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Creabeton begins manufacturing milled monolithic concrete manhole base sections in Switzerland

The Swiss company, Creabeton Produktions AG, belongs to Müller-Steinag Holding AG. Their production facilities in Brugg, Flawil and Trimmis, trading under the name of Creabeton Produktions AG, manufacture all types of concrete goods for the construction industry. The firm maintains distribution centres in the north and the east of Switzerland. Products are marketed via Müller-Steinag Baustoff AG and Creabeton Baustoff AG. This latter company is also a sales network for catalogued products from Müller-Steinag Group, who stock a full range of concrete goods for civil engineering, road construction, landscape gardening and environmental design. Their own fleet of vehicles and different regional operations guarantee a customer-friendly delivery service. For the environmental design and landscape gardening sectors, they supply interlocking blocks, paving blocks, garden slabs, wall and embankment systems for slope reinforcement, pond border elements, blocks of steps, angled steps and stairways plus plant troughs and fountain basins. The range for civil engineering and road construction includes, amongst other things, sewerage systems, jacking pipes, concrete pipes with their accessories, manholes, drainage channels, separating plants, small-scale wastewater treatment plants and environmental technology products. Great emphasis is made on the use of up-to-date production methods and modern machine technology in manufacturing these concrete elements. The name of Creabeton stands for innovative concrete products of high quality even beyond the country's frontiers. As regards innovation, Creabeton Produktions AG has now sent out a very clear signal with their commissioning of a new production line for milled monolithic concrete manhole base sections in the Brugg production facility. The Primuss plant supplied and installed by Prinzing GmbH from Blaubeuren, Germany, has not only substantially increased their capacities for manufacturing concrete manhole base sections. This investment has enabled the company to react in good time to the growing demand for monolithic concrete manhole base sections. It has been supplying the market for some weeks now with such manhole elements – their channels individually made to customer specification – on time and in high quality.

■ Mark Küppers, CPI worldwide, Germany ■

In 2006, Sebastian Müller AG from Rickenbach in the canton of Luzern took over the shares of Steinag Rozloch from Stansstad in the canton of Nidwalden and today still holds a majority stake in these production facilities and sales companies. The logical sequel was the founding of Müller-Steinag Holding AG and the strategic advancement of group thinking. The Müller-Steinag Group is an independent and self-contained company operating throughout Switzerland in the fields of concrete goods, prefabrication and natural construction materials. A staff of more than 600 is employed in the manufacture of high quality concrete goods and natural construction materials in the different facilities.

The origins of the facility in Brugg date back to the year 1874 and it has borne the name of Creabeton Produktions AG since 2006. Concrete precast components for civil engineering purposes are



Creabeton Produktions AG company premises in Brugg, Switzerland



In the Brugg production facilities, Creabeton Produktions AG manufactures catalogued products in high quality and great numbers; special construction components are also a feature of daily business



First, the steel pallet and support cap are positioned in the Atlas plant



Dosing shutters control the flow of concrete



Subsequent compaction with superimposed load

produced in particular at this site. Its core competencies are the manufacture of light wells, cantilever retaining walls, pipes and manholes. The two first-named products are manufactured with self-compacting concretes whereas pipes and manholes are made with conventional concretes. A total of four concrete mixers from Kniele and Teka supply the entire production process.

Creabeton Produktions AG is one of the major producers of precast concrete components for underground civil engineering in Switzerland. In Brugg, almost only great volumes of catalogued products are manufactured with the exception of the new concrete manhole base section unit, which manufactures solely to customer specifications. All product groups are immediately

available in high numbers for customers thanks to the large outside storage areas. Current high demand has ensured very good production capacity utilisation; the well-filled order books have required repeated extra shifts since the beginning of the year. The approximately 90 employees at the Brugg site have also played their part in the successful development of Creabeton Produktions AG. Numerous reference projects speak for themselves, in which the facility was involved as supplier. Extensive construction works, such as the Isisberg tunnel, the Zurich western ring road, Kloten airport (Zurich) and the Gotthard motorway, are only some that can be named as examples. For all these projects, Creabeton Produktions AG has made its mark as a reliable supplier of high-class concrete products. In

the field of waste water technology, Creabeton provides a comprehensive range of pipes and manholes. Demand has continually remained at a high level particularly in the manhole sector. In Switzerland as well, there has been a rapid growth in interest as regards monolithic solutions. Creabeton has introduced its new manhole base section unit at the right time. Individual concrete manhole base sections are now no longer a special challenge any more and can be produced and supplied at short notice.

Monolithic manhole base sections with variable channels

Concrete milling technology, as regards the manufacture of monolithic concrete manhole base sections, has also made its debut in



Atlas system control station



Primuss milling bay with two work places



Setting down a concrete manhole blank on the clamping ring in the work bay



Milling a drainage channel



Automatic tool change

Switzerland with the commissioning of the new Primuss plant. The Primuss features a high degree of automation. The programme-controlled production of any type of drain channel and corresponding pipe connections can be carried out with great precision. Great numbers of concrete manhole base sections can be manufactured automatically in a short time with minor manpower resources using just a handful of moulds.

The entire manhole base section production is made up of two machine components. The first stage involves producing manhole base section blanks on an Atlas unit. After a hardening time of a few hours, which, of course, is dependent on construction com-

ponent size, concrete recipe and ambient temperature, the drainage channel and connections are generated automatically in the milling bay by a robot according to product parameters previously entered into the computer system. When a manhole base section is ordered, the complete job is recorded by an enterprise resource planning (ERP) system and all relevant manhole data are fed into it.

Atlas – a flexible manufacturing system

Atlas is a flexible manufacturing system designed in modular units of different individual components, such as feed equipment, compaction unit, press and transport systems.

The plant's control unit ensures entirely programme run operations at Creabeton in Brugg.

The Atlas system can produce manhole base sections without a channel in varying heights, differing wall thicknesses and diameters from 800-1,200 mm. First, a steel pallet and a support cap are placed into the unit. Release agent is applied to the support cap.

Then, both steel pallet and support cap are lowered to basement level to where the outer mould is located. The outer mould and support cap make up the formwork for the manhole blank.



The two-part tool storage unit offers mountings for a total of six milling heads



The milling head moves in circular paths. The concrete is cut in layers right up to the total wall thickness.

Concrete is fed into the Atlas unit's storage hopper by means of a Rekers bucket conveyor. The concrete is transferred via dosing shutters to a conveyor belt, which then brings the concrete to the mould. The zero-slump concrete is compacted with vibration of controlled amplitude and frequency. The flow of concrete can be controlled very precisely via these dosing shutters so that no more concrete is given into the mould than absolutely necessary.

Manhole blanks are concreted on their head and once their base has been concreted, this production process ends. A superimposed load is applied to the base section and it is further compacted to create a well-compacted, planar surface. The finished blanks travel up from the plant's basement level for removal by forklift. The concrete monoliths are transported on their steel pallets to the curing area. The blanks remain here until they have reached the desired green strength.

Fully automated milling bay with permanent milled material evacuation

Once the concrete blanks have attained sufficient strength (after approx. 2-4 hours depending on marginal conditions), the blanks are lifted from the support cap with the collar and are brought to the milling bay by forklift. The milling bay possesses a centrally positioned robot and two processing points - unmilled manhole base sections are inserted and the milled ones then removed - thus allowing milling to be carried on without interruption. The monoliths are then set down on their head, as they were produced in the Atlas system, in the work bay

on a rotatable clamping ring. There is a large pit underneath the work bays that provides room for the robot to work in. Downward sloping panels, converging at the pit's bottom and discharging onto a conveyor belt operating continuously, ensure that no milled material can be deposited. This horizontal conveyor conducts any milled material out of the work pit and transfers it to a second belt, which, in turn, brings it to an accumulation bin at hall level. The material collected can then be fed back into production again.

Milling the drainage channels

The robot always first begins by milling the drainage channel. Milling heads with PKD cutting blades are utilised for this purpose. The spherically shaped milling head employed for creating the drainage channel cuts into the concrete one layer at a time until it has been made in its specified final form.

When the channel is milled overhead, the loose concrete falls in small particles perpendicularly onto the above-mentioned downward sloping panels. Material, momentarily deposited on the robot's arm during milling, automatically drops down due to the machine's regular rapid movements. The robot keeps on continually cleaning itself in this way.

Milling the pipe connections

The next stage involves milling the pipe connections. For this purpose, the robot first automatically changes the milling tool. The robot arm travels to the tool storage unit and places the milling head in prior use into the mounting provided. The tool is detach-



The milling head breaks through



A well-designed conveyor belt system carries the milled material away from the working area

FURTHER INFORMATION



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Pipe connections are swept out at the end

ed from the arm and a new tool attached in an analogous fashion. A side milling cutter is normally employed in milling the pipe connections.

The milling head is carefully positioned on the monolith. The robot works from the exterior towards the interior. The forward feed in milling is monitored automatically by the robot and is adapted to every individual state of concrete hardness. The robot's arm describes circular paths cutting into the concrete in layers.

There are almost no limits set to the number, size and design of the pipe connections. Once the first pipe connection has been milled - always from the rear - the concrete monolith is automatically turned to the appropriate angle by means of the clamp-

ing ring and the next connection can be milled. Cycles times for milling obviously then always vary in relation to the amount of work needed. Less elaborate monoliths need some 5-7 minutes; very complex drainage channel designs with a number of pipe connections need more time accordingly.

Removing the finished concrete manhole base section

The concrete base section is finished once all the pipe connections have been milled. The monolith is lifted out of the work bay with a forklift and placed in the storage area foreseen for final hardening. Any residual milled material, which may have collected in the pipe connections, is simply swept off with a hand brush.

The concrete manhole base sections are loosened from the collar and rotated 180° after attaining sufficient strength. As an option, seals can now be set in. At Creabeton Produktions AG in Brugg, seals from DS-Dichtungstechnik are utilised.

Start of production and marketing after a successful trial phase

Once the plant had been installed in the spring of this year, it was commissioned by the Prinzing team. Creabeton Produktions AG manager, Mr Marco Bizzarri, expressed his great satisfaction with the new system after just a few trial runs, during which the plant received its fine tuning. The goal is a yearly production of some 2,000 monolithic concrete manhole base sections with the Primuss manufacturing process. The market launch could already begin in May 2011 and has had a great response. ■



Milled manhole monoliths in the storage area for furthering hardening



View of a milled manhole base section