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Broader markets – further nominal widths: Concrete-plastic composite pipe system with connector now available up to DN1200

In 2014, the Perfect Pipe system, which has been used in civil engineering in Germany since 2013, was expanded with pipes in nominal width groups 2 and 3, according to DIN EN 1916 and DIN V 1201 standards. Characterised by the firmly anchored HDPE liner in the concrete and the efficient plastic connector, the piping system is now available up to a nominal width of DN1200. In 2014, the manufacturer Beton Müller installed a partly-automated production line with moulds at its Gündlingen site to produce prebed concrete pipes from DN700 to DN1200 according to specific project requirements.

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Beton Müller started the production of Perfect Pipe as early as 2012, in nominal widths from DN250 to DN600 (as reported in the CPI's 3/2012 issue). The first two years at Beton Müller were dominated by the product certification and market launch. During that time additional market requirements were consistently tested by Schlüsselbauer Technology who is the developer of the new production technology, and who also pressed ahead with relevant new and further developments. Following the initiation of fully automatic pipe production up to pipe diameter DN600 and the ongoing market launch, the time has come to make larger concrete pipes with a resource-efficient liner and well-proven connector available.

Since pipes with a nominal width of up to DN1200 – whether for use in trench construction or pipe jacking – must be produced by nature in smaller quantities and typically project-related, Schlüsselbauer was faced with the issue of appropriate automation. The aim of this was to relieve as much of the workload as possible from the workers involved, on the one hand, and to optimise the costs for the necessary production technology – measured in the potential production capacity – on the other hand. Schlüsselbauer has developed the suitable concepts at multiple R&D stages in order to consider different product lines or various production capacities in efficient manufacturing solutions. Around a year after the intensive launch marketing of Perfect Pipe, Beton Müller decided to expand its own product range as soon as possible with the now available larger concrete-plastic composite pipes. Just like in case of the pipes from DN300 upwards, Beton Müller uses the additional production technology to produce wet-cast concrete pipes without a liner also.

The decision of Beton Müller to press ahead with the market launch of Perfect Pipe subsequently, by expanding its product range, was also primarily based on the positive feedback received, not just from the narrow regional sphere of the company. Following initial projects in further states in Germany and ongoing work in France and Austria, civil engineers from the neighbouring country of Switzerland, had also drawn their attention to the high-quality sewerage pipe, manufactured in Baden-Württemberg. After Beton Müller unveiled its innovative concrete pre-cast components at the Swissbau trade fair in Basel, in January 2014, the possible applications were tested immediately in forthcoming pipeline projects. And it was a success. Only a few months after the presentation at the trade fair, Perfect Pipe was used in Zurich in summer 2014 for installation of a sewerage system, marking the first time in Switzerland.

The anchors cast firmly in concrete ensure safe handling of the robust concrete pipes, with or without liner

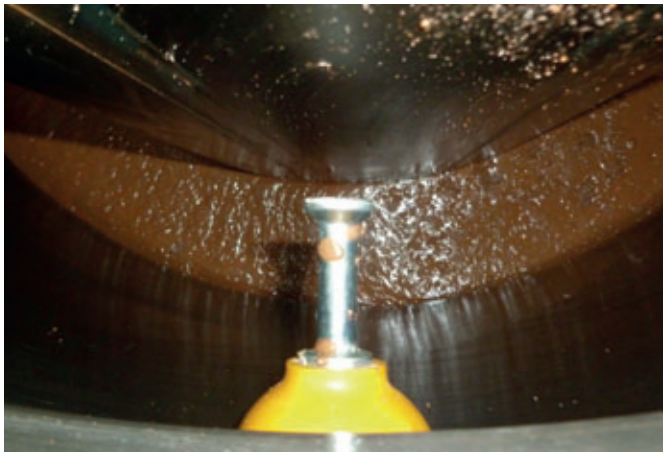
Even pipes in nominal width classes 2 and 3 are now manufactured as prebed pipes – DN800 concrete base pipes are shown in the image

To produce pipes with nominal widths from DN700 to DN1200, Beton Müller commissioned multiple moulds in a lowered hall area

Concrete as a future-orientated loadable composite material in civil engineering and superstructures

In Zurich, approximately 89,000 m² of living space is under construction, resulting in 800 rental apartments and 200 student rooms, covering an area of more than 7 hectares. The total letting space, including the commercial units for offices, shops and restaurants, amounts to around 97,000 m². And, although at least 700 car park spaces are also being made on the site, there will still be enough green space for leisure and relaxation among the buildings. All in all, the mixed-use site represents a challenging task for all firms that have been contracted for planning by the developer, Zürcher Freilager AG. As a full service general contractor, Allreal Generalunternehmung AG, Zürich, is in charge of the major project, worth a total of CHF 360 million. Whereas the building and open space concept and design were divided into five sub-areas to be contracted to different companies, the responsibility for implementing all of the civil engineering measures, lies with Eberhard Bau AG, Kloten, as the civil engineering general contractor. For both the architects working on the buildings as well as Basler & Hofmann AG, Zürich, contracted for the infrastructure planning, concrete served as the predominant material for the construction of the new long-living accommodation. The prevalence of this material can be justified on the basis that it forms an ideal compound as a load-bearing, reinforced pre-cast concrete component in the building or just as a high static load-bearing element in a corrosion-resistant concrete-plastic composite pipe. In the case of the sophisticated and extensive wastewater network in the area, planners opted for the rigid and thoroughly corrosion-resistant sewerage system Perfect Pipe.

In this specific case, the piping was laid on open terrain and in particular the welding of the PE pipes that were originally envisaged had to be avoided. In the past, welding had always slowed down the installation seriously, moreover external specialists had been needed to accomplish the welding required – another time and cost issue. In this case, instead of welded PE pipes, PE inner layer, firmly anchored in concrete, was used which is one of the main components of the Perfect Pipe system. The pipe connection was manufactured quickly, easily and – most importantly – dependably, using



By filling the moulds with fluid concrete, built-in components such as transport anchors are completely encased in concrete

Pipes of the 3 m standard construction length and joint and fitting pieces are made wet-cast in equal measure

As a basis for an adjacent redevelopment, DN800 prebed concrete pipes were produced in Achern, Baden-Württemberg, some with pre-made connections for side branches on the same invert

The progress of construction work – laying, filling, compacting – was significantly increased through the use of Perfect Pipe with connector in this major construction site in Zurich as described

plastic connectors. Robert Merk, the site supervisor for Eberhard AG regrets not having used the new Perfect Pipe from the very beginning of the project in 2013. "If we had known about this system at the start of the construction, we could have saved a lot of time. Now we cover 50 metres per day. And with the experience that we have acquired, we'll be able to work even more swiftly next time." Due to laying parallel lines of pipes with nominal widths DN400 and DN500, and the installation of numerous Perfect manhole components, the construction of underground sewer infrastructure is largely completed. Another aspect in favour of using prebed Perfect Pipe was the protection against buoyancy when filling the embedment. The weight of the concrete pipe itself renders buoyancy protection superfluous, compared to flexible plastic pipes. And the base pipe with middle notch remains in a stable position from the outset.

In addition to the static benefits of Perfect Pipe, which were decisive for the engineers in choosing the material in terms of integrated corrosion resistance, employees of Eberhard Bau AG are primarily concerned about suitability for installation. "Working with these pipes was a very pleasant experience for us. You can't really go wrong, and they are also highly safe to handle," says Peter Frei, the foreman for Eberhard Bau AG. This is, amongst other things, because of the two spherical head anchors set in concrete in the apex of the pipes. "You don't need to find the balance when unloading and lowering. So, there is no risk of tipping and falling if the robust pipes are dangling from the chain." The Freilager Zurich superstructure is expected to be completed by 2016. The history of the former bonded warehouse in the Albisrieden area of Zurich dates back 90 years. From 1924, the bonded warehouse was operated by Zürcher Freilager AG with the aim of promoting Swiss trade in general and transit trade via Zurich in particular. Two of the remaining original buildings from 1925 have now been gutted and they will be earmarked together with ten new buildings of a variety of types, layouts and material usages, with a central building material – concrete.

In addition to the concrete-plastic composite pipes, Beton Müller also supplied customised Perfect manhole bases to Zurich

FURTHER INFORMATION

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