THE UPONOR INFRA CUSTOMER MAGAZINE » ISSUE 1/2018

pipe world

Milestones of our history

uponor

1918 Aukusti Asko-Avonius establishes a carpentry workshop in Lahti, Finland.

1938

A new company, Upo Oy was established to manufacture cast iron products and household appliances.

With the production of cast iron pipes, sewer pipes become a whole new product group for Upo.

1948

The first plastic factory, Upo-Muovi, starts up in Nastola, Finland, and launches its first plastic pipes and fittings.

1965

1972 First in world, Wirsbo in Sweden starts to manufacture the unique and innovative PEX pipe for heating and plumbing applications.

1982

Asko and Neste establish Oy Uponor Ab.

1984

Uponor introduces the unique structured wall pipe construction called Ultra Rib.

1986

1987-88

Uponor enters the plastic hot water pipe business by acquiring the German company Hewing and the Swedish company Wirsbo.

The first overlapped welded multi-layer composite pipe (MLCP) is invented and patented by Uponor.

1990

Wirsbo opens a factory in Apple Valley, Minnesota, USA.

1993

The world's first press fitting for MLCP is launched.

Uponor launches the unique and revolutionary Quick & Easy fitting system.

1994

During 1997-1999 Uponor acquires the German company Unicor, and becomes a leader in multi-layer composite pipe.

1997

Uponor merges with parent company Asko Corporation, renamed Uponor Corporation on 1 January 2000.

2000

2006 Uponor consolidates all businesses under one brand.

uponor

Through a merger with KWH Pipe on 1 July 2013, Uponor Infra is established.

2013

UWater, a start-up company that specialises in water quality monitoring, is acquired.

2015

Uponor and Belkin International Inc. establish the joint venture Phyn. Phyn develops water-sensing and conservation technology both for consumers and the building industry.

PHYN

2016

Uponor acquires KaMo and Delta in Germany and expands its competence in drinking water hygiene.

2016

Uponor acquires a new manufacturing site in Hutchinson, Minnesota, to meet continued strong growth in the USA.

2017

2018 Uponor celebrates its 100-year anniversary.

BUILD ON uponor 100 YEARS

www.uponor.com

Dear reader,

In recent years, the financial markets, businesses, and consumers have benefited from low interest rates in Europe and North America, which have contributed to positive economic development. This, in turn, has encouraged many companies to invest in future growth. To grow and succeed, a company needs a vision and strategy on how to move towards its vision. A company also needs courage to invest in the future and change as the world around it changes. In addition, sheer hard work and perseverance are sometimes required to overcome challenges.

Uponor was established in 1918, when **Aukusti Asko-Avonius** set out to reach for his dream by establishing a carpenter's shop in Lahti, Finland. During its first 100 years, the business, now named Uponor, re-invented itself many times before eventually becoming one of the world's leading providers of building and infrastructure solutions.

Plastic pipes have been at the core of Uponor's product portfolio since 1965, when the first plastic pipe factory was established in Nastola, Finland. Plastic as a durable pipe material provides a sustainable, long-term life-time choice for our customers and societies. At Uponor, we are highly committed to sustainability, carefully studying the life-cycle impact of our offerings on the environment. This includes all kinds of environmental impacts, ranging from water purity to micro plastics. According to our internal analysis, plastic pipes are not a significant contributor to micro plastics. We continuously invest time and resources in researching our offerings, together with independent external experts. That is just one element in our commitment to a more sustainable world.

In addition to sharing the interesting story of Uponor's first 100 years with you, this issue of Pipe World provides a number of good examples of how Uponor is helping companies to succeed. One example of this is our new Water Monitoring Services recently launched on www.uponor.com. Through these new Uponor digital services, we will help to monitor a municipality's potable water distribution network 24/7/365 in real-time. This is an exciting development for Uponor and our customers.

I hope you enjoy all these stories in this issue of Pipe World.

I wish you all good reading!

Sebastian Bondestam
President
Uponor Infra

issue 1/2018

pipe world

PUBLISHER Uponor Infra Ltd » **www.uponor.com/infra** » **EDITOR IN CHIEF** Mr Sebastian Bondestam » **EDITORIAL BOARD** Mr Sebastian Bondestam, Ms Marlene Fremleson-Ohlis, Mr Vesa Kiiskinen » **EDITOR** Viestintätoimisto Supliikki, Ms Outi Järvelä, Tel. +358 40 577 1844 » **PRINTER** Grano Oy

PVC PE PP

New Weholite licences for Tanzania and Turkey

UPONOR INFRA has signed Weholite Licensing Agreements for the manufacture of the Weholite pipe in Turkey and the United Republic of Tanzania. As a result of these two new licences, Weholite licensees with manufacturing operations will be present in twelve countries in Europe, Asia, Africa and Latin America.

The new licensee in Tanzania is Plasco Ltd, a Tanzanian manufacturer of PE-HD, U-PVC pipes and fittings. Plasco will engage in Weholite production in its existing facilities in Dar es Salaam. Weholite products are expected to become available from Plasco during the second quarter of 2018.

In Turkey, the manufacture and marketing of the Weholite pipe has been launched by Gezer Endüstri Insaat Sanayi ve Ticaret A.S, a Turkish manufacturer of solutions for tanks, manholes and pumping stations. Gezer will engage in Weholite production in its existing facilities in the Istanbul area.

Thousands of Weholite projects worldwide

Weholite technology was developed by Uponor Infra in the early 1980s, since when it has provided excellent value on the global pipe market. Weholite has been successfully used in thousands of projects in different parts of the world.

Uponor Infra manufactures Weholite pipes in six factories in Finland, Sweden, Poland and Canada, and Weholite licensees have manufacturing operations in the UK, Iceland, Oman, South Africa, Malaysia, Thailand, Japan, Brazil, France, and now also in Turkey and Tanzania.

The Weholite polyethylene (PE) or polypropylene (PP) pipe is a spirally wound structured-wall pipe, which makes it highly durable, lightweight and flexible. The pipe is used extensively worldwide in gravity/low pressure service applications for potable water, stormwater, process and cooling water, sewage and various other liquids. Weholite pipe is available in various sizes, with inside diameters of up to 3,500mm.

"Weholite pipe does not corrode, tuberculate or support biological growth, which makes it an excellent choice in wastewater and harsh chemical environments. It is inert in saltwater and chemicals likely to be present in outflows of sanitary sewage," states **Tapio Alanen**, Sales and Marketing Manager of Uponor Infra Technology.

"All Weholite solutions are 100% customisable. An outstanding combination of pipes and panels enables the construction of a wide range of prefabricated tailor-made products. Examples include tanks, manholes, chambers, complete pumping stations and individual sewage treatment units for non-urban regions."

"Lightweight Weholite pipes are easy to handle even in long lengths, which guarantees fast and efficient installation." ■

More information: www.weholite.com

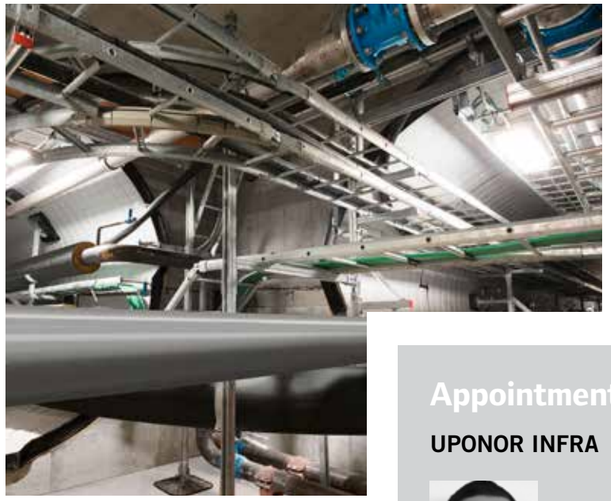
If you can detect it, you can control it!

A MUNICIPAL potable water network is an extensive system and water utilities have limited visibility within such networks. This can cause a number of problems. One example is leaking pipelines which result in water losses, while increasing the risk of contaminated water being distributed. Uponor has taken on this challenge by providing new, innovative technologies.

With Uponor's Water Monitoring Services, the water network can be monitored in real-time 24/7/365. This enables network owners to take immediate action if an abnormality is detected. In addition, laboratory testing can be optimised to match the related need, rather than being used as a precaution. "The systems keep track of water flow, its direction and water quality. Any deviations which indicate leakages or deteriorations in water quality are reported as an alarm event to the network owner," says **Magnus Lundin**, Director of Uponor Infra's Water Monitoring Services.

These new services will initially be available to network owners in Finland and Sweden, and will be extended to other Uponor Infra markets over time. We have now launched new web pages for Water Monitoring Services on **www.uponor.com**, where you can find out more about how Uponor Infra can help you to monitor the potable water distribution network. ■

Expanding security of supply in Linköping



UPONOR INFRA is continuing its cooperation with the Technical Department of the City of Linköping, Sweden, with the expansion of the infratunnel, which houses all of the piping needed for the infrastructure of a new city district, Vallastaden. Almost two kilometres long and 2.2 metres in internal diameter, the original Weholite infratunnel was installed in Vallastaden during the summer of 2014.

The tunnel will now be expanded by 170 metres, with the designed solution once again being supplied by Uponor Infra Project Services. Deliveries began in April 2018 and the project will be completed in June 2018.

Digging up the streets is history. Vallastaden is the site of a modern, ecologically sustainable city district, intended to house around 10,000 residents. The district's electricity and data cables, as well as its water, sewage, waste and district heating pipes run underground along a Weholite infratunnel.

"The ease of making modifications and repairs to cables and pipes without any digging is the most significant improvement to the traditional way of doing things. Any defects in the cables and pipes inside the tunnel are quick and easy to pinpoint and repair. Since all maintenance work and the installation of new pipes can be handled in the tunnel, residents won't even be aware that something is going on underground," points out **Christian Vestman**, Head of Project Services at Uponor Infra.

Excellent for densely populated areas. Infratunnel is ideal for densely populated areas and places with challenging terrain. For example, a high water table can cause problems and rust the joints and valves of underground pipes and cables. "In densely populated areas, digging up pipes and cables for repair and installation causes traffic jams and other inconveniences for the area's residents."

Linköping's example has raised interest elsewhere in Sweden. A dozen Swedish cities are currently at the budgeting stage with their plans, and building work will begin on at least one site this year.

Infratunnel has been patented in the Nordic countries and a patent is pending elsewhere in Europe. ■

Appointments

UPONOR INFRA

Mr **Vesa Kiiskinen** has been appointed Marketing Director as of 11 September 2017.

SWEDEN

Mr **Joakim Wingren** has been appointed Sales and Marketing Director as of 1 September 2017.

Ms **Elina Hietala** has been appointed Digital Marketing Manager as of 1 March 2018.

NORWAY

Mr **Bjørn Arve Sømhovd** has been appointed Sales and Marketing Director as of May 2017.

DENMARK

Mr **Søren Quist** has been appointed Key Account Manager as of 1 August 2017.

NORWAY

Mr **Geir-Are Berg** has been appointed Key Account Manager, Industry as of October 2017.

DENMARK

Mr **Thomas Høst-Madsen** has been appointed Key Account Manager as of 1 September 2017.

NORWAY

Mr **Simen Holen Lønstad** has been appointed Project Engineer on UVS as of October 2017.

NORTH AMERICA

Ms **Julia Redmond** has been appointed Engineered Sales Consultant in Design Solutions Sales as of November 2017.

Mr **Brian Maguire** has been appointed Weholite Sales Manager in Design Solutions Sales as of 2 April 2018.

Mr **Corey Park** has been appointed Weholite Regional Sales Manager in Design Solutions Sales as of 30 April 2018.

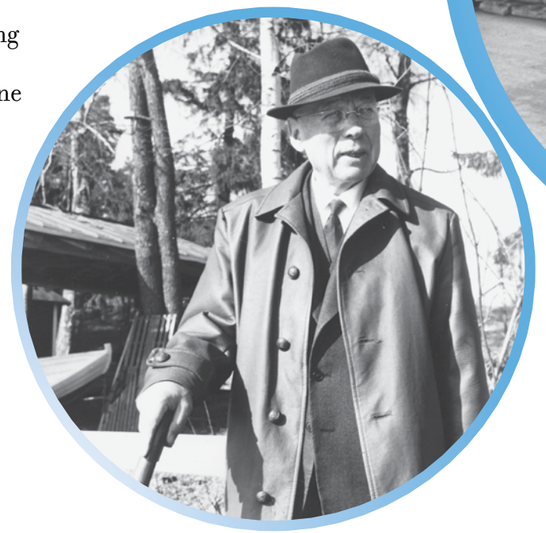
An amazing century

TEXT Kirsi Riipinen » PHOTOS Uponor »

One-hundred-year-old Uponor boasts an amazing history, having grown from a small carpenter's shop into a modern, global listed company and one of the world's leading providers of building and infrastructure solutions.

Uponor was born from a merger between Asko and Upo, and its story also reflects the remarkable history of Finnish developments in industry, trade and technology. It's also an unbelievable tale of globalisation – today, Uponor is one of Finland's most international companies. This true story is lacking neither drama nor dramatic turns nor moments of despair – and the joy and pride of overcoming them.

Uponor was born in 1918, when the Finnish self-made legend **Aukusti Asko-Avonius** set out to forge his American dream in a dirt-poor country by establishing a carpenter's shop in Lahti. But what then?



1918

- **Aukusti Asko-Avonius** submits his business registration application to the Lahti magistrate on 13 August 1918. He had found premises for his carpenter's shop, Lahden Puuseppätehdas, on Vesijärventie, as the previous tenant had died soon after being released from the Hennala prisoner of war camp. The company initially manufactures coffins, which is highly symbolic of the aftermath of Finland's civil war, that occurred in the same year. The following spring, the company embraces Henry Ford's philosophy and launches mass production of a single product – a writing desk designed by Asko-Avonius and master carpenter **Salonen**. Although his one-product ideology only lasts a short while, Asko-Avonius never gives up on his basic premise: he believes that mass-produced products will eventually replace individually handcrafted products in Finland as well.

1920

- Asko-Avonius opens his first furniture store in 1920, and establishes a new furniture factory soon afterwards.
- In 1928, a new factory complex is opened next to the railway line in Hollola – it is the largest furniture factory in Finland.

1930

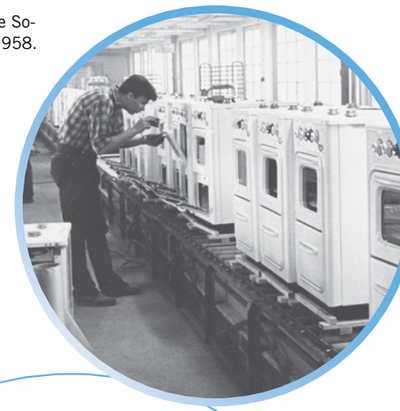
- An expansion of the new factory is completed just as the recession hits. The New York stock exchange had crashed in 1929 and the recession has now spread across the Atlantic to Europe.
- Being highly sensitive to economic fluctuations, the value of the carpentry industry collapses in 1931–33 to under half of what it had been at its peak in 1929. However, exports save the company from bankruptcy and Asko-Avonius manages to use the structural changes arising from the recession to his advantage. During the 1930s, the company builds up its own chain of stores called Asko. Asko stores can now be found in Lahti, Oulu, Turku, Helsinki, Rauma, Pori and Tampere.
- The success of Helsingin Teräshuonekalutehdas' metal frame beds is noted at Asko, whose own metal bed factory, Upo Osakeyhtiö, is then established in 1938. Aukusti Asko-Avonius' son **Arvi Tammivuori** is appointed Managing Director of Upo.

1940

- During the truce, Upo brings a successful product to market: Pilkko, a wood-gas generator that is installed in vehicles due to the petrol shortage. Almost 30,000 of these wood-gas engines are manufactured during the war years.
- In 1946, Upo's foundry begins to make products to pay off war reparations: ships, machine parts, and gears.
- In 1947, Asko establishes its first subsidiary in the USA.
- In 1949, Upo's foundry begins to manufacture cast-iron pipes.

1950

- In 1952, the year of the Helsinki Olympics, Upo begins manufacturing refrigerators. Washing machines are added the following year. The company also manufactures sewage and service water pipes, radiators, and metal bed frames. Spirit stoves are another of its best-selling products.
- The first large kitchen furnishing store is opened in the Soviet Union in 1956 and the first store in Germany in 1958.



1960

- Asko cooperates with IKEA, and manufactures furniture for IKEA's mail order business. However, negotiations on bed dimensions with IKEA's founder, Ivar Kamprad, end up driving the Managing Director of Asko's Swedish subsidiary to take sick leave. Cooperation ends due to irreconcilable differences on price issues, and Asko continues operating in Sweden according to a 'design and quality' concept that has proven successful in Germany.
- Upo-Muovi launches production in Nastola in 1965. Its plastic pipe production focuses on PVC pipes.
- The company's founder, Asko-Avonius, dies on 13 September 1965 aged 78.
- The Ball Chair designed by Eero Aarnio for Asko becomes an international success in the late 1960s. It is seen everywhere, from a James Bond movie to the homes of superstars such as Princess Grace of Monaco and Frank Sinatra.
- A 24 per cent devaluation of the Finnish Mark is carried out in 1967. This leads to a total bill of almost FIM 12 million in currency credit losses for Asko and Upo.

1970

- Upo faces its greatest financial difficulties in 1971. Asko, on the other hand, experiences a golden year for foreign deliveries in 1972, when a store opens in Germany and an Asko department opens at a department store in Liverpool.
- In 1972–74, Upo engages in restructuring that puts an end to domestic overcapacity and increases the company's ability to meet growing foreign competition arising from the EEC Agreement.
- In 1976, Asko and Upo merge to form Asko-Upo Oy. The company's earnings take a dramatic downswing.
- The company makes a loss of one hundred million marks in 1978, which leads its financier, SYP, to take up the reins. Actual decision-making authority is transferred to SYP in 1979. ▶

1980

- The structural reorganisation of Asko begins in 1980. The company sells off its plastic film production, department stores, sawmills and other property.
- Upo-Muovi, which had already changed its name to Upo-Putki, becomes Oy Uponor Ab in 1982. It acquires the Nastola factory from Asko and the plastic pipe factory in Sweden. Asko owns two thirds of Uponor and Neste one third. Uponor operates in Finland, Sweden and Denmark. Over the next few years, acquisitions are also made in Ireland, England, Germany, and Norway. Uponor experiences difficulties in these new countries, and its result slips into the red.
- In 1985, Asko acquires the multi-sector company Finlayson. It's a massive deal. For example, Finlayson has about 5,900 employees – 1,500 more than in the entire Asko Group. Public comments on the transaction include phrases such as 'the lame tries to lead the paralysed'. In actual fact, Asko acquires Finlayson (a listed company) for an affordable price.
- In 1986, Uponor acquires Finlayson's pipe business from Asko. Now PE pipes are being manufactured alongside PVC ones. Two more acquisitions follow a few years later: Hewing GmbH in Germany and Wirsbo Bruks AB in Sweden. Uponor becomes a world-leading supplier of plastic pipes for service and hot water.
- In 1988, Asko is listed on the main list of the Helsinki Stock Exchange, and a fantastic year lies ahead. Asko acquires Cylinda's home appliances, Karhu-Titan's sports equipment, and Nokia's flooring division.

1990

- Uponor expands into North America during the early 1990s.
- In the mid-1990s, building solutions account for an increasing percentage of the business, while infrastructure pipes are in decline. Acquisitions focus on building solutions.
- In 1999, Uponor acquires the German company Unicor Holding GmbH, thereby becoming a significant manufacturer of composite pipes.
- The dismantling of Asko began in the early 1990s. By the end of the decade, the company divests its textile and furniture manufacturing businesses.
- In 1999, Asko becomes Uponor.

2000

- Over the next few years, Uponor (the listed company that was created from the merger of Asko and Uponor) divests its home appliance and flooring divisions, and the real estate it acquired from Asko.
- Uponor's new strategy has three cornerstones: one brand, operational efficiency, and growth.
- In 2007, the Uponor KOTI service updates operating methods in the Finnish HPAC sector. Consumers can now obtain all of their home HPAC solutions, complete with professional installation, from a single point of sale. The service includes online tools and personal advice. A tender service is also available for homebuilders and renovators.
- In 2007, Uponor achieves the best result in its history, but also issues its first profit warning, as the US mortgage credit crisis is impacting on construction in Europe as well. A year earlier, Uponor had decided to seek growth from multi-storey buildings and refrigeration. Regional growth is primarily sought in Eastern and Southern Europe.
- In 2008, Uponor divests its water and gas pipe business in the UK, and also pulls out of infrastructure operations outside the Nordic countries. The company focuses more strongly on its building solutions.

2010

- Uponor Infra (Uponor and KWH Pipe's joint venture) starts up on 1 July 2013. This partnership brings together two strong experts with a combined total of 120 years' of experience in domestic and international infrastructure markets. Infrastructure operations are once again launched outside the Nordic countries. In addition to standard products and systems, Uponor Infra invests strongly in customised products and services, end-to-end services, and turnkey projects. Weholite technology, in particular, provides opportunities for the manufacture of highly customised and even extremely large-scale applications, as pipes of up to 3.5 metres in diameter can be produced.
- Uponor begins developing its industrially prefabricated building elements, which accelerate contract completion times in both new construction and renovations.
- In 2015, Uponor bolsters its expertise in the service and drinking water markets with two acquisitions: the German company Delta Systemtechnik GmbH, which manufactures hot water distribution stations, and KaMo Group, which develops systems for domestic heating and hot water production, and manifolds.
- In 2016, a joint venture is launched with the US company Belkin International. This joint venture is called Phyn and it begins to develop technology for both measuring and reducing buildings' water consumption. New products are being developed for both consumers and professional clients.

2018

- The one-hundred-year-old Uponor is a leading international provider of building and infrastructure solutions. It offers products and solutions for safe water distribution, energy-efficient heating and refrigeration, and reliable infrastructure. The company employs about 3,900 people in 30 countries. ■

No external concrete weights were used for sinking the pipes.

Sustainable solution for a pulp & paper mill

PROJECT FACTS

- **Customer** Stora Enso Nymölla Bruk
- **Country** Sweden
- **Town** Nymölla
- **Application** Marine installation
- **Completed** 2018
- **Project** Replacement of an outfall pipeline
- **System** Customised products/Uponor Infra 360° Project Services
- **Product** Weholite (PE) dimension DN/ID1,500mm

Weholite's ability to withstand external wear, such as friction against the seabed, was an important criterion when the outfall pipe of Stora Enso's pulp and paper mill in Nymölla, southern Sweden, had to be replaced.

Nymölla Bruk in Skåne, Sweden, is a modern pulp and fine paper mill which is part of the Stora Enso Group's division called Stora Enso Paper. Nymölla Bruk manufactures uncoated fine paper: document paper and paper for envelopes and printing.

The old outfall pipe, which was installed in 1961, was made of wood. It had begun to break in some places and was springing leaks. The bands around the pipe had rusted and begun to crack after many years of friction against the seabed, and the related maintenance costs were increasing. As a result, Stora Enso decided to replace the outfall pipe.

Stefan Johansson, a Construction Project Manager at Nymölla Bruk, contacted Uponor Infra during the marine installation of a stormwater pipe for the Glasbruket housing area in Limhamn. In the Limhamn project, no external concrete weights were used for sinking the pipes. A patented profile filling method was used instead.

A patented method for sinking the pipes

"Nymölla was very interested in avoiding the use of external concrete weights, because fishing activities occur in the area. Weholite was chosen because it could be profile-filled with grout. This was a crucial factor when choosing Uponor," says Stefan Johansson.

Nymölla chose Weholite for the new pipe due to its ability to withstand external wear such as friction against the seabed, which was so advantageous that alternatives were ruled out.

In all, 3,500 metres of Weholite dimension DN/ID1,500mm were installed, consisting of 24-metre sections of pipe.

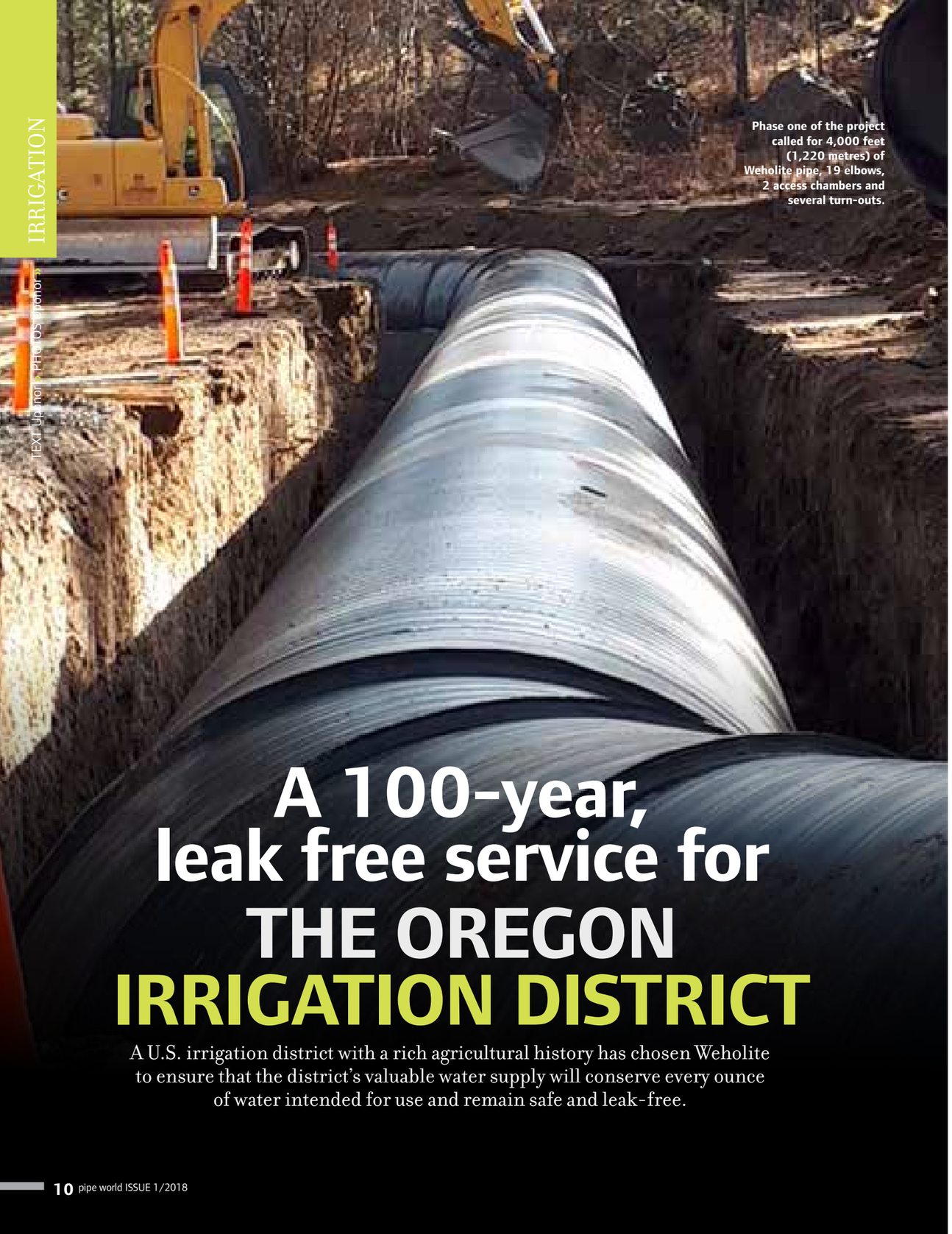
A dedicated team

"The project has involved several challenges, the greatest of which was the weather and ensuring that the old pipe would continue to function as the new one was being installed. In addition, connecting the new pipe could take no longer than 5 hours."

"In collaboration with us, Uponor Infra Project Services managed to handle all these challenges. Uponor Infra's project service team is very dedicated, competent, perceptive, reliable and fun to work with. They clearly like their job and enjoy working together," Stefan Johansson concludes.

Uponor Infra Project Service's work involved drawings, calculations of stability, corrosion and hydraulics, as well as project management and job descriptions. The field service work consisted of detailed engineering, project management, welding pipes into 265-metre sections, profile-filling by using the Uponor patented method, and the monitoring of sinkings. ■

TEXT Uponor PHOTOS Uponor



Phase one of the project called for 4,000 feet (1,220 metres) of Weholite pipe, 19 elbows, 2 access chambers and several turn-outs.

A 100-year, leak free service for THE OREGON IRRIGATION DISTRICT

A U.S. irrigation district with a rich agricultural history has chosen Weholite to ensure that the district's valuable water supply will conserve every ounce of water intended for use and remain safe and leak-free.

The Tumalo Irrigation District in Oregon, U.S.A., boasts a rich farming history originating in the late 19th century. To support the crops and livestock of the surrounding areas, the first documented canal was dug in 1883 to divert water from the Tumalo Creek.

The Tumalo Irrigation District now manages two primary water diversions in nearby reservation parks and lake storage. The District encompasses 667 customers, manages over 80 miles (130 kilometres) of piped and open canals and irrigates more than 8,000 acres (3,200 hectares) of growing farmland consisting of cash crops such as hay, garlic, lavender and others.

For the last 15 years, the District has been very active in enclosing long stretches of its irrigation canals, which can significantly reduce evaporation and exfiltration losses. The benefits of regular enclosure include increased safety for the surrounding public and livestock, as well as the opportunity to reclaim and utilise land, once occupied by the canal, for healthy crop production.

Minimal chance of leakage

The key aspect of a commercial irrigation system that sells water is ensuring that there are no leaks in the system, which could result in financial losses. Weholite ensures leak-free systems by way of its robust material characteristics and fabrication method. The fabrication of Weholite pipe, consists of extruding a linear closed profile structural beam of PE-HD and then winding the profile around a circular drum while fusing the adjacent profile surfaces together. The fusing process results in the development of a single homogeneous pipe of high structural strength. When fusing PE-HD pipes together, the connection points or joints are typically stronger than the pipe itself. These very strong, fused PE-HD joints allow for a leak-free system over the design life of Weholite, which is 100 years.

Uponor Infra North America worked extensively with the Tumalo Irrigation District to provide its Weholite offering for this impressive project. Phase one of the project called for 4,000 feet (1,220 metres) of 84" RSC250 Weholite large diameter PE-HD pipe, 19 elbows, 2 access chambers and several turn-outs. Installation of the Weholite pipe began in December of 2017 and concluded successfully in March 2018. Phase two of the same project is even more extensive, as it calls for another 8,000 feet (2,440 metres) of 84" RSC250 Weholite large diameter PE-HD pipe, with an additional 3,000 feet (915 metres) of 60" RSC250 to be installed in the autumn of 2018 and continuing into the winter of 2019. This winter installation is causing little concern, since the fusing zone only needs to be heated to a temperature of 5°C or higher for the installation to progress, even in the harshest of climates. The operating pressure of the complete irrigation system will be 15 PSI (1 bar).

The optimal material for irrigating farms

There are numerous benefits to using Weholite PE-HD pipe for various water management infrastructure projects. For successful farming and crop growth, dependability is a high priority throughout the system from the design to the installation and deployment of irrigation spanning large surface areas. While some piping materials may suffer from corrosion, erosion or in some instances cracking, the combination of Weholite's unique closed profile, double wall design with the added benefits of its PE-HD material, provides for a 100-year design life and the lowest life cycle costs on the market today.

The preferred material of North American engineers

Engineers choose Weholite structural PE-HD pipe over conventional pipe materials (concrete and steel) for several key reasons. For example, engineers now realise the importance of selecting solutions based on Life Cycle Cost (LCC) so that the true cost of ownership, which includes annual operational and maintenance costs, are captured. Steel pipe can corrode and in turn produce corrosion products capable of reducing the internal diameter of a pipe. Pipe restrictions result in increased annual pumping costs. Concrete pipe, which is good in terms of compression but not tension, requires the addition of steel wire or reinforcement to make it stronger. As concrete is porous, the steel wire can also corrode resulting in spalling and/or loss of pipe integrity, if the steel wire snaps. The consequence of wire corrosion is higher maintenance costs or immediate replacement. Weholite is a non-metallic structural pipe made from PE-HD and as such does not corrode, does not suffer from hydrogen sulphide ex-posure, does not spall and is not subject to high surge or transient pressures. This is why Weholite has one of the lowest Life Cycle Costs on the market today.

Working together as a team, Core & Main provided local support and communication for the client, while Uponor provided overall support in product selection, installation drawings and field installation services. Uponor´s ability to act locally in support of the client allowed for increased speed of response in answering their questions and requests, while the installation of Weholite provided the irrigation district with the means of conserving water through a leak-free system. ■

TEXT Uponor » PHOTOS KJ »

Delivery of fish farming pipes

under harsh conditions in the North Atlantic

Challenges due to the weather, underwater conditions and logistics are a fact of life for the salmon industry in the North Atlantic. In such conditions, it is essential that pipes are easy to handle and transport to where they will be used.

Challenging weather, demanding underwater conditions and logistical challenges in remote areas of the North Atlantic create the harsh working conditions confronting the Danish salmon industry.

That is also why a Faroese producer of breeding rings, KJ, sets high standards for its supplier´s solutions. Easily handled pipes are essential when producing breeding rings at the site where they will be used. Whether the rings are to be used in the Faroe Islands, Shetland Islands, Iceland or the United Kingdom, the related large pipes need to be moved easily, due to difficult access roads and limited welding space. That is why it is so crucial that they are light.

Easy to transport

Logistics in remote areas of the North Atlantic represent just one of KJ's biggest challenges, which is why the company views Uponor's products – as well as their logistical handling from its factory in Middelfart, Denmark – as ideal for its operations.

Due to the light weight of PE pressure pipes, KJ can handle and transport them directly to the production site, e.g. in Iceland and the Shetland Islands, through areas that are difficult to access.

KJ uses around 40,000m of Uponor PE pressure pipes each year, because they are easy to float on the sea and are lightweight, even when used in large dimensions. In terms of price and durability, the competitive advantages of plastic pipes speak for themselves. Additionally, they meet the breeding industry's requirements for certification and approvals in relation to the on-site weather conditions.

Safe and sustainable solutions

Due to environmental considerations – as well as demanding climate challenges at northern latitudes – the salmon breeding industry demands that a certification body, Noomas, approve breeding rings to ensure safer and more sustainable solutions in the food industry. Noomas Certification (Noomas Sertifisering) is an inspection and certification body focusing on fish farming and equipment.

Uponor's PE pressure pipes meet the stringent requirements in question, contributing to a thriving and growing salmon industry in the Faroe Islands and the surrounding markets. ■

Due to the light weight of PE pressure pipes, they can be transported through difficultly accessed areas directly to fish farms in e.g. Faroe Islands, Iceland or Shetland Islands.

TEXT Kirsi Riipinen » PHOTOS Metsä Group, Uponor, and Sweco »

The next-generation bioproduct mill

Metsä Group's new bio-product factory in Äänekoski, Central Finland, was a sizable project whose schedules left no room for delays. The new factory was opened in mid-August 2017, according to plan, and pulp deliveries to customers were to begin in September. Uponor Infra delivered most of the municipal infrastructure for the Finnish forestry industry's largest investment.

In addition to pulp, the Äänekoski factory produces bio-products such as pine oil, turpentine and biogas. Metsä Group has invested 1.2 billion euros in the new factory, which is the largest investment in the history of Finland's forestry industry.

Uponor Infra delivered most of the project's municipal infrastructure – the water, sewage and storm water pipes, the wells, and their parts. The deliveries also included an over one-kilometre-long Weholite outfall pipe for cooling water.

Flexibility on site ensured completion on time

The construction schedule for the new bio-product factory left no room for delays. Occasional traffic jams almost formed on the worksite, which included many sites under construction at the same time. The old pulp plant, which is now closed and ready for demolition, was fully operational during the entire construction period.

"Towards the end of the project, the pipes almost laid themselves compared to the early phases, because we managed to leave the busiest plant construction area. At the same time, daily negotiation with other contractors was markedly reduced. We also began performing installations in shallow trenches, which did not require separate support structures," says Project Foreman **Arto Korhonen** of Graniittirakennus Kallio Oy.

Graniittirakennus Kallio, which was responsible for the bio-product factory's underground pipe work, was also involved in other projects. This company was the one managing most project contracts with construction companies during the project.

Korhonen comments that, with around 20 years of experience, he is an old hand in the business but is still amazed that such a sizeable project was kept on schedule.

For the project to remain on time, the pipes had to be laid flexibly in line with other construction, despite the occasional surprise created by difficult ground conditions.

He affirms that change is the only permanent aspect of industrial construction. Flexibility on site ensured completion on time.

"I have only praise for Uponor. Despite the changes in the plans, we were provided with excellent support from both sales and production staff," Korhonen adds.

Varying installation conditions were challenging

The first pipes had to be installed and built in a sheet piled cofferdam, and the 22-metre long pipes needed to be shortened to 7–8 metre lengths. Korhonen admits that, by then, he doubted their ability to stay on schedule.

"We were able to catch up once we'd moved to the embankment section. After that, installation of the pipe elements progressed quickly, compensating for the slow start."

Uponor delivered the materials as the work progressed. Since no storage was available, the lorries brought the pipes directly from the factory to the edge of the worksite.

Planning and support at an early stage

What do projects of this magnitude teach their creators?

"In a factory or in any other kind of project, a functioning infrastructure including piping, roads, etc. should be planned at an early stage. Unfortunately, infrastructure plans are often made in the final stage of the design process, leading to challenging timetables. People only tend to notice infrastructure when it is lacking," comments Korhonen.

IN ADDITION TO PULP, THE ÄÄNEKOSKI FACTORY PRODUCES BIO-PRODUCTS SUCH AS PINE OIL, TURPENTINE AND BIOGAS.

Uponor Infra's Area Sales Manager, **Tom Karnela**, also points out that the Äänekoski project had a tight schedule.

"In large projects, plans are dynamic and become more precise as the project progresses, and this must be taken into account."

Uponor Infra 360° Project Services was closely involved in the Äänekoski project, providing support for planning and tailored solutions at different stages.

"In addition, we provided technical support during the entire project, and our welders were involved in the installations."

Karnela points out that the various services within the 360° Project Services concept can also be used in small projects. ■

AWARD-WINNING COOLING

TEXT Uponor » PHOTOS Uponor »

Öresundskraft's extension of the district cooling station seawater intake in Helsingborg, Sweden, is much more environmentally friendly than cooling based on electric cooling units. In 2017, the overall extension concept for Helsingborg's district cooling system was awarded the CCAC international environmental prize at the UN's climate conference COP23 in Bonn.

The district cooling system in Helsingborg involves the streamlining of current production. By means of seawater and using heat from the district heating network to power an absorption cooling unit, district cooling provides much better environmental values than electric cooling units. The district cooling station is an efficient source of cooling for buildings, industrial facilities and shopping centres.

The largest prefabricated structure in Sweden

The new modern district cooling station should be completed during the spring of 2018. It is located in Helsingborg's harbour and uses seawater from the Öresund channel to produce district cooling. A fully developed district cooling system of this kind can reduce electricity consumption and emissions by about 65–70%, compared to cooling from local cooling units. However, use of seawater requires caution with regard to the environment, durability and maintenance, due to the installation conditions in the sea, the effect of seawater on materials, and fouling from shells and barnacles.

Initially, there was no guarantee that Öresundskraft would choose Uponor Infra and Weholite. The initial plan involved creating an in-situ cast concrete structure. However, the choice became easy when Öresundskraft considered the advantages of Weholite: the huge savings to be made and no risk from concrete disintegrating through exposure to seawater. The pump station is the largest prefabricated structure in Sweden, at 23 metres long and with dimensions of ID/OD3,500/3,900mm. Weholite enabled the pump station to be prefabricated at Uponor Infra's factory in Fristad, transported to Helsingborg, and lowered into place in a water-filled sheet-piled cofferdam. This method hugely rationalised the work and would not have been possible on the basis of concrete construction.

PROJECT FACTS

- **Main contractor** Uponor Infra
- **Subcontractor** BCA, SSE
- **Reference** District cooling system based on seawater
- **Country** Sweden
- **Town** Helsingborg
- **Project** Cooling water intake, pump station and outfall pipeline into the sea
- **Period of construction** September 2017– March 2018
- **Product** Weholite and pressure pipes, DN630 – ID3,500mm

Choosing Weholite for the intake pipes was more self-evident. Compared to other materials and piping systems, Weholite is the most cost-effective material with the highest durability and is the easiest to maintain. Öresundskraft required that neither the pipes nor the pump station would need chemical cleaning, but could be cleaned by pigging, a method that works well with PE pipes.

Creative support throughout the project

Uponor Infra's overall contract consisted of detailed engineering, project management, marine dredging and backfilling work; the underwater installation of intake and outfall pipelines; land-based sheet piling; excavation, backfilling and asphalt works; the welding and installation of the intake pipes; the supply and installation of a prefabricated pumping station including sluice gates; filtration units; two pumps with a capacity of 3,600m³/h; and the circulation of water to the heat exchanger and outfall pipeline and then back into the sea chambers and poly pig devices. The entire process – from the first drawing and calculations to the groundwork, complicated installation process and land restoration – was conducted by Uponor Infra and subcontractors.

In 2017, the project was awarded the CCAC international environmental prize at the UN's climate conference COP23 in Bonn. ■

In place in a couple of days

TEXT Outi Järvelä » PHOTOS Uponor »

Weholite pipes made of polypropylene met – and even surpassed – strict requirements in the renovation of a waste water channel at the Stora Enso Oulu mill in Northern Finland. Timed for a maintenance stop of nine days, the installation proceeded quickly and was finished well before the deadline.

The other 42-metre long pipe was installed under the building, the other one into the channel outside the building.

Founded in 1937 in Oulu, the Stora Enso integrated pulp and paper mill produces 360,000 tonnes of long fibre pulp and 1,125,000 tonnes of coated fine paper each year. 60 percent of pulp production from the mill, which has around 600 employees, is exported and 40 percent is fed into the factory's own paper machines.

The waste water channel for the pulp line of the mill, which was renovated in 2017, was commissioned in the 1960s. Over the years, the channel had deteriorated to the point that there were fears that it would collapse.

"The channel's condition was examined during a maintenance stoppage two years ago. At the time, it was decided that the channel should be renovated as soon as possible," says Project Manager **Juha Parpala** from Efora Oy.

Efora, which is owned by Stora Enso, specialises in industry maintenance and other services that ensure that factories run uninterruptedly.

"At Stora Enso's plants, we are responsible for preventative maintenance, as well as maintenance purchases and investments."

Parpala says that the pipe inspections and repair and renovation work must be planned carefully and timed for the 7–10 day-long maintenance stoppages that occur every 1.5 years or so.

"Because all water needed for the Nuottasaari factory complex is treated at the Oulu pulp factory, very extensive arrangements are needed for repair and renovation work related to the water treatment process. This may only be possible every 5–10 years," says Parpala.

"This waste water channel renovation also required the shutdown of the entire factory complex, because waste water from the water treatment process flows into the channel. Other chemical industry plants in the area had to be shut down, until we were able to arrange the bypass pumping of the sludge from the clean water production process."

The pipes must withstand chemicals and high temperatures

An important criteria in choosing the polypropylene Weholite pipes was their tolerance of high temperatures and almost all chemicals. Plastic also involves no risk of corrosion.

"The temperature of the waste water flowing into the channel is +60–70°C and it includes traces of chlorine dioxide, which is a strong, corrosive agent used in bleaching," says Parpala.

Kalle Kärnä, Operations Manager at the Oulu Stora Enso factory, points out that Weholite pipes have previously been installed at Stora Enso's factory in Imatra in eastern Finland.

"This decision was also substantially affected by the good experiences we have had with Weholite."

Kärnä states that concrete pipes were considered for the renovation, but were thought to be too labour intensive and slow.

"Time was of the essence, because the contract absolutely had to be finished during the stoppage – within nine days in this case."

Preparatory work during the first week

The channel to be renovated was over 80 metres long, half of which was underground, outside, while half lay under the floor of the factory building.

"We decided to remould the end section of the channel in concrete, because with so many branches and other structures, there would have been no other way to complete the work in practice," Juha Parpala states.

A heavy, 30 centimetre thick concrete cover for the outside channel needed to be demolished before the renovation began. The ground was dug up and the cover was opened for a distance of around 50 metres.

Uponor Infra began the preparatory work the week before the renovation.

The Weholite pipes, which had an interior diameter of 1,200 millimetres, were delivered to the worksite in 21 metre-long sections.

"During the first week, we prepared connections and welded two pipes together, so that the first 42-metre long pipe going under the building would be ready at the beginning of the maintenance stop," says Foreman **Veli-Matti Hakala** from Uponor Infra.

Ready well before the deadline

Work on installing the pipes could begin about midday on the Tuesday of the maintenance stop week, by which time a bypass pump for sludge from clean water production had been installed. In addition, the gravel and sludge layer that had gathered on the bottom of the channel had to be removed before the new pipes were installed.

The renovation was begun by feeding the first pipe into the channel under the factory building.

"When the pipe fed under the building was in place, an excavator was used to insert the other 42-metre long pipe into the channel outside the building."

Branches were only made on the outside section of the pipeline, because it was impossible to open the factory floor due to the production machinery.

"Several side branches made of polypropylene in diameters of 110, 315, and 500 millimetres were added to the outside pipeline," Hakala says.

Both Parpala and Kärnä were surprised by the speed of the installation. The original deadline for completing the work was Saturday evening, but the job went exceptionally well and was finished on Wednesday afternoon.

"The installation went much faster than what we had expected," Parpala and Kärnä state.

"Weholite is light and easy to handle, as the installation time shows," Hakala notes.

The renovated waste water channel was taken into service at the end of May. Once the land had been refilled, the concrete cover was reinstalled to protect the new pipes. New asphalt had been laid in the yard by the end of June. ■

TEXT Monika Tarnawska » PHOTOS Krzysztof Kobiałka »

An optimal solution for a Polish power plant

WehoSlurry polyethylene pipes with an additional, internal slurry layer, provided an optimum solution for hydrotransporting ash to the Bełchatów Power Plant's disposal site.

The ash is transported to the disposal site in a water-and-ash mixture in a 1:1 ratio.

The 5.472MW Bełchatów Power Plant located near Bełchatów, in central Poland, is the world's second largest lignite-fired power plant. It is also the largest thermal power plant in Europe, and the second largest fossil-fuel power plant worldwide. The power plant is owned and operated by PGE GiEK Oddział Elektrownia Bełchatów, a subsidiary of Polska Grupa Energetyczna.

In 2008, during the construction of technical maintenance facilities for a new 858MW power generating unit, Uponor Infra supplied about 3km of WehoPipe pressure pipes, with diameters ranging from 225 to 900mm, for the installation of raw water and preheated water systems.

PE PIPES PROVED TO BE THE BEST SOLUTION, GIVEN THEIR FLEXIBILITY AND RESISTANCE TO CORROSION AND UV RADIATION.

A few years later, in 2016, the Bełchatów Power Plant asked Uponor Infra to assist it in developing an ash hydrotransport system.

The ash problem

One of the byproducts of lignite (brown coal) combustion is ash, which is deposited by the Bełchatów Power Plant at the Bagno Lubień disposal site. Before 2010, the ash was dry stored. However, due to high dust emissions, the Power Plant had to switch to a wet storage system. In 2011, the Power Plant went ahead with preparations for the installation of an ash hydrotransport system and the disposal site's customisation for this type of coal combustion waste. The hydrotransport system and wet storage technology helped to reduce dust emissions and increase the ash storage capacity.

The ash is transported to the disposal site in the form of suspension, i.e. a water-and-ash mixture in a 1:1 ratio. The main distribution lines leading to the disposal site are made of steel for greater resistance to the high-temperature ash fed into the system upstream.

Although the dusting problem was solved, another challenge lay in ensuring the mixture's uniform distribution over an area of 416ha, because the dense material becomes a hard shell once the water is removed.

The best solution

Uponor Infra participated in the technical dialogues alongside the investor (the Bełchatów Power Plant) and contractor (Ramb), and served as a specialist adviser. Ultimately, the decision was taken to use WehoSlurry polyethylene pipes with an additional, internal abrasion-resistant slurry layer for connection to steel pipes and the distribution of the ash mixture to the disposal site. Polyethylene pipes proved to be the best solution, given their resistance to corrosion and UV radiation in general, while their flexibility makes them suitable for dynamic environments, including low temperatures. Around the disposal site, there were a total of 79 discharge points made of steel pipes to which the WehoSlurry pipelines were connected.

"A pipeline connection method is devised to enable the supply of the mixture to the centre of the disposal site and then – by reducing particular pipeline sections – its distribution towards the edges of the site, thereby achieving a uniform layer," explains **Krzysztof Kobiałka**, Industry Sales Manager, who represented Uponor Infra during the technical negotiations. "The pipelines are then reconnected and another layer is poured into the centre," he adds.

The 15-metre sections were installed using AVK Victualic pipe-to-flange joints, which allow the quick and easy assembly and disassembly of the piping system. A total of 5km of WehoSlurry pipes, with a diameter of DE/ID 250/203mm and manufactured by Uponor Infra in Kleszczów near Bełchatów, were used for the project.

Use of WehoSlurry for transporting the very awkward water and ash mixture, and the possibility of repositioning pipeline sections to ensure the uniform distribution of the abrasive mixture, proved to be an optimum solution. This is confirmed by the power plant's maintenance department. ■

WEHOSLURRY PIPING SYSTEM PROVIDED BY UPONOR INFRA

- Diameter: DE/ID 250/203
- Total thickness of the pipe wall: 23.5mm
- Thickness of the slurry layer: 8.7mm
- Thickness of the carrier pipe wall: 14.8mm

PARAMETERS OF THE TRANSPORTED MATERIAL

- Water-and-ash mixture in a 1:1 ratio
- Max. operating pressure: up to 6 bar
- Max. temperature: 30°C

A total of 5km of WehoSlurry pipes were installed for transporting the water and ash mixture to the disposal site.

TEXT Tobias Thorell » PHOTOS Carl Kjellberg »

Tobias Thorell (left) of Uponor, Rikard Söderström of Fjärrvärmeprojekt Sverige AB and Hans Jakobsson of Stockholm Exergi visited the site at the early stage of the project.

Power boost for Stockholm´s district heating network

Close and efficient cooperation and flexible deliveries are ensuring the smooth renewal of a district heating network in a busy city environment in Stockholm, the capital of Sweden.

Stockholm Exergi AB is an energy utility company that operates in Stockholm. It is jointly owned by the City of Stockholm and the Finnish energy giant Fortum Oyj.

The company produces district heating, district cooling and electricity. Today, it supplies heat to approximately 800,000 inhabitants in the Stockholm region.

Previously known as Fortum Värme, the company adopted its current name a short while ago.

"The company was renamed because the City of Stockholm bought half of it from Fortum about a year ago. In this respect, the city wants to be an active owner of its large stake in the energy company. It also meant much more cooperation with the city than before, both on practical and environmental matters. For example, we are working together to decommission our coal-fired heating plant in Värtan by 2020," says **Hans Jakobsson** of Stockholm Exergi.

THE SIZE OF THE PIPE INCREASES TO DN800, SO THAT IT CAN TRANSFER MORE HEAT ENERGY BETWEEN PRODUCTION FACILITIES.

Stockholm Exergi's goal is to use 100% renewable fuels by 2022. This is of major importance for Stockholm's climate strategy, since the city aims to be fossil-fuel-free by 2040.

Stockholm is already considered one of the world's cleanest capitals, having been rated the third most sustainable city in a comparison of 100 cities in the world.

A new culvert with better insulation

Stockholm Exergi manages 2,900 kilometres of district heating network in Stockholm area. The company invests some 300–350 Million Swedish kronor per year in the renewal of its network.

"A future challenge lies in the need to largely replace old culverts. We have replaced several special square culverts, and that is what we still have to prioritise," Hans Jakobsson says.

Major ongoing renewal projects include the replacement of an old main pipeline between the Hässelby and Akalla districts in western Stockholm.

"This will need to be replaced due to aging. In addition, we need to increase the size of the pipe, from DN600 to DN800, so that it can transfer more heat energy between production facilities," says Jakobsson, responsible for the project in Stockholm Exergi.

Uponor Infra will supply 7,000m of pre-insulated Wehotherm district heating pipes for the project.

Wehotherm district heating elements are designed for the underground installation of district heating pipeline systems. Their polyurethane rigid foam pre-insulation and rigid connection structure provide the system with excellent insulation properties, mechanical strength and a long life.

"We have worked on several projects with Uponor, which was clearly the best choice of supplier for this project."

"With Uponor Infra´s district heating system, we will obtain a new culvert with better insulation," says Hans Jakobsson.

Challenging work in the middle of a city

Construction of the new pipeline began in December 2017 and the work will be completed in September 2019.

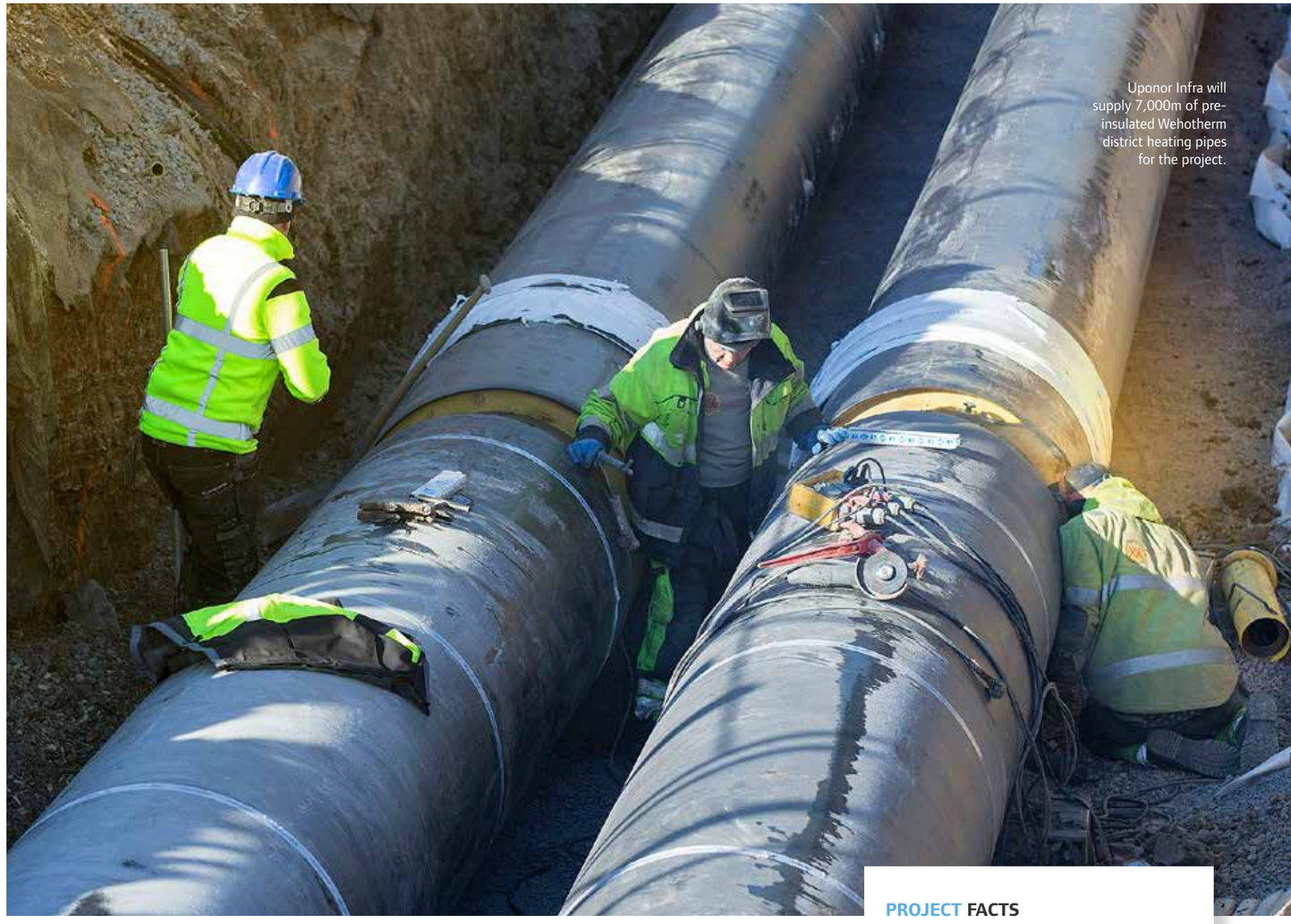
The installation work has been fairly challenging, due to the pipeline´s location in a busy city environment with heavy traffic.

"Laying large pipes in the middle of a city always involves challenges. The route crosses Mälarbanan, one of the busiest railway lines in Stockholm, and the management shaft is next to a major road in the city. Traffic works are also ongoing in the same area," says Project Manager **Rikard Söderström** of Fjärrvärmeprojekt Sverige AB.

"The route also extends through an industrial area with heavy traffic. There is little space for storing the pipes, which sets high demands on transport," he adds.

Rikard Söderström praises Uponor Infra's deliveries, service and flexibility during the project.

"Everything works just fine. Based on close dialogue with Uponor, we are able to plan the work as efficiently as possible. Their service has been excellent – we have no cause for dissatisfaction! It's very easy to work with Uponor," Söderström sums up. ■



Uponor Infra will supply 7,000m of pre-insulated Wehotherm district heating pipes for the project.

PROJECT FACTS

» **Customer**	Stockholm Exergi
» **Country**	Sweden
» **Town**	Stockholm
» **Period of construction**	December 2017–September 2019
» **Project**	Renewal of a district heating network
» **System**	District heating
» **Product**	Wehotherm DN800


uponor
We can´t stop the rain
but we can help you manage it
BUILD ON uponor 100 YEARS
Cities are growing. More and more large, hard surfaces are laid. Heavy rain is becoming increasingly common. As a result huge amounts of storm water need to be taken care of in urban areas. Choosing the right storm water solution matters.
Uponor offers efficient and sustainable solutions for storm water management. Solutions that help protect people, property, and environment. Solutions that deliver low lifetime costs and enable fast and safe execution on site. Solutions that are developed and manufactured with a unique combination of expertise and experience – The Uponor Way.
Read more about our complete storm water offering on www.uponor.com and in the next issue of Pipe World.
www.uponorcom