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Fachgemeinschaft Guss-Rohrsysteme

NEWSLETTER

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Dear Readers,

permanently filled pipelines from culverts present the operators of disposal networks with a special task: they are difficult to inspect. Hans-Jörg Schulz and the team from Stadtentwässerung Koblenz faced this task, the inspection of the Mosel culvert with two ductile cast iron culvert pipelines. With great expertise and a great deal of personal commitment, they have successfully demonstrated that even after 44 years of operation, the culvert pipelines have hardly changed and can continue to be operated. Reason enough that this special project was awarded the "Golden Manhole Cover" by the IKT Institute for Underground Infrastructure.

The situation is probably different with butterfly valves and control elements in drinking water networks: They must be easily accessible! At the same time, however, they should enable the safe operation of drinking water networks for a long time and with low operating costs. Important design details that support these requirements are concealed in the valve housings. A contribution on the refurbishment of a distribution structure of Trinkwasserversorgung Magdeburg GmbH, in which Roco Wave butterfly valves were used, and a contribution on the visualisation of the functionality of a Type 7015 plunger valve (RKV), shed light on the situation.

The fact that ductile cast iron pipes with cement mortar coatings are still the first choice for the new construction of drinking water culvert pipelines with trenchless horizontal directional drilling technique (HDD) is illustrated by the article on their use under the Nežárka River in the South Bohemian region. Tunnelling, widening and pipe pulling were carried out in 12 days.

Enjoy and inspire reading

Yours Christoph Bennerscheidt

Always topical, always informed

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A “Golden Manhole Cover” for the inspection of the Mosel culvert

Three small Golden Manhole Covers were presented to their new proud owners Tycho Kopperschmidt (Technische Betriebe Solingen), Frank Große (Zweckverband JenaWasser) and Hans-Jörg Schulz (Eigenbetrieb Stadtentwässerung Koblenz) by the IKT – Institute for Underground Infrastructure in recognition of their outstanding achievements.

For the 15th time already, IKT has awarded the Golden Manhole Cover, the “Oscar” of the sewer industry, to special achievements of individual employees of sewer network operators such as municipal sewers, civil engineering offices and municipal utilities. The industry award is an example of what technologies, what economic dimensions and what water protection services are behind a waste water discharge that is taken for granted.

Golden manhole cover 2019 – 3rd place:
Hans-Jörg Schulz, Eigenbetrieb Stadtentwässerung Koblenz, handed over to his colleague Ralf Saftig.

Ralf Saftig hands over the Golden Manhole Cover to Hans-Jörg Schulz in Koblenz.

3rd award for Hans-Jörg Schulz, 3rd award for ductile cast iron pipes

The third “Golden Manhole Cover 2019” is awarded to Hans-Jörg Schulz from the Eigenbetrieb Stadtentwässerung in Koblenz. Because H.-J. Schulz is responsible for the successful implementation of the highly complex “Inspection of the Mosel culvert after 44 years of operation” (see also the annual journal 53 DUCTILE IRON PIPE SYSTEMS, 2019). The culvert is made of two wastewater pipelines DN 800 and DN 1250 made of ductile cast iron.

The inspection became necessary because in Rheinland-Palatinate State a proof of tightness is required for such a culvert. The purpose of the inspection was to provide this proof and, if necessary, to ensure further operation with a renovation. However, the Mosel culvert had been in operation for 44 years without any inspection and maintenance. And it was not without reason that no one had dared to undertake this venture before.

Limiting conditions and requirements

Hans-Jörg Schulz, entrusted with the solution of this delicate task, first defined the limiting conditions with which a suitable inspection procedure had to cope. It quickly became clear that an optical inspection – including the necessary emptying of the culvert – was hardly feasible. After 44 years of operation, Schulz did not want to expose the Mosel culvert to the interplay of buoyancy and supporting forces. After all, only one method proved to be practicable for this individual case. But Schulz, in cooperation with the supplier, first had to adapt this to the specific task and the currently applicable standards.

And: the basic prerequisite for carrying out the SLOFEC technology, which uses eddy current to inspect pipes from the inside for corrosion, are absolutely clean pipes. The non-destructive inspection of the pipe walls with the SLOFEC Pipe Scanner could only be carried out after demanding cleaning. And the results surprised everyone.

The two culvert pipelines made of ductile cast iron showed only slight corrosion along the whole of their outside. Conclusion: no need for renovation – not even after 44 years of continuous operation under sometimes difficult conditions with strong currents and floods!

Pointing the way

Hans-Jörg Schulz has adapted an existing technology for his special case in an innovative way and thus ventured something new. He managed the project confidently and with great skill, accompanied it with enormous technical knowledge, high personal commitment and a lot of discipline and completed it successfully. And he and all those involved have thus shown many municipalities a practicable way to determine the condition of their culverts, which were previously regarded as uninspectable.Team member Ralf Saftig was handed over the award because Hans-Jörg Schulz himself was unable to attend the award ceremony.

Renovation of a distribution building with butterfly valves DN 500 and DN 800

Trinkwasserversorgung Magdeburg GmbH (TWM) is a drinking water supplier for municipal suppliers, public utilities, associations and industrial companies in the greater Magdeburg area and the surrounding area and is responsible for the production, treatment, storage and distribution of drinking water until it is handed over to customers. TWM's facilities include 15 waterworks, 760 km of drinking water pipelines, 34 pressure boosting systems and 21 elevated reservoirs. The Colbitz waterworks is TWM's main waterworks and contributes approx. 70 % to the drinking water supply.

Renovation measure building C

As part of the investment measures to upgrade the piping system, building C, which serves as a drinking water **distribution structure** for the state capital Magdeburg and the Wanzleben supply area, was **renovated**.

Due to the technical supply significance of the building C and the complexity of the construction project, the renovation was carried out in several construction phases, but always without interrupting the supply while the plant was in operation. It included the **exchange of the pipelines** in the nominal sizes **DN 800** and the **butterfly valves** in the nominal sizes **DN 500 and DN 800** in the pressure class PN 10.

Installation of butterfly valves with bypass in long overall length

For the butterfly valves required for this renovation, TWM opted for the first-class **ERHARD butterfly valves**. These were installed in a long overall length, DIN EN 558-R15, with integrated bypass, which is used for filling and discharging pipelines. The bypass to the shut-off also has a soft-sealing gate valve. The nominal diameter of the bypass generally corresponds to 1/10 of the main nominal size, as is the case here.

Both the coating and the material selection of the butterfly valves were designed for underground installation and for drinking water applications:

- Inside and outside epoxy plastic coating EKB, layer thickness min. 250 µm according to GSK
- Material housing components made of EN-GJS-400-15, seat rings made of austenitic chrome steel
- eals made of EPDM according to DVGW, KTW and UBA

Installation of ERHARD butterfly valves mounted on the pipeline.

Final situation after the renovation measure.

Outstanding features of ERHARD butterfly valves

The proven **ROCO Wave concept** with proven details meets the highest demands for a wide range of applications. ROCO Wave has set standards in terms of efficiency and precision – quality “Made in Germany”:

- The patented and flow-optimised design of the housing and disc ensures stability and maximum economy.
- ROCO Wave has been the benchmark for the best Kv values on the market for years.
- The innovative polygon plug connection of shaft and disc is backlash-free, transmits torque without loss and ensures uninterrupted corrosion protection – another ERHARD patent.
- The unique SKG gear reliably protects against damage caused by pressure surges and is the ideal solution for safe opening and closing. It is designed and produced by ERHARD.

Extension of the ROCO Wave product range in PN 40

From October 2019, the company will expand the product range of the **ROCO Wave double eccentric butterfly valve** and now also offers this precise technology for nominal sizes DN 150 to DN 600 in pressure stage PN 40.

With this extension ERHARD continues the ROCO Wave success story of PN 10-25 and complements its standard product portfolio. The first 100 standard valves of this size, respectively pressure stage have already been installed in Germany and Switzerland in the course of this year.

Authors: Daniela Usenbenz and Sven Paetzold, ERHARD GmbH & Co. KG

How to explain the function of a control valve?

The presentation of technical products can be a challenging task for companies. On the one hand it is not merely the component that has to be represented, but also the **interplay between components** and hence their **function**. On the other hand, the advantages and particular features of the product have to be illustrated and singled out. Not least, everything has to be expressed in different language. Naturally, the **presentation of technical products** should also excite the curiosity and attention of the client and "sweep him away".

Moving pictures

Dry technical texts alone do not do the trick here – but pictures! A picture speaks more than a thousand words, but a picture is also only a momentary snapshot. The interplay of components can only be illustrated if the components are moving. This provides an opportunity to present products such as the **RKV Type 7015 Plunger Valve** to customers at trade fairs and other events. It's quite simple: with moving pictures! Because a film can best demonstrate the many carefully thought-out details for example these of the Düker plunger valve.

Components of the Düker RKV type 7015 plunger valve.

Making the invisible visible

Unfortunately, however, a real film has to be ruled out because a **plunger valve** only functions when it is integrated into the closed water pipeline with water flowing through it. And as we can apparently only make the invisible visible by "changing it around", a virtue was quickly made out of necessity and all the possibilities of modern CAD-based simulation were used. The construction data created by Düker for the new plunger valve were the basis on which the Sven and Björn Pfister from the Geminus 3D company in Gemünden/Main produced a fascinating and inspiring **animation**.

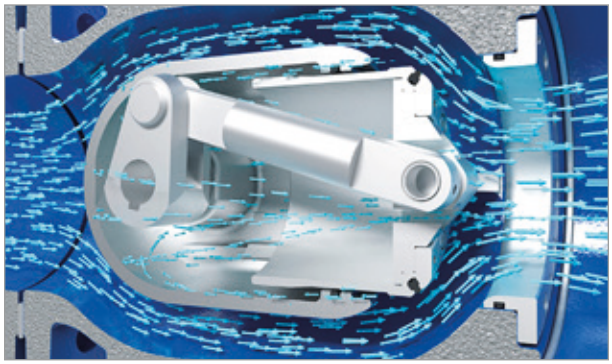
The quality of the animation with

- photorealistic surfaces,
- the true-to-detail simulation of water movements,
- the skilful emphasising of important details and not least
- some powerful music to which the scenes were accurately adapted to the scenes,

also reflects the quality and the advantages of the Düker plunger valve. These are:

- an optimum control range and extremely soft closing thanks to the slider crank movement of the plunger, which is also supported by the Düker slider crank gearbox,
- secure main sealing in the form of a robust profile sealing ring on the plunger and an O-ring in the valve body, which are intelligently positioned to avoid unnecessary wear,
- hygienic security by means of systematic flushing of the plunger and a secure shaft seal,

- a long working life on account of robust, carefully positioned guide beads and wear directed at the rotatable and easily replaceable plunger,
- no cavitation damage to the valve and pipeline, because cavitation can occur harmlessly in the middle of the pipe.



Hygiene safety by systematic flushing of the plunger.

In the context of this animation it is of course important not merely to produce beautiful pictures but also to represent the **technique and function of the product** correctly. It is a real delight to present the advantages of the plunger valve to clients and interested parties with the help of the animation.

Therefore we recommend interested parties to convince themselves of the quality and advantages of the Düker plunger valve via www.dueker.de/film

Authors: Ursula Vogler and Oliver Jäger, Düker GmbH

The article was slightly shortened by the editors. You can find the complete article with various illustrations as a PDF in the download area under Downloads Annual Issues EADIPS FGR.

Drinking water culvert with ductile cast iron pipes under the Nežárka river

The Chotýany-Zlukov **drinking water supply pipeline** is one of the most important transport pipelines of the Southbohemian region. Previously, it crossed the River Nežárka as an above-ground pipeline, suspended from a steel bridge, but now, for various reasons, it had to be laid under the river with the construction of a **culvert**.

Function testing of the drilling head before pulling in the pipes.

Data on the culvert

As a 71 m long pipeline of **DN 600 ductile iron pipes**, the **culvert** was pulled using the **trenchless horizontal directional drilling (HDD) technique**. The total length of the drilling, including the pilot bores, was 113 m. The curve in the culvert benefitted from the flexibility of the **socket joints** of 2 degrees in each case, which with this installation technique, the high flexibility of the socket joints means that, at the same time, they can also withstand the high tractive forces which occur while the pipes are being pulled in by the drilling rig. For the **DN 600 ductile iron pipes** with **BLS® restrained push-in joints** used, tractive forces of up to 1,525 kN are permissible. The external diameter of the joints is 742 mm; the **positive-locking joint** with welding bead and locking segments withstands an operating pressure PFA = 32 bar.

With the use of **trenchless technologies** for example, it is necessary to select a pipe system with high-quality mechanical **external protection** and also strong **corrosion protection**. Therefore, **ductile iron pipe** with fibre-reinforced **cement mortar coating** were used as this protects the pipe against mechanical damage when it is being pulled through in the trenchless technique. The sockets of all the joints are protected with a rubber or thermoshrink sleeve and a sheet metal cone, which prevents the rubber sleeve from being stripped away and grinding damage being caused to the socket.

Data on the HDD process

The pipe string was pulled in with a special pull-in head to fit the shape of the socket. It is longitudinally positive-locked by means of locking segments to the welding bead of the first pipe.

An important parameter which has a considerable influence on the success of the **horizontal directional drilling technique** is the geological composition and condition of the subsoil at the installation site. Here the basic conditions were complicated: on the starting side there were deposits of loose river sediment as far as the slightly weathered paragneiss at a depth of around 3 m and then hard granite. On the opposite, target bank, which lies approx. 2.5 m lower, there were also deposits of loose river sediment, but to a considerably greater depth. The profile beneath this is similar to that on the starting side. The groundwater level is at a depth of approx. 1.2 m. According to the planning, from the starting side the drilling would be through the hard rock strata; at about halfway across, the drilling would be through the sandy river sediment.

In the background: the ageing drinking water pipeline routed across the Nežárka bridge; in the centre: starting pit and the pipe string ready and waiting to be pulled in.

Driving, widening and pipe pulling in 12 days

With a horizontal drilling rig (with a maximum pulling force of 150 kN) the pilot bore was driven with a roller bit and then widened to 300 mm in a second drilling process. Using the considerably larger drilling machine the bore was widened in stages to 400 mm, 500 mm, 700 mm and finally to 950 mm.

In order to be able to pull in a **DN 600 ductile iron pipe** with an outside socket diameter of 742 mm, an opening of approx. 950 mm is necessary. The volume of a borehole with a diameter of 950 mm and a length of 71 m corresponds to 50 m^3. So that the pipe string can be drawn through the borehole, this volume of earth has to be transported to the starting and target pits in each case! That means: The borehole has to be cleared as far as possible during each individual widening process.

During the stage-by-stage widening of the borehole to the diameters of 500 mm, 700 mm and 950 mm, in total around 350 m^3 bentonite was used for the drilling fluid, which could then be sent to a recycling plant for reuse.

For the pipe pull-in, the pipes were preassembled and successfully pulled through in one piece at the same time as the final widening stage without problems.

A premiere under difficult framework conditions

By the construction of a **culvert** under the Nežárka, the essential drinking water pipeline could be protected from flooding, vandalism and other disrupting influences and the undisturbed supply of an entire region could be ensured. It is not without pride that the responsible members of the association regard the fact that this was the first project in the Czech Republic in which **ductile iron pipes** have been installed using the **horizontal directional drilling technique** to drill under a river – and this under quite difficult conditions.

Authors: Ivan Demjan, TALPA-RPF s.r.o and Petr Krejí, Duktus litinové systémy s.r.o

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