Prinzing GmbH Anlagentechnik und Formenbau, 89143 Blaubeuren, Germany

Modern concrete container manufacturing for large-scale production at O Beton in Belgium

The O Beton company of Rumbeke in Belgium manufactures various precast concrete elements for underground construction. The company was founded in the 1980s and was initially called Olivier Beton. It quickly earned a good reputation in the region and beyond with its products. Olivier Beton was one of the leading manufacturers of water containers, wastewater treatment plants, house cellars and pits, which were manufactured as monolithic elements and transported as such to the building site. The company is now managed by its two owners, Odiel Vandenbulcke and Gerdi Vankeirsbilck, and the old company name Olivier Beton has now become O Beton. During the realignment of the company great importance was attached to the concrete containers. Thus the decision was taken to invest here and to build a new production facility. In close cooperation between Odiel Vandenbulcke, Gerdi Vankeirsbilck and Roel van Osnabrugge from Rosecco/ubo engineering, this project was quickly planned down to the tiniest detail and to the complete satisfaction of the two managing directors of O Beton and was implemented to high quality standards. The two core elements of this investment are the Atlas and Zelus production systems from Prinzing, with which the concrete containers can be manufactured on the one hand and the corresponding covers on the other.

Mark Küppers, CPI worldwide, Germany

Before starting with production in the concrete works in Rumbeke, the two owners of O Beton, Odiel Vandenbulcke and Gerdi Vankeirsbilck, had both gained many years of experience in the concrete and construction industry.

With modern production technology and modern production plants, the appropriate know-how and a team of qualified and motivated employees, O Beton today produces a series of high-quality precast concrete elements.

Apart from the manufacture of the products mentioned, O Beton also concentrates on the delivery and assembly of these concrete elements. The company has the necessary equipment – for instance its own crane – for the on-site installation. O Beton's products are sold all over Belgium and in northern France.

Of particular importance, however, and with a high growth potential in Belgium are the large water containers, which can now be manufactured in large numbers with the new plant from Prinzing. Many building permits are linked with the provision of sufficient stores of water for the case of fire. For this purpose the containers offer a good possibility to build underground reservoirs quickly and simply with precast elements. If large volumes are required, any desired number of containers can be connected to one another to form one large unit. Due to their relatively low overall height there are normally no problems due to groundwater with these containers.

New central mixing plant built according to customer requirements

O Beton wanted to have a high-performance central mixing plant as the basis for the new container production, with which both self-compacting concretes and classic concretes can be produced according to requirements. Ubo engineering b.v. then built a tailor-made solution, completely enclosed and located directly adjacent to the production halls.

On delivery the aggregates are tipped from the truck directly into the feed silo and are transported from there via an elevator to the uppermost level of the mixer tower. A distributor crane at this level

Ubo engineering b.v. built the new central mixing plant completely enclosed and located directly adjacent to the production halls.

Two identical mixers from Haarup (3,750 l) were installed in the mixing tower.

All mixing and dosing processes are controlled by the Sauter controller

Truck mixer from Merlo

transports the aggregates to one of the six bunkers. Consequently up to six different aggregates are available for concrete production. The aggregates are dosed by means of a weighing wagon which drives underneath the outlets of the six bunkers. After taking on board all the aggregates for a mixing process, the weighing wagon transfers its contents to one of the two lifting buckets that bring the material to the two mixers. Ubo installed three plastic silos for the storage of cement. The complete handling of the aggregates, the dosing technology and the cement storage were manufactured by ubo engineering according to the customer's requirements and constructed on site. For the mixing equipment, control system and concrete transport, ubo relied on well-known suppliers, whose components were integrated into the overall package.

Two identical mixers from Haarup (3,750 l) were installed in the mixing tower. At the moment one mixer produces exclusively self-compacting concrete while the second manufactures earth-moist concrete for the production of the instantly demoulded concrete containers. The Haarup mixers have a wear-resistant design. The combination of three rotating mixing stars with fast rotating mixing paddles ensures an intensive mixing process in short periods of time. If necessary, steel fibres can also be added to the concrete. A suitable dosing system for this was also installed by ubo. The fibres are then added directly to the aggregates in the mixer lifting bucket.

All mixing and dosing processes are controlled by the Sauter controller. All of the control cabinets for the entire mixing tower are installed in a central switchgear room and from here all of the fully automatic processes can be followed as necessary on the monitor. However, this central control room is not usually manned.
The distribution of the concrete from the mixers to the production plants takes place by means of a bucket track system from Rekers, which conveys the concrete to the concrete container production plant or to the concrete cover production plant in the adjacent hall. A small truck mixer from Merlo is available for a further production area that cannot be reached by the bucket track. This drives backwards under the outlet of a concrete mixer and is thus filled simply and directly.

Sufficient space for efficient container manufacturing at O Beton

Production takes place on production station 1; the concrete silo is filled in the central position and production station 2 is prepared for the next product.

The control device with menu navigation; everything is operated from here.

The Atlas is supplied with earth-moist concrete via a bucket track and a pre-silo

The compact arrangement with two production stations ensures high productivity.

The pallet is automatically clamped to the filled and compacted mould.

The container is made absolutely watertight by pressing and compacting again.

A recycling plant from Hölscher, which was also installed by ubo, enables surplus concrete to be treated.

Flexible Atlas production system from Prinzing

The flexible Atlas production system from Prinzing is a modularly constructed system made up of different individual components such as feeding, compaction unit, press and transport systems. The plant controller can be designed for manual operation or alternatively for program-controlled (semi-automatic) processes. The plant at O Beton is program-controlled.
Thanks to the stepwise construction and the modular expandability of the individual components, a customer-oriented solution can be offered for every requirement. The range of concrete elements that can be produced on the different plant conceptions of the Atlas is accordingly extensive. The product dimensions lie between 150 and 3,600 mm, the component lengths or heights can extend up to 3,500 mm. In addition to road gullies, pipes, rectangular components and manhole rings, cones and bases, the system is particularly suited to the manufacture of elements and containers for wastewater treatment plants.

Thanks to the modular plant concept a product-specific combination of machine components was also put together at O Beton for the intended exclusive production of concrete containers. The plant was also equipped with two workstations, allowing continuous production. While concreting is taking place in one station, the finished product can be removed from the second station and the necessary setup work can take place.

At present 50 to 60 containers are manufactured per day at O Beton. The intended full utilisation of both workstations with around 80 containers per day should soon be attained.

The number of containers produced naturally depends on their size. O Beton offers its customers containers with capacities from 2,500

During the removal of the mould the material silo at the central position is filled again.

The mould is hydraulically turned during transport to the demoulding station.

The complete demoulding process is controlled from the pendant crane control.

to 20,000 litres. One special feature that distinguishes the containers from O Beton from those of many other suppliers is the elliptical shape of the containers. This shape is a great advantage when transporting the containers to the customer. Due to the elliptical form the containers take up less space width-wise and the transport vehicles can be loaded more economically.

In addition, the containers from O Beton have only a very small wall thickness, which makes them considerably lighter.

While the combination of elliptical shape and thin-walled design appears at first sight to be detrimental to the compaction of the concrete, O Beton confirms that the compaction results are ideal. The company considers one of the reasons for this to be the very good vibration transmission of the Atlas production system from Prinzing. Hence, the containers produced are absolutely watertight without any further treatment. O Beton guarantees this for every container that leaves the works yard.

Flawless containers in every cycle

As already mentioned, the Atlas production system is supplied with concrete by the bucket track system. The bucket track transfers the concrete to a storage container in which the concrete is buffered independently of the production cycle. The concrete is then transferred directly into the Atlas' concreting system via a conveyor belt. The container mould of the Atlas is located below ground for the overhead filling. The concrete is thus poured into the mould evenly from the hall floor level, from the uppermost edge of the container down to the container base at the finish. If sufficient concrete has been poured in, a reinforced sheet steel construction with the same elliptical shape and size as the container is placed on top by means of an overhead crane. This is then automatically clamped to the container mould and compaction takes place again.

Afterwards the entire mould is lifted out of the production plant by means of an overhead crane with the steel cover still clamped to it. The mould is subsequently taken by the overhead crane to the desired area in which the fresh concrete container is to harden. During transport the complete mould is turned by 180 ° so that the container is set down in its correct position on the sheet steel construction. The clamping of the container mould is released and the mould is carefully pulled vertically upwards until the fresh concrete container is standing free.

The container mould is taken by the crane back to the Atlas and inserted into the plant again. Following the application of a release agent and the insertion of a reinforcement mesh for the container base, the mould is ready again for the next cycle.

Up to 60 thin-walled containers daily in top quality.

Zelus automatic casting machine

The production sequence with the Zelus is based on a circulation system, in which a crane robot fully automatically manages numerous battery moulds with dimensions of up to 6,000 x 3,000 x 1,200 mm and supplies them to the individual work positions such as feeding station, filling station or demoulding station or removes them in order to return them to the mould store.

Using self-compacting concrete the Zelus offers special options for the most diverse products such as window sills, wall copings, kerbstones, panels, U-channels, lightwells or also slabs, such as the concrete covers for the concrete containers at O Beton.

The fully automatic Zelus production line for the processing of self-compacting concrete is also supplied with concrete by the Rekers bucket track. The concrete is poured into a voluminous concrete distributor on whose underside a total of 14 dosing valves ensure very precise discharge of the concrete. Products with maximum dimensions of 6,000 x 3,000 x 1,200 mm can be manufactured with the Zelus. The cycle times are normally around three minutes.

After demoulding the mould is put back into the workstation and the next product can be manufactured.

Zelus plant from Prinzing with concrete feeding and crane robot

The crane robot places a battery mould in the concreting station. A mesh reinforcement has been placed inside the elliptical cover mould beforehand and recess bodies keep the subsequent openings in the cover free of concrete.

Now the concrete distributor drives once completely over the mould and fully automatically opens the valves which are momentarily above the mould. The mould is thus filled evenly with concrete. The manual distribution of concrete in the flat mould is not required. With the Zelus, moulds can be filled fully automatically for all product geometries, independent of the number of recesses and mould shapes. Very accurate dosage is achieved with a filling height tolerance of only +/- 1 mm.
The filled mould is removed by the crane robot and intermediately stacked for hardening. Subsequently, the robot places a new mould in the concreting station and the next cover can be concreted.

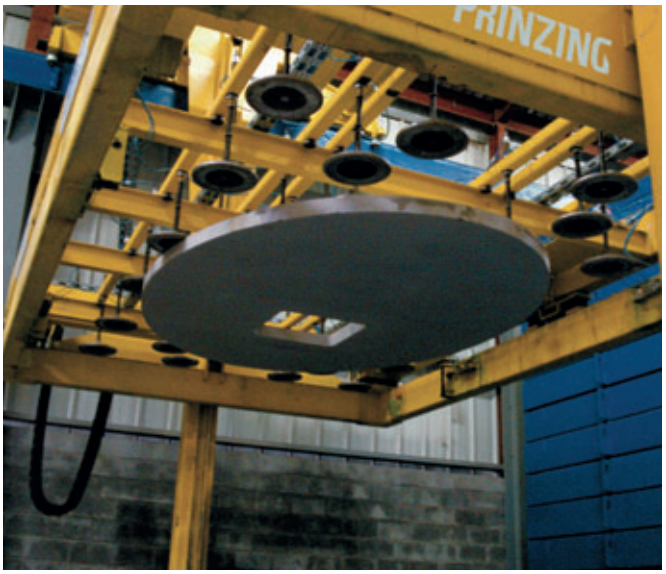
The mould store managed by the crane robot can hold up to 130 battery moulds in the standard version. A sufficient number of covers for the targeted 80 containers per day is thus guaranteed.

The finished, hardened covers are later placed on top of the containers of the appropriate size. The dimensional accuracy of the container walls and the covers is so high that the covers are only sealed with mastic. Further measures are not required according to O Beton. The result is an absolutely watertight container that can be transported in this way to the place of installation.

High utilisation of production plants and increase in quality in all areas

Following the production of the first containers at the end of 2012 using the new Atlas and Zelus production plants from Prinzing, pro-

The fully automatic Zelus casting plant fills the mould with self-compacting concrete via individually controlled pinch valves



The hardened container covers are removed from the mould using vacuum gripping technology.

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A crane robot fully automatically manages and operates the mould store of the Zelus casting plant.

The finished concrete containers are loaded onto trucks for transport to the building site.

The two owners of O Beton, Gerdi Vankeirsbilck and Odiel Vandenbulcke

duction has now started up really well. The employees are well trained and have 'got a grip' of the new production technology. The new central mixing plant at O Beton produces concrete of very high quality for all product areas, also to the company's complete satisfaction. The investment into modern plant equipment seems to be paying off quickly for O Beton.

FURTHER INFORMATION

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