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# Flexible production of large format concrete precast components for water resources management in the Gulf of Oman

Most recently, concrete precast components used for surface drainage, infrastructure construction and waste water draw-off are being produced in the Sultanate of Oman at an Exact XL production plant with especially flexible equipment supplied by the Austrian equipper Schlüsselbauer Technology. During the feasibility and profitability analysis, the manufacturer, Amiantit Oman Concrete Products LLC, was faced with meeting the requirements of a greatly changing demand for different products or component dimensions in this growth market, in addition to offering product range variability. Therefore, the new manufacturing technology to be developed had to provide perfect-quality and durable concrete components in a reliable, highly automated manufacturing process.



Large-format frame components with 2000 x 1500; 2000 x 2000; 2000 x 2500 and 2500 x 2500 mm dimensions are produced on an industrial scale at Amiantit Oman Concrete Products LLC.



By using steel set-rings, the Exact XL plant permits precisely manufactured joints on all products – pipes and frame components.

Amiantit Oman Concrete's product range includes manhole components with nominal widths of DN1200, DN1500 and DN1800; pipe with nominal widths ranging from DN700 to DN1800, and rectangular profiles with dimensions of 2000 x 1500 to 2500 x 2500 mm. The Schlüsselbauer Exact XL production system is equipped with two

casting stations that can be converted quickly, by means of hydraulic core bracings, to produce different product types or dimensions. During the first weeks of manufacturing, one station was used for circular components and the second station was used for rectangular components. While product was demoulded on one station and then



Visible product quality thanks to the use of the of set-rings; for use on concrete pipe up to DN1800.



The flexible Exact XL production plant is ready for the next pipe production cycle.

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Spigot set-rings are automatically inserted into the machine before the compacting process and remain on the product throughout the curing cycle.

when the station was being equipped for the next cycle, concrete filling and compacting was taking place on the second station. With high-frequency core vibrators, the earth-moist concrete is compacted uniformly over the entire installation height of the precast component. A robust, force-guided press allows the production of rectangular components in the same process without sacrificing quality.

The ability to produce a large variety of precast concrete components and the different nominal widths and installation heights manufactured at this plant is remarkable. In addition to having moulds for four different rectangular geometric profiles, the system is equipped with moulding technology to accommodate five different pipe diameters and moulds for cover plates in three nominal widths. Furthermore, it is equipped to produce manhole rings in three nominal widths and ten different installation heights ranging from 300 to 1500 mm. The maximum permissible product weight for an individual concrete precast component is 30 tons. An additional item of production equipment, a Formexact, was commissioned solely for the manufacturing of manhole bases and containers. This mobile



Frame components are increasingly used in infrastructure construction and are especially used in road construction to prevent flooding by high flow rates during heavy rain events.

production station, equipped with a shrinkable core, gives the option of installing stirrups or crampons.

This type of Exact XL system enables the production of concrete pipe with and without liners and at the lowest conversion costs. Furthermore, the use of set rings ensures very high quality spigots of all product types and exact joints to comply with very low tolerances. The dimensional stability is a crucial criterion for both high-quality pipe as well as high-quality manhole constructions. For the manufacturing of manhole components, climbing aids can be directly installed by the Exact XL system, or it can produce products furnished with appropriate pre-punched holes. The maximum product overall length for this type of system is 3600 mm. Concrete precast components with an overall length of up to 2500 mm and maximum nominal width of 3600 mm are manufactured in the area of Muscat. Only two employees are required to operate the two production stations, including the lowering of the products and equipping of the moulds.



Amiantit Oman, which specialises in the construction sector, was established in 1974 and employs more than 900 staff. About 80 of these employees are at Amiantit Oman Concrete Products LLC.



Even large format manhole components are manufactured on the Exact XL production line.

For Amiantit Oman Concrete Products, the installation of Schlüsselbauer's Exact XL flexible production system constitutes a future-oriented investment that enables a rapid response to the changing market requirements over the next decades. Even in the short term, the manufacturer can now achieve low operating costs with the system due to reliable processes and low staffing costs. The efficient production of large volume concrete precast components is reflected in the extremely low, cost-effective ratio of working time to volume produced. And as a result of high concrete compaction and plane-parallel moulding of spigots using steel set rings, Amiantit Oman Concrete Products benefits from visible product quality of the immediately demoulded concrete precast components.

Water management issues are strategically significant to the national economy of the Gulf of Oman. This includes, on the one hand, the creation of an infrastructure such as resilient pipe and safe outlets in road construction to deal with the few concentrated heavy rain events. And on the the other hand, in the area of wastewater management, a changeover from occasional recuperation of wastewater by tankers to a continuous dissipation in corresponding pipelines is also useful in the long term. At Amiantit Oman Concrete Products, preparations are being made for these developments in infrastructure construction, water supply and wastewater disposal. Thus, in addition to the production system for large-format precast components described here, in the past year a complete system for the manufacturing of concrete pressure pipes with internal steel cylinders and wire pre-tensioning has been commissioned by Schlüsselbauer (extensive report in BWI 01/2013).

### FURTHER INFORMATION

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