

BFS Betonfertigteilssysteme GmbH, 89143 Blaubeuren, Germany

## Chaux de Contern invests in a modern concrete pipe making machine and a system for the manufacture of monolithic manhole bottoms

The machine and concrete mould manufacturer BFS from Blaubeuren in southern Germany and Chaux de Contern from Luxembourg have already been partners for ten years. BFS recently developed and manufactured a Souveraen 1230 and the Capitan manufacturing system for Chaux de Contern, which was established 91 years ago and is one of the main manufacturers of concrete products and precast elements in Luxembourg.



*The BFS Souveraen S 1230 high-performance pipe-making machine was optimised for Chaux de Contern in order to achieve an even higher production output.*

The long-standing co-operation between the two companies began with a wet-cast plant of the type Creavib, which BFS designed and installed for Chaux de Contern in 2004. Investments in the latest technologies have always been important to the Luxembourgian company. "Those who don't invest are doomed", declares Robert Dennewald, who has been head of the company for the last twenty years. In order to optimise productivity and quality, several innovations were lined up for 2013 and 2014: Chaux de Contern had BFS install both a modern Souveraen 1230 concrete pipe making machine and the Capitan system for the manufacture of monolithic manhole bottoms.

"We chose BFS because they offered us the best technical solution for the manufacture of the manhole bases and could manage a very short delivery time for the Souveraen concrete pipe machine", Dennewald explains. Instead of the usual six months, BFS was able to supply the Souveraen after just four months. "Before delivery we heavily reworked the machine

and developed it still further in order to improve the product quality and production rate, which were already very high anyway. Now, for example, a quality steel-reinforced concrete pipe with a diameter of DN 600 and an overall length of 2.5 metres can be manufactured in approximately 80 seconds. In order to increase the production output we increased the power of the drives and optimised the machine controller", says Klaus Müller, CEO of BFS.

With the new concrete pipe making machine Chaux de Contern can manufacture concrete and steel-reinforced concrete pipes, flat-base pipes and jacking pipes as well as other pipes according to international standards with nominal sizes of DN 225 to DN 1400 and overall lengths of up to three metres. "At the present time we are very satisfied", says Dennewald, describing initial experience with the new plant. The fact that the Souveraen brings along numerous advantages is already apparent: it offers very high product quality with minimum use of personnel, because thanks to the fully automatic, computer-controlled



*The Souveraen S 1230 has a fully revolving spigot end shaper and a weight-dependent compaction controller.*



*Demoulding with three-part moulds*



Production of short pipes

production, only one machine operator is required to operate the machine. All machine parameters can be stored for each type of pipe, which ensures constant quality. Changes of operating staff do not affect the product quality.

#### Further developed machine concept

Together with a diagonally-toothed spur gearbox, the frequency-controlled electric motors of the S-Eco drive system provide exact speeds and a large drive torque for very good compaction results. One of BFS's major concerns in the development of the machine was that it should save energy in operation and generate as little noise as possible: whereas the employees at Chaux de Contern were exposed to continuous vibration noise from the predecessor pipe machine, the noise level of the Souveraen during manhole production is well below 85 dB. Vibration noise occurs only briefly during the filling of the bell.

The concrete amount is calculated by the process controller and supplied by the S-feed concrete supply system in a precisely defined amount and speed to the compaction process, due to which the quality of the manufactured pipes is always constantly high. Thanks to the built-in weighing system, concrete is requested when the machine controller identifies the need.

S-Compact, the patented compaction tool, forms the heart of the Souveraen 1230. Thanks to the rotary press method with counter-rotation, the concrete is compacted so intensively that there are no longer any compaction-free zones. The counter-rotation ensures that the reinforcement cage is completely embedded in the concrete. In addition, twisting of the reinforcement cage is avoided with this system. "The quality of the concrete pipes is very good", says a satisfied Bruno Marx, head of the 'Section tuyaux'. Good product quality also means that there is little work to do on the pipe inspection line.

#### Three-part mould jackets

Chaux de Contern uses the 'three-part mould jacket' system for pipe making, as a result of which the pipe can be demoulded in a very short time and a new base pallet with a reinforcement cage placed on it can quickly be taken up. A further advantage of the three-part

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## SOUVERAEN



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*Transfix automatic anchor insertion machine*



*Robert Dennewald on the machine platform of the Souveraen S 1230*

moulds is that demoulding can take place even in very low halls. The BFS mould jacket closure is patented. The opening and closing as well as the locking and unlocking of the mould take place automatically. Thus no additional personnel need to be assigned.

### Concrete pipes with lifting and installation anchors

Chaux de Contern also chose the fully automatic Transfix transport anchor insertion system. Using cast-in-concrete transport anchors, concrete pipes can be picked up safely at defined points. The Transfix system has a large buffer magazine for the selected transport anchors. Two gripper arms each take an anchor from the magazine and place them in the respective mould equipment. Since the system is not connected to the mould equipment it can be used for the entire mould pool.

### Development of the Souveraen

The Souveraen 1230 does not by any means represent the end of development. BFS has larger machines of this type in its product range, such as the Souveraen 1630, which can be used for the production of pipes up to a nominal size of DN 1800. "We are currently preparing this machine for a customer in Australia. It has an even more powerful drive than the Souveraen 1230 and enormous power reserves", Müller explains. Already in planning is the development of a packerhead machine for the manufacture of steel reinforced concrete and jacking pipes up to a nominal size of DN 2200.

### Everything from a single casting – Capitan from BFS

Apart from the system for concrete pipe production, BFS also supplied and installed the plant for the manufacture of monolithic manhole bases for Chaux de Contern. "With the Capitan we are able to manufacture manhole bottoms with extremely smooth surfaces, flexible channel diameters, angles of inclination and variable heights of the inlets and outlets", Marx says, adding: "it's simply the best system for our needs." The formwork system produces with low wear and reduces the cycle times in the production process to a minimum. With the investment in a BFS Capitan plant Chaux de Contern was able to achieve a rationalisation effect, so that the employees freed up can now be used in other departments of the company.

The Capitan configurator, which is based on a 3D design software, calculates all product parameters. Specific manhole data such as standard or end section, diameter, number of inlets, pipe connection types, angle of the pipe connection in the wall, channel slope or height are entered here. "Even tapering channels are no problem", explains Müller. Wall thickness and manhole height can be calculated automatically. Oversizes can also optionally be realised to allow for brick liners, wall thickness reduction, different ledge inclinations or stepped ledge surfaces. From these inputs a 3D model is calculated that can be transmitted to the end customer in the form of a data sheet even before production commences. "The Capitan is very user-friendly. Since the milling program is automatically created, no technical personnel is required for the operation of the CNC milling centre", says Müller.

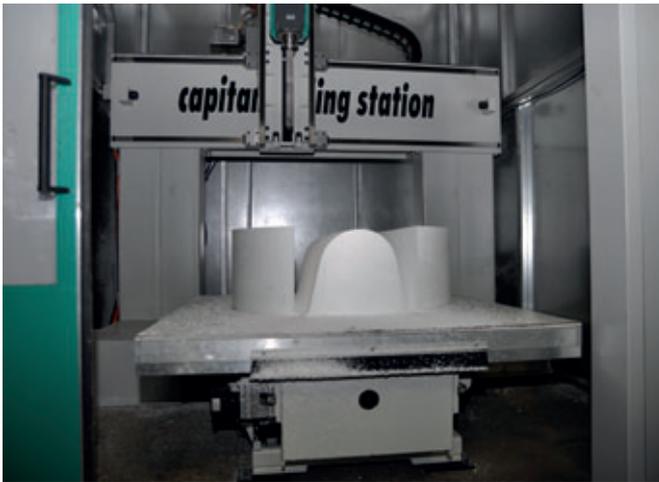
Following the calculation of the model, the data are sent to the heart of the Capitan:

the multi-axis milling centre. Both channel negatives and blockout cores are milled from EPS blocks here within a short time. The chips produced by this are extracted and collected for recycling. Very little work is necessary to join the channel negatives and the blockout cores together by means of a special screw connection. At the same time, anchor bolts are sunk into the underside of the channel negative. The moulding inserts can be pulled out of the hardened concrete by the anchors without effort later on.

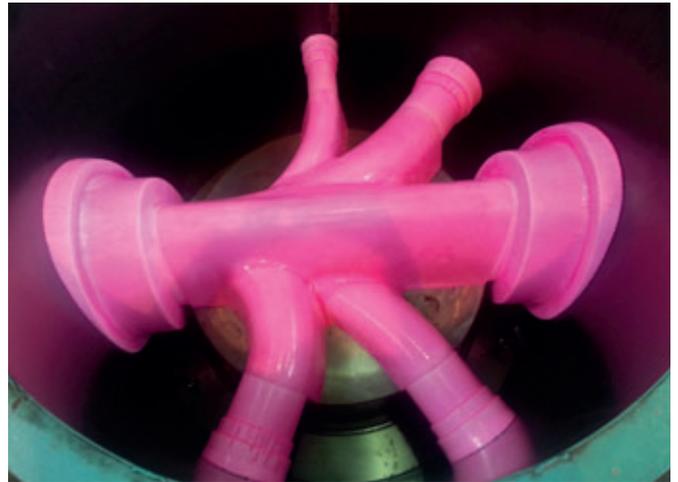
Decisive for this is the patent-pending Casacap release agent from BFS, which is applied to the channels. The polystyrene channel hardens within a few minutes under radiation. With the aid of the magnetic fastening anchor the channel is then placed on the mould core of the BFS wet-casting mould, the product height is individually adjusted and the mould is closed. The concrete mixture is then poured in. The manhole base can already be lifted off the mould core the next day by the Capitan turnover spreader beam and positioned for demoulding. "We can use common channel moulds several times, which enormously increases the profitability of the plant", says Marx. The blockout cores created by the milling system can be used up to six times in his experience.

### Quick decision

Dennewald's goal is to successively automate the processes in his plant. The template for this is one of the most modern concrete pipe production plants in Europe: Ruskon Betoni in Finland, for which BFS developed, designed and installed two turnkey, fully automated production lines for the manufacture of concrete pipes. "At that time this high-end solution was not affordable for us", says Dennewald. In December 2013, he and his employees inspected the installation in Finland. Three months later the decision to acquire the Souveraen had been taken. "Quick decisions are a forte of the middle class", explains Dennewald, who employs 160 people in his company. The rebuilding work necessary for the installation of the new plant proceeded at top speed from April to September 2014: The roof had to be raised, the machine foundations manufactured and the pipe hardening chamber rebuilt. "Everything went well and I am proud of my employees", says Dennewald, "and the co-operation with BFS also proceeded to our entire satisfaction. "Müller confirms that: "The co-operation between the responsible project managers, Martin Humm (BFS) and Bruno Marx, went



Channel moulds are manufactured effortlessly and quickly using the Capitan milling centre. BFS supplies machines for channels up to 2 m in diameter and a channel height of 1,600 mm



Capitan channel mould with connection for oval pipes; such demanding channels can also be manufactured using the Capitan.



Capitan wet-casting moulds



The manhole bases are safely demoulded and rotated into the installation position using the hydraulic turnover spreader beam.

extremely well. Our service technicians who carried out the installation and commissioning in Luxembourg were optimally supported by the employees at Chaux de Contern." Optimum service plays just as important a role as good machine quality for BFS: "We attach great importance to a trusting relationship with our customers, because only in that way is a long-term successful co-operation possible," Müller stresses.

Thanks to the new machines the mood at Chaux de Contern has improved still further. "Work has become simpler, more comfortable and more ergonomic", says Marx, describing the positive effects of the modernisation. And Dennewald also experiences at first hand what it means for his employees: "On a tour through the plant an employee stopped me to thank me that we have invested in the company and thus in

his future. That shows me that we are on the right path. The latest technologies are important, but the most precious thing that a company has is its employees."



Finished Capitan manhole bottom

FURTHER INFORMATION



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