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# Production of concrete pipes with PE corrosion protection starts in Cambodia

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The company Phnom Penh Precast Plants Co., Ltd. is undoubtedly among Southeast Asia's most innovative manufacturers of concrete products. Since the company was founded in 2013, innovations have been implemented in remarkable speed in all their business segments, including concrete pipes, concrete poles, PHC piles and box culverts. The flare for innovation that forms the core of the corporate philosophy is omnipresent the company; in line with this mindset, the company constantly searches for and evaluates new products and technologies, and consistently implements economical solutions. The rapid introduction of new products is based on research into current developments around the world and collaboration with globally active partners. The company's latest innovation leap concerns the jacking pipe product segment, which is playing an increasingly important role around the world and in Cambodia itself. Until now, the pipes for this installation method had to be imported from other countries. The decision-makers at Phnom Penh Precast Plants recognized the growing demand early on and also the advantages of the

pipe type Perfect Pipe, which has been launched in Singapore back in 2015. The company ordered an appropriate production plant from Schlüsselbauer Technology, which they have been using to produce premium-quality concrete/plastic composite pipes for microtunneling since spring 2020.

The relevant dimensions of the robust pipes needed for the current civil engineering market in Cambodia for trenchless installation/microtunneling range from DN300 to DN700. According to the project requirements, the pipes can be produced with overall lengths of 2 m or 3 m. In each case the required length of the HDPE liner is first cut of a coil, rolled and welded into a cylinder. To create a flexible joint in the finished pipe, both ends of the cylinder are expanded in a thermoplastic process. The resulting recess, formed at both ends of the cylinder is exactly dimensioned for insertion of the plastic connector, which reliably seals the pipe against leakage and water ingress with two external gaskets. This technology eliminates the need to weld the pipes on the construction site as



User-friendly molds of the category Perfect Forming Technology from Schlüsselbauer in production at Phnom Penh Precast Plants, Cambodia



The thermoplastic forming of the liner cylinders is an essential step in the production of Perfect Pipe



*The Perfect Liner is placed on the expandable core*



*Perfect Jacking Pipe—cured after a few hours in the casting mould*

the pipes are already joined with connectors providing a sealed and ready-to-use pipeline. This is all the more important in pipe jacking since welding works on site need significant subsequent labor and safety measures which represent an enormous cost factor.

After the HDPE cylinder is manufactured, it is mounted on the shrinkable core of the casting mold. The steel molds have split outer molds, running on rails for easy operation by just one worker. After application of a separating agent and inserting the reinforcement cage, the moulds are closed and filled with self-compacting concrete. After just a few hours, the cured pipes are demolded and the molds are prepared for the next production cycle. At Phnom Penh Precast Plants, an indoor gantry crane is used to move a manipulator with a hydraulic product clamp over the moulds in order to demould the pipes. The manipulator removes the pipes from the moulds safely and gently and moves them into the required position for installation of the connectors and for final quality control and labeling.

The corrosion protection material HDPE, which is used by Phnom Penh Precast Plants in the jacking pipes, has a thickness of 1.65 mm and several fundamental properties for protecting the concrete pipes. The extraction force of the Perfect Liners with optimized thickness is 0.9 N/mm<sup>2</sup>, making them one of the strongest anchored material for concrete corrosion

protection compared to other systems with comparable approaches available on the market. This is crucial to the cost-effectiveness of the product and the service life of pipelines, which is usually designed for several decades. The same applies for the abrasion resistance and high pressure cleaning resistance. And, last but not least, the tightness of the flexible pipe joint created with the connectors is tested for usage in water conservation areas, such as in Germany. In Singapore, the fixed connection of the robust concrete component with the durable plastic lining led to Perfect Pipe becoming the preferred material for pipe jacking within just a few years.

The international network of Phnom Penh Precast Plants and its receptiveness to innovative concepts as well as partnerships spanning different cultures and countries were important prerequisites in ensuring that very little time passed from the initial ideas through to the implementation of local production in Cambodia. During bauma 2016, Phnom Penh Precast Plants started to focus on the product and production concepts developed by Schlüsselbauer Technology. They quickly decided to analyze the business area of pipe jacking/microtunneling in detail and soon realized that this pipe concept could be used to set quality standards for decades to come. In an equally short and intensive consultation phase, the product spectrum and the most appropriate production concept were agreed on, so that the investment decision could be finalized in spring 2019—once again at bauma in





Phnom Penh Precast Plants is currently using the Perfect Pipe technology in the inaccessible diameter range up to DN 700

Munich. The world's largest construction industry trade fair also offered the owners and representatives of Phnom Penh Precast Plants the opportunity to reassure themselves that Perfect Pipe would put them among the world's innovation leaders.

"Go for the Best" and "The strength to drive it through" are key elements of Phnom Penh Precast Plants' innovation strategy. On one hand, going for the best demands the requisite expertise in the company's respective service areas. On the other hand, it also requires the will and determination to convince partners in the civil engineering value chain of the benefits of innovation and to leave behind traditional, outmoded practices. The innovation that can be seen at Phnom Penh Precast Plant combines both elements. And Phnom Penh Precast Plants' entrepreneur role in its home country manifests itself in multiple ways, including recognition by local media or through its membership in international associations.



The delegation from Phnom Penh Precast at bauma 2019



For example, in April 2019, a detailed report on the bauma delegation was published in the Phnom Penh Post and Phnom Penh Precast Plants is also active as a "satellite member" of the American Concrete Pipe Association (ACPA).



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FURTHER INFORMATION



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