up a new production line. "We were looking for a complete solution from concrete transfer to delivery of finished products. The system by Schlüsselbauer is exactly what we required" said Mr. Deheul. Throughout his career he has already had plenty of experience with many different product lines and manufacturers. "Bonna Sabla has had experience with many different types of machines from six manufacturers. Our experience has shown that we

need to take Schlüsselbauer machines if we are to continue to meet our own high standards. And the value for money is right," adds Mr. Deheul. This is actually the fifth manhole ring system in production at Bonna Sabla. Most recently, in 2008, a magic system was purchased but none of the previous installations had such a high degree of automation.

A special word of praise must go to those helpful technicians from Schlüsselbauer who at some stages were on site with up to four workers to complete the commissioning of the plant. The Schlüsselbauer Team introduce the operators to the comprehensive control system of the production line on site in a programme of training lasting several weeks.

**Production has begun**

As stipulated in the contract, production of the EN 1917-certified concrete components with the new highly automated Magic 1501 started promptly in early August with less than a year passing since the first exploratory talks to actual start-up. Already,

there are preparations afoot to commission further two Schlüsselbauer systems at Bonna Sabla and there are of course hopes of long-term, excellent cooperation.

**FURTHER INFORMATION**



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