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15 Years of Monolithic Manholes – a Success Story of High-Quality Precast Concrete Products for Rainwater and Waste Water Sewage Systems

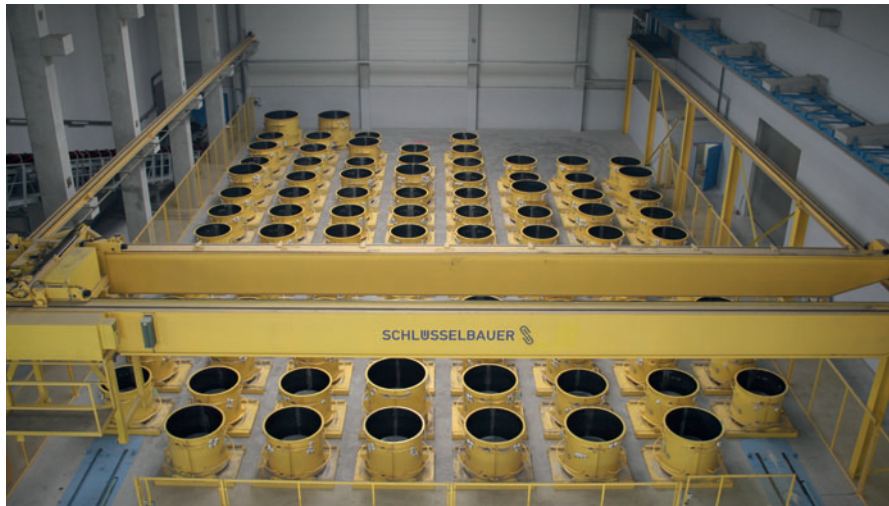
■ Christian Weinberger, Schlüsselbauer Technology GmbH & CoKG, Austria

Obvious weaknesses in sewage systems in general, irrespective of the materials they use, as well as increasing quality expectations in terms of precast concrete products in particular, marked the start of a new era of technology 15 years ago. The Austrian system manufacturer and developer, Schlüsselbauer Technology, first showcased a method for industrially manufacturing custom-made mould-hardened concrete manhole bases. After first being installed in precast plants in France and Germany, the manhole bases soon penetrated markets in most countries across Europe and North America under the brand name Perfect.

Meanwhile, the brand name became synonymous with reliably watertight, monolithically manufactured concrete parts. In addition to concrete manhole bases, the brand portfolio comprises other manhole components and pipes which are factory-made with or without corrosion protection in the form of a HDPE lining. Schlüsselbauer Technology is focusing on the impressive range of durable concrete products for different variants of sewage systems as well as options for gradually automating their manufacturing in their presentation at bauma 2019.



Components adapted to individual requirements, efficiently produced using automated manufacturing – a special feature of Perfect Forming Technology.



While mould-hardened components have been produced for decades in the form of single production, Schlüsselbauer Technology has developed systems for mass production using self-compacting concrete.

Market Success as a Measure of Innovation Capacity

The constant development and improvement of products and technologies in all areas of the economy is interrupted time and time again by major innovations, the relevance of which can usually only be objectively appreciated in retrospect. Depending on whether an innovation becomes established in the long term, it becomes a significant driver of growth - or just the opposite. In recent years, developments in concrete composition, such as the concrete quality required for visible concrete surfaces, in processing technology or in the variety of final products can be observed in the concrete industry. All these developments have already contributed to Perfect Forming Technology, a method for manufacturing custom-fit mould-hardened precast products, enabling it to evolve and become established relatively quickly. The users of this method consistently include the leading innovators in their markets, and the increased product quality provides the basis for their market success, even during economically volatile periods. After 15 years, the Perfect method of manufacturing individual monolithic concrete manhole bases is one of the most common production system in this market sector worldwide by quite a margin. By developing the technology to include shaft superstructures and pipes, the Perfect Forming Technology method offers manufacturers many options to expand their own product ranges.

Individual Manholes & Standardized Pipes in One System

Owing to differences in level, changes in direction, connecting different types of pipe, etc., it is intrinsic to manhole structures that components need to be adapted to individual requirements. When installing pipelines, it is sometimes necessary to precisely adjust the reach lengths. In the past, customized length adjustments to concrete pipes might have been a competitive disadvantage compared with other products. The need for that can be easily prevented using new manufacturing methods and by practically planning construction work. Rather than the length of adapter pipes, it is in fact the suitability for different environmental conditions (soil properties, traffic loads, etc.) that needs to be taken into account when planning the project and selecting materials. The wrong decision at this stage cannot be rectified later



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Perfect manhole base manufacturing is also characterized by high-quality components that are ready for shipment in a short space of time.

on in construction, even if the company carrying out the work is taking responsibility for the proper completion of the construction project. Concrete therefore is a robust material with static properties that remains unchanged considerably, which is an integral part of durable sewage systems. Thanks to innovations in concrete technology and the flexible Perfect Forming Technology manufacturing system, producers of precast products can manufacture both mass-products such as pipes and custom-made products such as custom-fit manholes, special constructions or adapter pipes in a demand-driven and therefore economical way.

Added Value from Concrete Technology and Material Combinations

Developments in concrete technology allow for more stringent quality requirements for components in engineering and

construction, and also allow for processes in precast product plants that could not be achieved in the past, in terms of profitability and quality assurance of each individual product. Besides the increased component quality of monolithic products that are manufactured solely from concrete in one pour, there is now also the option of combining materials, which is simpler and improves final product properties. Therefore, for applications involving contact with aggressive media, such as mixed-water pipelines or waste water pipelines, concrete parts are provided with permanent corrosion protection in the form of the Perfect HDPE liner. The concrete-HDPE composite Perfect Pipe is another innovation that has been used in many pipeline projects in Asia, Europe and North America since it was first presented at bauma 2010 (see CPI 3/2010). In open trenches as well as pipe jacking, this meanwhile well-established pipe system ensures that waste water is reliably drained away, particularly when fluctuating flow volumes are involved, thanks to the permanent corrosion protection in the concrete pipe.

The next step in the innovation of the Perfect Pipe system will be presented by Schlüsselbauer Technology at bauma 2019. A jacking pipe with a HDPE liner rigidly anchored in the concrete and a flexible synthetic push-in connector in nominal width DN1500 is opening up new options beyond the normal entry diameter spectrum. Now, for pipe diameters up to 1,500 mm, liners do not need to be welded on site. As a result, higher installation rates can be achieved whilst at the same time reducing costs. The Perfect Pipe joint system with inner and therefore protected sealing surfaces offers advantages to everyone involved in infrastructure projects, whether they're working in an engineering consultancy, in local government, or in companies carrying out the work. And last but not least, there is the possibility of generating added value in precast concrete product plants through future-oriented manufacturing of components for sewage disposal!



It's simple to guide parallel lines through a base part using Perfect manholes.



The Perfect production system can be used to economically produce manhole bases, and also special constructions such as spring tapping equipment.



Sealed connections are just as important in infrastructure installations as in waste water manholes - both are simple to manufacture using Perfect Forming Technology.

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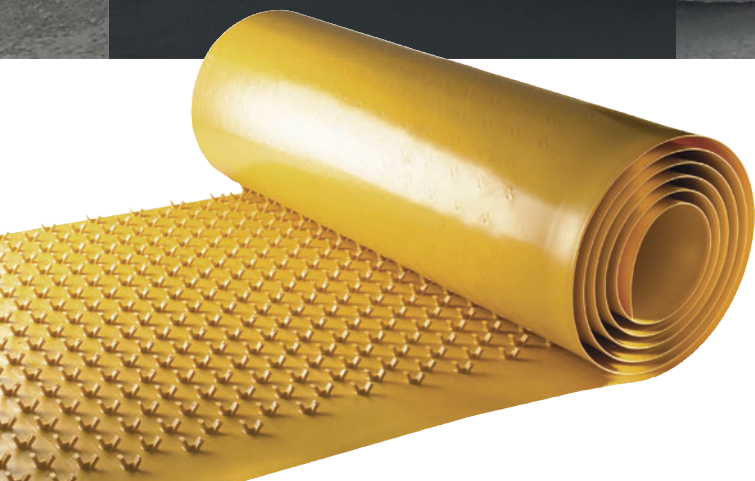
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The profitability of manufacturing is largely depending on intelligent processes and coordinated automation of relevant processes.

Perfect Forming Technology - Used Worldwide, Successful Worldwide

The flexibility of Perfect Forming Technology is demonstrated by several criteria. First of all, in the manufacturing of Perfect manholes, all channel and pipe-connection variants required for a public sewage system can be converted in simple steps. Complex components such as manholes for spring tapping or for applications in communication, energy, and transport industry can also be produced. Through intelligent moulding, basic requirements for the geometry of the component (round, oval, square, etc.) can be met just as easily as requirements arising from everyday manufacturing, such as easy operation and cleaning. Plant equipment can range from predominantly manually operated workplaces through to largely automated manufacturing. It is often helpful for manufacturers to be able to increase both the manufacturing capacity and the level of automation in stages when required.



Schlüsselbauer Technology has over 15 years' experience in the optimal processing of self compacting concrete (SCC) in its plants.

For various requirements, Schlüsselbauer Technology offers technical concepts tailored to the specific application coupled with the reliability of a family owned company committed to its customers and employees. This forms a solid foundation for a long-term collaborative partnership with knowledge of the persons directly responsible. From its two company sites in Austria and the USA, Schlüsselbauer customers around the world are directly supported in all their projects, from concept development through to services.

Fully Automated Manufacturing of Mould-Hardened Components in New Zealand

Schlüsselbauer is currently commissioning a complete plant in New Zealand with a production line with very high flexibility and capacity. To produce a wide range of precast concrete components an automated manufacturing is set up in which both mass-produced products and components in lot size 1



The Perfect Pipe concrete waste-water pipes with a HDPE liner are widely used in Asia, Europe and North America.

are cycled in by an intelligent production controller in such a way there is always maximum output with minimal input of man hours. Besides optimizing all processes, key elements of this currently unique production plant are the multiple filling of casting moulds with moulding of all joints using steel pallets. The plant takes over all the processes making sense to optimize. By investing in a new manufacturing site fitted with Perfect Forming Technology, the New Zealand manufacturer Hynds Pipe Systems, is setting the course for the company's continuous development as an entrepreneur and quality leader in the market.

This plant represents a milestone in the automation of production systems for mould-hardened concrete components. Although former plants have been fitted with systems for mass-producing manhole bases or pipes too, the manufacturing system that has been implemented for Hynds Pipe Systems now makes it possible to adjust the production program on a daily basis without compromising on product quality and without affecting the profitability of the plant.

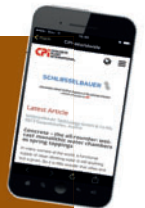
Adrian Hynds, owner of Hynds Pipe Systems, said his expectations had been more than met following plant installation and start-up. "The move towards simultaneous optimization of product quality and manufacturing efficiency was implemented in cooperation with Schlüsselbauer. The Schlüsselbauer technicians entrusted with planning and executing the plant conducted themselves in a very professional manner. All of our requirements have been met, and many details have even been improved further than expected. I can see a strong basis for long-term collaboration!" ■



SCC manufacturing, which is one of the world-leading in terms of flexibility and capacity, will be put into service in New Zealand.



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