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European Association for Ductile Iron Pipe Systems

Fachgemeinschaft Guss-Rohrsysteme

NEWSLETTER

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Dear Readers,

already in the 19th century, drinking water pipes made of grey cast iron were the backbone of the development of urban life. This is also the case in Magdeburg, the state capital of Saxony-Anhalt. 120 years after the commissioning of a DN 700 grey cast iron main drinking water pipeline, pipes made of cast iron were once again used with the long pipe relining process. Modern ductile cast iron pipes DN 400 with positive and longitudinal force-locking push-in joints; they will again ensure a further long working life of more than 100 years.

In their structure, those components are more complex which enable the extraction of water from or the flushing of drinking water networks: Hydrants. Enamelled or EKB-coated jacket pipes, PUR-coated shut-off cones and low opening and closing torques are just some of the improved properties of a new generation of underground hydrants that we are reporting on.

Reorientation and consolidation: These are the key words that can be used to describe the merger of DUKTUS and KEULAHÜTTE into vonRoll hydro (deutschland) gmbh & co. kg. With the new company, customers now have a single point of contact for all products from the vonRoll Group.

Enjoy and inspire reading

Yours Christoph Bennerscheidt

Always topical, always informed

The online Newsletter published periodically provides professionals in the field with up-to-date information about interesting European pipeline projects as well as the many and varied activities of EADIPS®/FGR®.

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Events

24th ROHRBAU
Congress and Exhibition,
15 and 16 January 2020,
Weimar

34th Oldenburger Rohrleitungsforum
12 to 14 February 2020,
Oldenburg

Imprint

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Replacement of the 120 year old grey cast iron drinking water main (Long pipe relining)

The planning, construction and operation of the 1,235 km long **drinking water network** (820 km of water mains and distribution pipelines plus 415 km of domestic service pipelines) are down to SWM Städtische Werke Magdeburg GmbH & Co. KG. Close to half of the drinking water mains and supply pipelines for Magdeburg consist of **cast iron pipes** which, for the majority, have been in operation for more than a hundred years. In the context of continuous renovation and/or renewal measures, SWM began rehabilitation of the **main drinking water pipeline** on Halberstädter Straße in summer 2018 on a section about 1,000 m long.

After 120 years of operation, the **DN 700 grey cast iron pipeline** is in a very passable state of maintenance.

An old pipeline in modern surroundings

The key data for this existing pipeline are as follows:

Year of construction: 1897 and in operation ever since
Material: **grey cast iron (GG)**
Nominal size: DN 700
Pressure stage: PN 10
Condition: ageing damage as a result of spongiosis and increasing incrustation
Location: beneath the pavement
Depth: on average at approx. 2 m

The Halberstädter Straße is a major and busy arterial road running North-East to South-West with tram rails, two to four traffic lanes, bus traffic, cycle ways and wide pavements which are lined with shops, cafés and restaurants. Also there is an extensive stand of old trees in the immediate area of the **drinking water pipeline** to be renovated. So it was important to take account of traffic and environmental technology concerns as well as obstructions/incursions for shops and residents and keep these to a minimum.

Decision in favour of the tried and tested

From time to time it was necessary to integrate **valves** and **hydrants** as well as **branches** and connections by open-trench installation.

The planning carried out in the previous year provided for a **reduction of the pipe diameter** from DN 700 to DN 400 as a result of years of declining or static water consumption, as had already been taken into account and implemented in completed renovation projects. After experiences in recent years, when renovation measures were being continuously carried out on old grey cast iron pipelines in the city, once again after cleaning and after camera inspection the existing pipeline did indeed show damage (incrustations, risk of pipe ruptures), but even after 120 years of operation was nevertheless in a passable state of preservation.

It was therefore obvious, considering these underlying conditions, the nature of the area surrounding the worksite and the corresponding economic and ecological considerations, that the renovation should be done mainly using a **trenchless technique**. In some place however, depending on constraints, the **open trench technique** would have to be adopted as well, above all to incorporate **fire hydrants, branches, connections** and sets of **valves** in the pipeline. In these cases, a reduction in the minimum depth of pipe cover from approx. 2 m to 1.20 m was specified.

So, in the end, SWM opted for the **long-pipe relining** process for 915 m out of the total of around 1,000 m of DN 700 grey cast iron pipeline using

- **DN 400 ductile iron pipes**, standard overall length 6 m
- wall thickness class K 9
- pressure stage PN 10
- **BLS® type** positive-locking restrained **push-in joints**
- **cement mortar lining** and
- a zinc-aluminium coating (400 g/m²) with a finishing layer of blue epoxy resin (EN 545)

For the renovation of smaller sections, pipes in different materials and dimensions have been used.

Execution: precise, safe and effective

In Spring 2018, after around a year of planning, the renovation project was commenced in two phases in terms of both location and time.

Construction pits

Because of the route of the existing pipeline, the **valves** installed and because of changes to the pulling-in sections (it was planned to have pulling-in lengths of up to approx. 300 m), construction pits (for both installation and pulling-through) were excavated in the pavement area of Halberstädter Straße at a distance of 150 to 280 m and between 2.0 and 2.5 m deep on average. For **pulling in the pipes**, a Grundoburst 800 G bursting rig from Tracto-Technik GmbH & Co. KG was used.

Pipe-pulling

The old **DN 700 grey cast iron pipeline** was first mechanically cleaned and then inspected by camera. The new 6 m long **DN 400 pipes in ductile cast iron (GGG)** were pulled in, aligned in the construction pit in each case and the **BLS® push-in joints** including their protection were assembled with a sheet steel cone sleeve. Using the bursting rig, the pipe string was then pulled 6 m into the old pipeline in each case, draggling on the sheet steel cone.

The pipe-string was pulled 6 m into the old pipeline in each case, draggling on the sheet steel cone.

Finishing work

The annular space remaining between the old pipe and the new pipe was filled with an alkaline insulating material which, according to the requirement set by SWM, had to have a shrinkage/water separation after curing of less than 1% by volume and a compressive strength of at least 1.0 N/mm^2 after 28 days. The last stage of the work was the pressure testing and the subsequent disinfecting of the pipeline.

Sustainability aspects achieved

The careful planning and preparation of the project, the fine-tuning with respect to adjacent construction projects, diversion concepts, public transport requirements etc. as well as the choice of material and installation processes resulted in a successful completion of the renovation project. Numerous aspects of sustainable construction are achieved here. The most important of them are:

economic aspects

- considerable reduction of civil engineering costs by the use of the **trenchless relining technique**
- reduced costs for restoring the pavement surface
- reduced restriction of traffic (traffic lane, public transport, diversions)
- minimised impairment of access to the shops

- fast and secure assembly of the **BLS® push-in joints**
- high rate of installation productivity with the **BLS® push-in joints**
- reduction of the existing pipe diameter (increasing the speed of flow and shortening the dwell time of the drin king water in the pipeline which avoid hygiene problems)
- a further long working life of more than 100 years

ecological aspects

- only intermittent excavations for construction pits
- minimising the stoppages of private transport
- short assembly times allowing fast progress of work
- food-grade lining of pipes
- high diffusion tightness protects the drinking water
- low servicing and maintenance expense
- no negative impact on the trees

technical aspects

- **restrained joints** allow for the highest tractive forces and are therefore best suited for **long pipe relining**
- pipes and joints allow for operating pressures up to 100 bar according to nominal sizes
- installation does not need special equipment

Authors: Andreas Chladek, Städtische Werke Magdeburg GmbH & Co. KG
Uwe Hoffmann, Duktus (Wetzlar) GmbH & Co. KG

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.

A new generation of underground hydrants

With the new generation of **underground hydrants**, ERHARD GmbH & Co. KG in collaboration with the BAYARD company from France is bringing a revised design in two versions onto the market. **PREMIUM with a PUR cone** and fully enamelled casing pipe and **STANDARD with an EPDM cone** and **EKB epoxy coated casing pipe** are the names of the two versions, which offer maximum performance for the maximum security.

PREMIUM DN 80 underground hydrant with PUR cone, enamelled

DN 80 PREMIUM underground hydrant.

The **hydrants of the new generation** have numerous well thought out construction features which guarantee the user even **more reliable operation** and **maximum security**. Hence the shut-off cone is joined to the valve insert pipe by a secure bolt connection and so provides a reliable in the enamelled seating of the lower part of the column. Polyurethane (PUR) is a high-molecular organic material with a chemical structure characterised by a high number of urethane groups. Within determined temperature limits it therefore has the characteristic elastic properties of rubber and is therefore used in products under very high mechanical stresses. For its **use in hydrants** it stands out above all because of the **very high tensile strength** and **elongation at break** on the one hand and the **low water uptake** on the other hand.

Further **advantages** of the PUR cone:

- The material has an extremely high abrasion resistance and hence minimal wear (as shown in numerous long-term tests).
- Not sensitive to soiling in the cone seat; full tightness (especially in case of surface distortion due to foreign bodies) is guaranteed at all times and the working life is considerably increased thanks to the excellent resilience.
- Very good tear strength, considerably higher than with comparable elastomers; extension of material damage therefore only to a very low extent.
- Very high ageing resistance; this also means that leaks due to crack formation or brittleness are avoided over very long periods of use.
- Good sliding characteristics on account of the low friction coefficient; therefore only low torque values required for opening and closing.
- Meets all requirements according to DVGW W 270 and KTW guideline and is free of plasticisers and fillers.

Corrosion protection of the casing pipe: permanently protected with ENAMEL

The PREMIUM design underground hydrant is offered with a fully enamelled casing pipe for **perfect corrosion protection**. The particular properties of enamel have been known for around 3,500 years when the first pieces of jewellery were made with it. And still today, enamel is indispensable as a technical material for industrial applications. When fired at around 720°C it presents itself as a glasslike, high-strength material which forms a permanent and inextricable bond with the metallic substrate. ERHARD enamelled valves have a special fibre enamel with short fibres in the material which prevent the enamel from cracking in case of damage.

Enamelling in accordance with DIN 51178 offers **numerous advantages**:

- Safely protected from possible infiltration
- Absolutely impervious to vapour and oxygen
- Stable bonding even under bending of the material and other loads
- High elasticity
- Resistant to acids, alkalis and neutral organic media
- Extremely temperature resistant, can be used without problem even with sudden temperature fluctuations
- Good resistance even with abrasive media due to high hardness of 600 HV
- Even with soil class III, no further protection measures necessary
- Extremely smooth surface (Ra 0.05) for hygienically impeccable conditions
- No fixing of mineral and/or organic elements (no growth of incrustations to reduce the cross-section)
- Ideal mating surface for elastomer seals
- Extremely durable and long-lasting, no embrittlement and chalking
- High environmental compatibility

The company has **extensive experience** and **many years of knowhow** in the complex process technology of enamelling. A modern enamelling plant allows flexible but high-quality production as all the stages of enamelling with ERHARD Pro-Email are seamlessly monitored.

The ERHARD DN 80 PREMIUM underground hydrant is available in the design with flange connection with the reliable claw cover in plastic, with and without double closure.

STANDARD DN 80 underground hydrant, EPDM cone, EKB epoxy

DN 80 STANDARD underground hydrant.

As compared with the PREMIUM underground hydrant, the STANDARD underground hydrant designed with an EPDM cone according to KTW guideline and DVGW W 270 – instead of PUR – and the casing pipe coated with epoxy-plastic (EKB) – instead of enamel.

Corrosion protection of the casing pipe: permanently protected with EKB coating

The STANDARD design is seamlessly protected by cataphoretic dip-coating inside and out. Cataphoresis is an electrochemical process in which the workpiece is coated n a dipping bath. The coating thickness is around 50 µm. The process is also used to ensure corrosion protection in vehicle production, i.e., it is extremely suitable for complicated contours.

The most **important properties** are:

- In accordance with EN ISO 2808: impact strength 5 Nm (EN ISO 6272-1), 1 kg falling weight, height 50 cm, no cracks
- Salt spray test: 500 hours corrosion resistance (EN ISO 9227), no bubble formation
- Adhesion with the cross-cutting test: 0, no separation of the coating
- Threads are included in the dipping process and so also protected against corrosion

Particularly with the subsequent EKB coating, the result for this combination is an **absolutely sure protection against corrosion**. The total thickness of the powder coating applied is at least 250 µm.

Naturally, the new generation corresponds to EN 14339 for underground hydrants; both alternatives have the DIN-DVGW type approval certificate for drinking water and the CE label.

Author: Matthias Müller, EHRHARD GmbH & Co. KG

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Realignment and consolidation

DUKTUS and KEULAHÜTTE Vertrieb become vonRoll hydro (deutschland) gmbh & co. kg

As of 1 January 2020, the Swiss company vonRoll hydro AG will bundle its competencies in Germany. The former sales companies of VONROLL (ex. AWP), DUKTUS and KEULAHÜTTE are merged into vonRoll hydro (deutschland) gmbh & co. kg. From January 2020, this company with its headquarters in Wetzlar will be the sole contact for the company's trading and sales activities. The proven and established brands DUKTUS, KEULA and VONROLL will remain as product brands and will continue to be produced at the Wetzlar and Krauschwitz sites. The production site in Prenzlau will also remain, where special valves of the VONROLL brand will increasingly be manufactured in the future.

"With the new company, our customers now have a single point of contact for all our products from the vonRoll Group. The Swiss company vonRoll hydro ag took over Duktus in 2016 and Keulahütte in 2018. By integrating the activities into a single sales company, we now have a very good solution. The distribution of the German activities will be streamlined and synergies will be exploited in a targeted manner. In this way, customers and trade benefit from reliable, fast and flexible order processing and deliveries. This makes us the only German manufacturer able to offer complex solutions from a single source," says Stefan Neuhorn, Managing Director of vonRoll hydro (deutschland) gmbh & co. kg.

Dipl.-Ing. MBA ETH Zurich, Stefan Neuhorn has 8 years of industry experience. He has been Managing Director of Duktus GmbH since 01.03.2019 and will in future be responsible for the realigned and renamed company vonRoll hydro (deutschland) gmbh & co. kg.

He will be supported by Andreas Lotz (Sales Manager), Roger Distler (Head of Internal Sales) and Oliver Jäger (Head of Technology) as well as the regional sales managers Alexander Bauer (South), Florian Häusler (Middle) and Karl Wilhelm Römer (North). The ZEROWATERLOSS Champions Dennis Göttling (South), Uwe Strich (Middle) and Manuel Görzel (North) will now support the regions in the field of sensor technology to meet the coming requirements of the water supply.

About vonRoll hydro

vonRoll hydro (deutschland) gmbh & co. kg is part of the vonRoll infratec Group, which employs around 1,200 people at 8 production sites in Europe.

Products and services from vonRoll hydro are used wherever the safe and economical supply of water and gas or the disposal of process water is required. The range of products and services includes valves, cast iron pipes, hydrants, measurement technology, drainage technology, sewer casting, planning and installation support and the HYDROPORT division, which digitally records public infrastructure and network data. The system provides transparency and security.

ZEROWATERLOSS.WORLD – Vision with Future

vonRoll hydro is today committed to ZEROWATERLOSS.WORLD so that water of impeccable quality from the best infrastructure is also available to our future generations.

Contact for inquiries: Stefan Neuhorn, stefan.neuhorn@vonroll-hydro.world

We participate in

IAB – Institut für Angewandte Bauforschung Weimar gGmbH expects a large number of experts from industry and science to attend the **24th ROHRBAU Congress and Exhibition**, which will be held in Weimar on **15 and 16 January 2020**. They will pick up on new developments and take a closer look at **quality aspects in pipeline construction** and in the field of **backfill materials**. Together with the industry associations and the media partners bbr and 3R, IAB Weimar gGmbH is organising this impulse-giving event. As usual, we as the European Association for Ductile Iron Pipe Systems (EADIPS®) / Fachgemeinschaft Guss-Rohrsysteme (FGR®) e.V. will be represented both in the trade exhibition and with a technical contribution in the lecture programme.

You can find out more about the **24th ROHRBAU** on the IAB website.

The Institute for Pipeline Construction at the University of Applied Sciences Oldenburg e.V. invites you to the **34th Oldenburger Rohrleitungsforum** from **12 to 14 February 2020**. As every year, we are represented again in 2020 as a professional association at the big event of the pipeline industry. We will be contributing to this year's topic **"Pipes and cables – conduits for a modern infrastructure"** with two specialist lectures in the lecture block "Cast iron pipe systems" on Thursday, 13 February, 9:00 to 10:30 a.m.

You can find out more about the **34th Oldenburger Rohrleitungsforum** on the IRO website.