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American Concrete Products Co. is investing in the highly efficient production of corrosion-resistant concrete wastewater pipes

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After a year of gaining experience with the Perfect Pipe concrete-plastic composite pipe in select projects, American Concrete Products Co. installed a fully automatic system for the production of HDPE liner cylinders in summer 2020. This means the liners required for the innovative Perfect Pipe wastewater pipe can now be produced on an industrial scale. The "American Perfect Pipes" are produced in six nominal widths from DN 600 to DN 1500 and an installation length of 3 m at the Omaha site. The decision to invest further in this new technology was made based on specific experiences and feedback from the market. In the past, prefabricated liners were processed in Omaha and pipes were thus made available for the first civil engineering projects, but now the complete manufacturing process has been set up at the site.

American Perfect Pipe is installed in Nebraska. A corrosion-protected flexible pipe system is produced immediately after the pipe has been installed.

Decisions Based on Positive Experiences

The main wastewater collection system in the city of Smithville, Missouri was restored in 2019. GRP pipes were installed at the beginning of the project. Over the course of the installation, however, the executing firm Blue Nile Construction began running into more and more problems. Deformations and leaky pipe connections made it impossible to implement the measure according to the plan. While looking for a reliable solution for this pipeline to be constructed in inconsistent ground conditions, they made a true find with American Concrete Products Co. The Perfect Pipe pipe system offered all the required properties of a robust pipe type that maintains stability through the entire pipeline even with little lateral support due to the sandy soil. In addition to the resilience of the pipe, the continuous corrosion protection in

In contrast to conventional concrete pipes, production takes place on a needs-based manner, with correspondingly low stock levels and tied-up capital.

The fully automatic HDPE liner welding system from Schlüsselbauer Technology supplies liner cylinders from DN 300 to DN 1500 for a max. pipe length of 3 m.

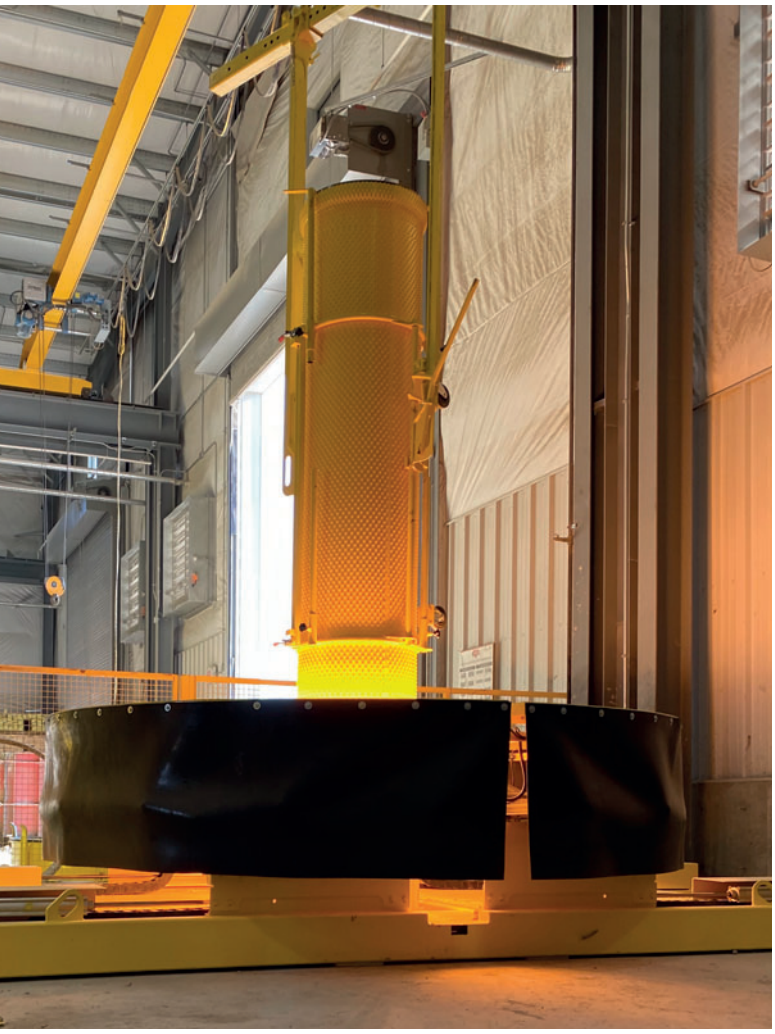
the pipe and in the flexible pipe connections as well as the simple installation were important for the construction company. Details about this measure where GRP pipes DN 900 were replaced by the American Perfect Pipe can be found on the website of American Concrete Products Co. (www.amconco.com/projects/1/2/utility-projects/smithville-mo-wastewater-treatment-facility/).

The feedback from this and other projects reassured the decision makers from American Concrete Products Co. and the owners of Enterprise Properties Inc. about their intention to prepare themselves for future requirements in the pipeline market via new technologies. After taking over the production site from a traditional concrete pipe manufacturer, Enterprise Properties Inc. endeavored from the beginning to introduce new and promising civil engineering products in addition to the tried-and-tested concrete pipe. While in the USA small pipe diameters are also increasingly being produced as plastic pipes, there is great market potential for concrete pipes, not least due to the ever-present high demand for new building construction. However, requirements are changing in both areas – surface drainage and wastewater discharge. "Zero leak"–the absolute water-tightness of pipelines–is now not only required by planners, but also consistently checked during implementation. This is a development that benefits quality-focused manufacturers such as American Concrete Products Co. and which has now spread to the entire nation, as demonstrated by the installation of this plant in the Midwestern state of Nebraska.

Insights into Needs-Based Production

As a first step for Perfect Pipe production at American Concrete Products Co., a liner sheet corresponding to the diameter is cut from a coil whose width corresponds to the subsequent length of the pipe. This HDPE sheet is moulded into a cylinder in the system supplied by Schlüsselbauer Technology and welded fully automatically. This ensures the consistent high quality of the weld seam and thus the tightness of the liner. The ends of the liner cylinder are then heated and moulded in a thermoplastic process. This creates the mount for the connectors to seal the pipes. The prefabricated HDPE cylinder is pushed over the shrink core of the casting mould

After the welding and cooling phase, the liner cylinder is ejected from the machine and is immediately ready for the next production step.



The ends of the liner cylinder are moulded in a thermoplastic process to make room for connecting the Perfect Pipe Connectors with external seals.

and fixed in its circular cross-section by widening the core. After inserting the reinforcement cage, the casting mould is closed and filled with self-consolidated concrete. The pipes with the fixed liner connection in the concrete harden in mould. This permanent bond is created through numerous anchors on the back of the liner. American Concrete Products Co. can manufacture two pipes per day per casting mould using the Perfect Forming Technology system. A hydraulic turning gripper is used for demoulding, which removes the pipes from the mould. As the final production steps, the connectors with external tilting lip seals are mechanically pressed into the bell and a label is adhered to the pipes which provides information on product and production data.

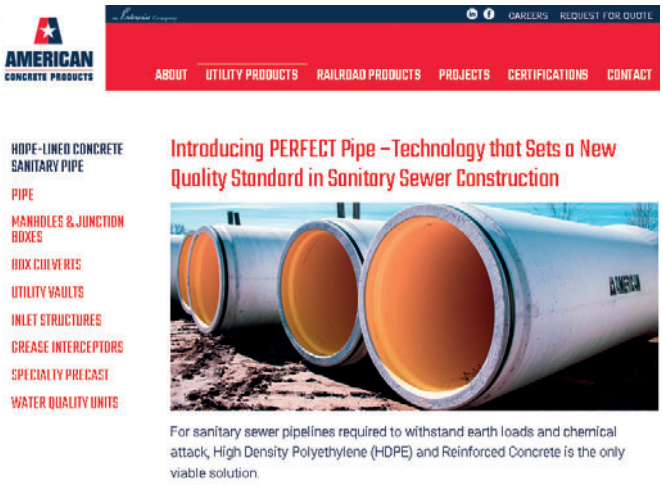
Additional consulting services from American Concrete Products Co. will be required for customers since Perfect Pipe will be used to specifically supply those wastewater drainage projects for which concrete pipes are generally no longer considered to be sufficiently resistant to biogenic sulfuric acid corrosion. Decision-makers in communities and the executing companies for planning and installation must first be made aware of the advantages of the new type of pipe. This phase of the introduction and consultation gives American Concrete Products Co. the opportunity to promptly adapt to specific requirements and to produce in a needs-based manner. This is particularly advantageous for the manufacturer during the market launch phase, since barely any additional capital is tied up through large-scale storage. The same applies to the manhole components in these projects. Perfect manhole manufacturing has also been in operation at the Omaha site for several years, where custom manhole bases are also produced as needed (see report in CPI 01/2019).

Efficient Production and Efficient use of Resources

The higher corrosion protection for wastewater pipes—which is being increasingly required—places high demands on pipe manufacturers. This is becoming increasingly relevant for concrete pipe manufacturers, as demonstrated by a number of tests from recent years, in which pipes must have a higher surface resistance to chemicals through coatings or additives in the concrete mixture. Protection via liners also shows a wide range of attempts to solve the problem of corrosion protection. We can now look back at a variety of coating, additive and liner variants which have proven to be impractical for long-term use. The reasons for this may lie in technical failure, an inadequate cost-benefit ratio, or both. New approaches to concrete pipe corrosion protection often failed to meet even the basic requirement for simple and clear traceability of the existing protection. It was at this point that the development of Perfect Pipe began.

Corrosion protection must be identifiable and easy to measure even after decades of use. The protection system must naturally have a reliable, strong connection to the concrete pipe. Last but not least, the protection system must also be economically beneficial. All these requirements are met through the minimum wall thickness of the Perfect Liner of

The Perfect Forming Technology moulding system for processing self-compacting concrete is a key element of the Perfect Pipe production process.



www.amconco.com/utility-products/perfect-pipe

Construction companies value the simplicity of the Perfect Pipe installation. Regardless of the trench depth and the soil properties, the correct installation of the pipeline is much easier than with flexible pipes made of GRP or plastic.

1.65 mm and the large number of anchors on the back of the liner. The thickness is sufficient to achieve a 100-year service life with a high level of security assuming the normal amount of abrasion. The number of anchors is selected so that the Perfect Liner has a very high extraction force. The wall thickness of 1.65 mm is also ideal for efficient production. Processing is reliable with consistent high quality, and material consumption can be kept to a minimum. If a pipeline is removed, the materials used can be recycled, avoiding the need for disposal of problematic materials. In the overall context of "use of resources + technical implementation + economic suitability", Perfect Pipe now provides concrete pipe manufacturers with a solution to the aforementioned corrosion protection problem. In addition, the company's own range of services is expanded to include a product with high growth potential.

Perfect Forming Technology

The mould system developed by Schlüsselbauer Technology with the introduction of the Perfect manhole bases forms an essential foundation for the production of the Perfect Pipe concrete-plastic composite pipe. Regardless of whether moulds are used in small batches or whether dozens of moulds are part of the fully automatic production concept, the result is always a high-quality concrete pipe. The same applies to the pipe geometry and installation variant. Regardless of whether bell-shaped joint pipes, foot pipes or jacking pipes are needed, these can also be manufactured together in one production plant with mould hardening. Details in the casting moulds developed by Schlüsselbauer Technology, such as the maintenance-free shrink core, make up the special advantages of Perfect Forming Technology and their effects are evident in the end product. Owing to the continuous development of mould technology, both the quality of the end products and the profitability of large-scale wet cast production are continuously increased. ■

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