

THE UPONOR INFRA CUSTOMER MAGAZINE » ISSUE 1/2015

pipe world

A large industrial tunnel, likely an infratunnel, containing multiple parallel pipes and metal walkways. The pipes are arranged in a row, and the walkways are made of metal grating. The tunnel is illuminated by overhead lights, and the overall atmosphere is industrial and technical.

**INFRATUNNEL
PROTECTS
PIPES AND CABLES**

Page 12

**MAXIMUM VOLUME
WITH DESIGNED
SOLUTION**

Page 14

**WEHOLITE TANKS
HAVE MULTIPLE USES**

Page 16



Unbeatable systems for stormwater handling

The **Uponor IQ stormwater system** is a watertight, durable and easily installed basic solution for sites of various sizes. Made of polypropylene, Uponor IQ pipes come in diameters Ø 200–1,200mm.

Uponor stormwater boxes withstand heavy loads and are ideal for detaining stormwater in a wide range of yard, traffic and parking areas.

Weholite is a sure choice for locations requiring large capacity and individual design. Weholite pipes can form the basis of an entire system, complete with detention and storage reservoirs. The entire pipe range goes all the way up to 3,000mm, with reservoir capacity of up to more than 1,000m³.

 Nordic Poly Mark

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Uponor
simply more

Together we will build sustainable underground infrastructure

Underground infrastructure is a major challenge for all of us. When discussing infrastructure, politicians usually mean roads and railways. The water supply and sewer network are often forgotten, at least in discussions. City residents expect urban infrastructure to work, but do not consider what is beneath their feet until something goes wrong.

Cities are growing and infrastructure development cannot keep pace with the rapid movement of people into cities. But heavy rainfall and a larger paved area are not a good combination. Consequences such as flooding, which cost billions, are there for all to see.

I am proud of being in a company which is committed to solving underground infrastructure challenges. Merging two of the most experienced companies into a single organisation, in which experience and expertise are shared, really does make a difference. Although we still offer traditional plastic pipe systems, we are also developing technically advanced solutions in order to save people, money and the natural environment. Flooding solutions form one of our key areas. During the last five years, we have launched a very strong and broad portfolio in order to solve problems associated with flooding and intensive rain, and there is more to come.

During 2014 we executed several fascinating projects all around the world and I'm delighted to gain the opportunity to share some of them with you. I hope that you find them interesting and that they provide you with new ideas on how to solve infrastructure challenges. At the same time, I would encourage all of you to share your ideas with us. We are eager to develop solutions for a sustainable future and believe that, together, we can make a difference!

With best regards,

Sebastian Bondestam
President
Uponor Infra Ltd



issue 1/2015

4 In Brief

6 Cooling

Uponor Infra supplied the world's first plastic super-size intake structure for Philippines' largest oil refinery.

8 Renovation

A renovation project is solving a number of problems in Chelm, Poland.

11 Technology

A tailored blown film line will boost capacity and ensure high quality for a southern Finnish manufacturer.

12 Infrastructure

An almost two-kilometre long infratunnel will house all of the piping of the new city district in the southern Swedish city of Linköping.

14 Stormwater

A designed stormwater basin provides the sought-after maximum volume in Kalundborg, Denmark.

16 Tanks

Durable and light Weholite tanks are easy to handle and can be sized and equipped for various purposes.

19 Renewable energy

WehoEnergy Geothermal Vaults are designed to meet the requirements of a customer's projects.

20 Infrastructure

Quality with excellent warranty and complex system by a sole manufacturer were the requirements for developing buildings in a vast area of Marupe, Latvia.

22 Licensees

Weholite has successfully entered new markets in recent decades and is currently being manufactured on five continents.

pipe world

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Major innovation in renewable energy production

At the Energy Fair, Finland, in October 2014, Uponor presented a new heat exchanger which has raised widespread interest.

The UPONOR water body heat exchanger is a totally new type of product for the generation of renewable energy. Specially designed for northern climates, this heat exchanger can even utilise energy generated by the sun and trapped in water with a temperature of just +1 degrees. At a sufficiently high water temperature, the system can generate up to 1 MW of useful heat output. If the energy need is greater, more exchanger units can be installed in the same system due to the device's modular structure.

Made from PE-HD (polyethylene high-density), this cellular board heat exchanger is highly durable in various alkaline and acidic environments, with no risk of freezing during the winter months. The exchanger is an environmentally friendly and cost efficient alternative for customers such as energy companies, sewage processing plants and large point sources of emissions such as spa hotels.

This low maintenance exchanger has a useful life of over 50 years.

The exchanger is tailored to meet customer needs. The turnkey solution includes design, manufacture, installation and commissioning. ■

500 tonnes of pipeline for hydroelectric power stations

For many years, from its base in Milton Keynes the Uponor Infra UK sales office has been a major supplier of solid wall polyethylene pressure pipes for the hydroelectric power sector. With the support of colleagues in Uponor's Danish and Polish production units, over the last few months Uponor Infra UK has won orders in excess of 500 tonnes. The pipeline diameters to be supplied range from 315mm up to 1,400mm.

In response to ever increasing pressure to reduce greenhouse gas emissions, particularly in energy production, the UK government is encouraging growth in renewable energy, including the introduction of privately developed small-to-medium-sized hydroelectric power stations. ■



Smooth deliveries for a summer cottage area

Uponor Infra is involved in several projects in the industrial area of Viared in Borås, Southern Sweden. One of these projects involves deliveries to "Sommarstaden", a summer cottage area in Viared. When this area was in need of new sewers, stormwater pipes, potable water pipes and chambers, Uponor was chosen as the supplier.

The project has just begun and will continue during the winter and spring of 2015. Skanska's project leader, **Johannes Gustafsson** points out the importance of a local supplier located close to the project site and delivering products that are easy to handle and install. High quality products are also important to Skanska. "So far, Uponor has provided excellent deliveries and service," says Gustafsson. ■

Chamber production to be boosted in Finland

Uponor is to boost its chamber production and deliveries in Finland, to ensure better availability and fast delivery times. In addition, production solutions will be standardised and developed to better meet customer preferences.

Production has been concentrated in two locations and a service centre, Kaivocenter, has been established in Vaasa to serve customers nationally in all chamber-related issues. Kaivocenter brings together two strong players with decades of experience in the sector – Uponor and KWH Pipe. Furthermore, a unit focusing on chamber repairs and single, fast deliveries, is located in the Helsinki region. ■

Uponor Infra Sweden is Supplier of the Year 2013

On June 10 2014, Uponor Infra was declared Supplier of the Year 2013 by Elektroskandia, one of Sweden's leading electrical wholesalers.

Each year, Elektroskandia presents an award to the supplier which has done most to increase its own quality, efficiency and profitability during the previous year.

"This is a great honour and we are very proud. My thanks go out to everyone working at Uponor Infra – you have all contributed to this achievement," says **Robert Burén**, sales manager at Uponor Infra. ■



From the left, Henrik Petterson and Kenneth Östlund from Elektroskandia, Robert Burén, Annika Georgson and Lars Berglund from Uponor Infra and Jan-Erik Ericsson from Elektroskandia.

Wehocoat contracts received



Two commercial contracts, concerning Wehocoat field joint coating machinery for PP coated steel pipes, were signed with two companies in July 2014. Both companies have ordered two sets of machinery for offshore applications, while one also ordered two extruders with the related accessories. The machines are capable of coating field joints for steel pipes from 6" up to 18". It has been agreed that the four machine deliveries will take place in December 2014, just after the FAT (Factory Acceptance Test) tests. Actual PQT (Prequalification Test) tests with end customers will begin on the business customers' premises immediately after the delivery.

The Wehocoat field joint coating system consists of two product families: onshore and offshore. Development of the Wehocoat began with an onshore application based on a pilot project performed in Mäntsälä, Southern Finland, in 2010 alongside Gasum Oy. Gasum is an integrated gas company engaged in the import, transmission, distribution and sale of natural gas, as well as producing and selling biogas. Roughly 1,500 joints were made in rough autumn and winter conditions. Despite the conditions, the team managed to obtain top quality results for its satisfied customer. The onshore machinery recently excelled in a series of demanding tests and demonstrations in Kuwait.

The Wehocoat concept is now a recognised, alternative, field joint coating method used on steel pipes for the oil and gas industry all over the world. ■

Weholite pipes play role in African rhino rescue project

A Wales-based manufacturer and Weholite licensee, Asset International Ltd, has supplied a number of large-diameter Weholite pipes to a South African wildlife agency. These will be used to build a raft for transporting stranded and starving rhinos across water.

The current rhino population on the southern side of the Loskop Dam Nature Reserve is stranded due to a dam wall raised many years ago. **Gait-Jan Sterk** of the Mpumalanga Tourism and Parks Agency

says, "In the dry season, the Mpumalanga rhinos on the southern side of the dam compete with other bulk grazers for limited grazing. However, unlike other grazing animals, the rhinos are unable to cross the river because they are unable to swim. The aim is to relocate a number of the rhinos from the southern side to the northern side of the Loskop, and then move a large



number of the other bulk grazers off the southern side. This will allow the vegetation to recover."

Simon Thomas, the managing director of Asset International, comments, "We were only too happy to be involved in this exciting ecological scheme. As

a company, our environmental credentials have always been of the utmost importance to us, and so to see our products being used in this way is extremely gratifying." ■

Super-sized cooling

The Petron Bataan Refinery (PBR), based in the Philippines, chose Weholite, a high density polyethylene (PE-HD) pipe, for the completion of its cooling water intake and outfall pipelines. As part of the redevelopment, Uponor Infra supplied the world's first plastic super-size intake structure, made from its new Weholite profile panels, which are lighter, faster to install, and therefore much better value than traditional solutions.

The Petron Bataan Refinery (PBR) is the Philippines' largest integrated crude oil refinery and petrochemicals complex. Inaugurated in 1961, with a capacity of 25,000 barrels per day, it has steadily grown

to its currently rated capacity of 180,000 barrels-per-day. In 2011, Petron decided to develop the Refinery Expansion Project (RMP-2), in order to make the refinery more competitive in the Asia-Pacific region, by significantly increasing its production rate (by up to 200% for some products).

The Project Services team at Uponor Infra, composed of international experts in providing turnkey solutions for the marine environment, designed, installed and supervised the installation of a cooling water intake pipeline and discharge outfall, and all of the intake offshore structures for the project.

Easily welded, no corrosion

The Korean company, Daelim, was the EPC contractor, while CCT-Toyo was the consortium that carried out all of the required tasks for the civil and marine works involved in the cooling system.

It did not take long for the CCT-Toyo Consortium to understand all of the advantages that Weholite would provide for their PBR cooling system.

Weholite, the global leading brand in large-diameter pipe technology, is one of the few solutions on the market that can be produced with internal diameters of up to 3.5 metres. The PE-HD pipe can easily be welded together on site and does not corrode, which is a crucial factor when pipes are installed in salt water and marine applications.

As part of the redevelopment, Uponor Infra supplied the world's first plastic super-size intake structure – made from its new Weholite profile panels – which are lighter, faster to install and therefore much better value than traditional solutions.

Less than one month after its first visit to the Philippines in August 2012, the consortium gave the final yes to having a cooling system made of Weholite.

Teamwork in three countries

Uponor Infra Project Services' wealth of experience in these types of projects and installations is the ideal complement for Weholite, particularly when working on a project on the other side of the globe.

610 metres of Weholite SN4 ID 2,400mm for the intake and 450 metres of SN4 ID 2,200mm for the outfall were produced in the Uponor Infra factory in Thailand, under the supervision of Project Services in Vaasa, Finland. The connection flanges and fittings also came from Thailand.

Uponor Infra provided all of the hydraulic and mechanical calculations for the intake and outfall, and handled the supervision of the installation process.

In May 2013, Project Services mobilised a crew of welders from Vaasa to the Philippines to start work at the Orion Port in Manila Bay, the site provided by CCT-Toyo for the welding activities and the launch of the Weholite strings. Meanwhile, the Project Services office in Vaasa was working on the design and calculations for the manufacture and installation of the two pipelines.

The team was completed by the addition of two welders from the Uponor Infra subsidiary in Thailand.

Weholite means major cost savings

Weholite was chosen for its design lifetime guarantee and non-corrosive material, all of which enable Petron to avoid costly maintenance.

Pablo Ramón, the project services site manager at Uponor Infra, commented as follows:

"Weholite was ideal for this complex marine project for a number of reasons, as it eliminated the need for heavy concrete collars to ballast the strings, which can often be extremely risky during submersion. Filling its hollow profile with an inexpensive and pumpable material, such as limestone, was much faster and easier."

"The submarine installation of Weholite is faster than that of steel pipes, allowing the installation of up to 200 linear metres in just one day. Since Weholite doesn't require concrete collars, the contractors were able to use a smaller trench, which minimised the dredging operation. The reduced volume of excavations meant lots of savings, since work done under water costs much more than work done on dry land," he added.

Although this was not Uponor Infra's first marine project in Asia, it was a milestone in the Philippines. It was also a major success, being the first time that plastic had been used as the lead material for an application of this kind in the Philippines. Weholite now has plenty of admirers in this part of Asia. ■

The perfect fit

Key sewage pipeline undergoes successful renovation in Chełm, Poland, thanks to outstanding performances by both the contractor and Weholite.

The renovation project is solving a number of problems that have been plaguing the city's water supply and wastewater treatment system for some time.

In early 2013, the Municipal Services Office in Chełm launched a sweeping renovation project of the city's water supply and sewage network. Worth 24 million euros and partly financed from the EU's Cohesion Fund, the project is set to solve a number of problems that have been plaguing the city's water supply and wastewater treatment system for some time. The main tasks include expanding the existing water supply and sewage networks to cover the greater Chełm area, and the modernisation of the Bielawin wastewater treatment plant. An overhaul of the treatment facility is necessary in order for the unit to process higher sewage flows and meet EU standards on environmental pollution control.

The project also called for the renovation of a 1.5 kilometre section of an old sewage pipeline passing between Lubelska Street and

the Bielawin treatment plant. Originally made from reinforced concrete, the deteriorated pipeline has been causing the city's water and sewage services numerous problems. The project manager for the renovation programme, **Renata Brudnowska** of the Municipal Services Office, explains that the pipeline's location in the Uherka river valley, where water levels are exceptionally high, led to its gradual deterioration. "The channel shifted within the terrain, with some short cylinder sections sliding into the swampy ground. Pipe joints became misaligned and the pipeline began leaking. Sewage escaped into the ground and vice versa – rainwater flowed into the pipeline. This significantly increased wastewater flows, which burdened the treatment unit both technologically and financially."

Worse still, the pipeline's profile became

obscured by heavy sedimentation at the skewed joints. This diminished the channel's real carrying capacity and resulted in the swelling of wastewater flows. According to Renata Brudnowska, increased wastewater flows and the close proximity of the Bielawin treatment unit prevented full maintenance stoppage of the pipeline, which made the necessary repairs of the channel extremely difficult.

Weholite means reliable

Renovation work was carried out on a 1,291 metre section of the pipeline, with a diameter of 1,000mm, passing from Lubelska Street to the Uherka river, and a 155 metre section with a diameter of 1,200mm between the river and the K1 chamber of the treatment plant. Due to demanding hydrogeological conditions such as muddy soil, high water

levels, an unchecked inflow of rainwater as well as single-family housing on the surface level along the channel route, long relining using PE-HD pipes was chosen as the renovation method. For a 59 metre double pipeline with a diameter of 800mm passing through the river, the designers chose short relining with short PE segments. PBRSP Sp. z o.o. from Kielce, a company with extensive experience in no-dig engineering projects, became the contractor for this task.

Uponsor Infra (former KWH Pipe Poland) was chosen to deliver the pipework. The company excels in implementing large-diameter piping projects around the world, and is able to manufacture pipes in sizes ranging from a 300mm to 3000mm internal diameter based on its flagship Weholite technology. Weholite has all the qualities inherent in PE-HD piping: it is lightweight, durable and resistant to corrosion, chemicals and the damage caused by abrasive transported media, while having a low roughness coefficient k. The pipe sections are joined by means of extrusion welding,

THE RENOVATION PROVIDED FOR A LEAK-PROOF AND REINFORCED CHANNEL STRUCTURE.

which provides for a leak-proof and monolithic pipeline. Weholite is also resistant to damage caused by differential soil settlement. As such, it is ideal for projects carried out in demanding hydrogeological conditions, as it guarantees exceptional reliability and durability for underground pipelines.

Smooth installation

Work on-site began in January 2013, with the construction of temporary working chambers and the hydrodynamic cleaning of the old concrete channel. Next, the new PE-HD pipes were laid out at surface level, welded together into longer sections and pulled into the host

pipeline. The pipes were manufactured and delivered in 12.5 metre sections and welded into sections ranging from 20 to 150 metres in length. The welding was carried out by welders from PBRSP Sp. z o.o., who had been trained beforehand by Uponsor Infra service staff. Uponsor Infra also lent out a welding machine for large-diameter piping. After a considerable section of the pipeline had been installed, bottoms were crafted by slicing off the top portion of the piping at selected intervals. The annular space between the host pipe and the new liner was filled with specially formulated, impact-resistant grout able to withstand in excess of 5 MPa. In all, between February and August 2013 Uponsor Infra delivered 1,419 metres of Weholite DN 800–1,000mm pipes to the installation site. An additional 216 pieces of short VipLiner DN 560mm modules in 0.5 metre sections were delivered for the renovation of the pipeline at the river crossing. The renovation provided for a leak-proof and reinforced channel structure. Resistance to wastewater flow has



The pipes were welded into sections ranging from 20 to 150 metres in length.



WEHOLITE IS IDEAL FOR THE PROJECTS CARRIED OUT IN DEMANDING CONDITIONS.

been minimised and the network's parameters have considerably improved. The pipeline is once again fully operational, with its life-cycle extended by at least several decades.

The poor hydrogeological conditions of the river valley provided the contractor with a few challenges during the project. **Robert Dyrda** of PBRSP Sp. z o.o. remembers how, during rain-fall, the ground became swampy and squelchy, while dry spells turned it almost rock-solid. However, based on its long experience, the contractor soon overcame these difficulties and the installation went fairly smoothly. When asked about his working relationship with

Uponor Infra, Dyrda gave the company top marks for high product quality, problem-free cooperation and technical support. This is not the first time the two companies have worked together – in the early 1990s PBRSP Sp. z o.o. – the first Polish no-dig engineering company – approached Uponor Infra with collaboration in mind. Twenty years later, both companies were still enjoying a successful working relationship, implementing demanding engineering projects. There can be no better recommendation for present and future clients seeking reliable and knowledgeable partners.

A new chapter

The renovation of the old sewage pipeline, by means of long relining with Weholite pipes and short relining with VipLiner modules, is the first step towards a modern, reliable and widely accessible water and sewage network for the city of Chelm. According to the Municipal Services Office, wastewater flows in the pipeline have already decreased significantly, although the full benefits of the

renovation will not be felt until the spring.

It is jobs like this – challenging, urgent and requiring in-depth engineering and product know-how – that have lifted Uponor Infra to the top of its game in Poland and made it a sought-after partner among investors, contractors and designers looking to implement large-diameter piping projects. The company operates its own factory near Bełchatów in central Poland, which delivers products to clients in Europe as well as Asia (Georgia, Kazakhstan and Russia).

On July 1, KWH Pipe opened a new chapter by joining forces with Uponor Infrastructure Solutions, the leading international provider of stormwater and sewer systems. This coincides with KWH Pipe Poland's 20th anniversary on the Polish market and underlines its many achievements, as well as a desire to further expand its business. The new company, Uponor Infra, combines the best of both organisations and will continue to play a strong role in the development of the infrastructure systems segment in its key markets. ■

Quality and capacity boosted by **new production line**



A tailored blown film line supplied by Extron Engineering will boost capacity and ensure high quality for a southern Finnish manufacturer. The 17-metre high, 10-metre wide tower structure is one of the largest blown film production lines in Finland.

Kalliomuovi Oy, a southern Finnish firm which has been in business for over 40 years, produces polyethylene film that meets various needs within the industrial, construction and agricultural sectors. The company decided to invest in a new production line in early 2014, in order to lift both quality and capacity while enabling a broader product range.

"Extron Engineering was chosen as the supplier because we were able to provide a tailored, cost-competitive package which fulfilled the customer's needs," comments **Jari Ketomäki**, sales director at Extron Engineering.

Ketomäki explains that pipe and film lines supplied by Extron Engineering are always tailored according to customer's needs.

"The old factory hall imposed its own requirements on the planned line, which required the construction of an extension. A ready-assembled, standard solution just wouldn't have fitted into the space," adds Ketomäki.

Automation ensures high quality

The line, which started up in early November 2014, can produce up to 800 kilos an hour

of 1,000–3,000mm-wide three-layer film. Stretch and heat-shrink films produced on the line are primarily intended for the packaging industry, or as protective films.

The line was assembled on a turnkey basis and includes the full range of required production equipment, a full monitoring system

and automatic recording of production data.

"High-level automation system was an important criteria for the customer. The line includes built-in gravimetric control system and automation unit for controlling film layer thickness, while irregularities in the film are evened out by automatic profile measurement and control. Ready roll change is also fully automatic. The equipment enables three winding techniques," explains Ketomäki.

The production line has three extruders, two of which are 70mm in diameter, and one is 90mm. "When we want to increase the shrink capacity, we can change the 500mm die lip for a 350mm one."

Production is also boosted by a servo-controlled cutting system, which makes for faster and more reliable cutting than the more commonly used compressed air systems.

"A servo-controlled cutting system also needs less maintenance," Ketomäki adds. ■

EXTRON ENGINEERING IN BRIEF

- » Extron Engineering, a member of the Uponor Infra Corporation, is an innovative company offering advanced technical solutions in extrusion and printing techniques for the plastic industry. Extron is a pioneer in the industry. Numbering among its achievements is the delivery of the world's first ten-layer film production line in 2000.
- » Extron has nearly 30 years of experience in designing and building high-tech machinery for the world's major companies engaged in the manufacture of plastics, multi- and monolayer films, as well as plastic piping. Extron supplies machines and complete turnkey production lines designed to meet precise customer requirements.
- » It is the only producer of industrial-scale extruders and supplier of whole production lines in the Nordic countries.

Infratunnel protects pipes and cables in new residential area

An almost two-kilometre long infratunnel with an internal diameter of 2.2 metres will house all of the piping needed for the infrastructure of a new city district being added to the southern Swedish city of Linköping. Excavations in the streets and residential areas will soon be history, since all maintenance and installation work will be achievable within the infratunnel.

Almost two kilometres long and 2.2 metres in internal diameter, the Weholite infratunnel was installed in the Vallastaden district of Linköping during the summer of 2014.

Vallastaden is the site of a modern, ecologically sustainable city district, now under construction and intended to house around 10,000 residents. A housing fair area will also be built on the site.

"All pipes and cables in the new residential area will be located in the Weholite infratunnel. Water, sewage, district heating and district cooling pipes,

as well as electricity and data cables, will run through the tunnel," says **Andreas Lillmals**, site manager at Uponor Infra.

The infratunnel will also house a waste collection pipe system for the area, which will use suction and air flows to carry waste to a collection point.

Uponor Infra has been in charge of the Infratunnel's design, manufacture and installation. The customer is the Technical Department of the City of Linköping.

Lillmals explains that Uponor Infra installed its first infratunnels in Germany in the 1990s.

"However, they were only a few hundred metres long."

Excavation-free maintenance

The great advantage of an infratunnel is the fact that it relieves cities from a familiar curse: regular hole-digging in streets.

"All maintenance work and tasks such as the installation of new pipes can be handled in the tunnel. There is no need to dig holes in streets or redirect traffic. Residents won't even be aware that something is going on underground."

Working is safe in a ventilated and well-lit tunnel. There is no need for heating, since the subterranean temperature is five degrees year round.

Workers can access the tunnel via concrete chambers built at turning points.

The tunnel also branches off to properties located at intervals along its route.

"An infratunnel is a slightly more expensive solution than simply installing pipes and cables directly in the ground in the traditional manner. However, because pipe maintenance and adding more infrastructure are so easy, the tunnel will pay itself back with time," explains Lillmals.

Christian Vestman at Uponor Infra's Project Services points out that providing pipes and cables with the protection of an infratunnel lengthens their maintenance intervals and lifecycles.

"Because the pipes do not come into contact with groundwater, for example, their valves do not rust."

"And when the need arises to renew cables, financially valuable materials containing copper are easy to recover," Vestman comments.

It is estimated that the infratunnel itself will last for at least one hundred years.

In a greenfield site – or the middle of a city

Vestman explains that infratunnels are ideal for new, greenfield sites and locations where excavation is hampered by groundwater or bad soil conditions.

"However, an infratunnel is also a great solution for built environments and sites that are criss-crossed by a network of pipes and cables. In pipe work, the price of the pipe is not the key issue. Repeated excavation, asphaltting, kerbing and landscaping are the most expensive items."

Excavation is also hard on underground infrastructure.

"When a lower set of pipes is renewed, during the backfill phase it can be difficult to return the ground to its original firmness. Such

work can cause problems for the upper pipes, which only come to a head a few years later."

Module solution speeds up installation

"The Linköping infratunnel was installed in a greenfield site whose drawings were only finalised after the work had already begun. For this reason, the pipes and cables were only laid in the infratunnel afterwards," Lillmals explains.

An infratunnel can also be built as a module solution. In such cases, the pipes to be housed by the tunnel are pre-installed at the factory. The pipes are connected up after the infratunnel has been set in the ground.

"A module solution speeds up installation," affirms Vestman.

Tunnel has aroused interest

Linköping already has a new infratunnel under planning to be installed in the city centre and to run under areas including the main street.

"We aim to begin work next summer," comments Vestman.

Linköping's example has raised interest elsewhere in Sweden. Visits have been made from all over the country.

"We are currently engaged in negotiations with around ten cities, some of which would like work to begin next summer," Christian Vestman points out. ■

WEHOLITE INFRATUNNEL LINKÖPING

- » Tunnel built from Weholite pipes almost 2 km in length and 2,200mm in diameter
- » Water, sewage, district heating and district cooling pipes, as well as electricity and data cables and a waste collection pipe system have been installed in this ventilated and lit tunnel
- » The infratunnel will serve a residential area currently being built for around 10,000 inhabitants
- » Uponor Infra is in charge of the design, installation and materials for the tunnel. In addition, Uponor Infra is supplying some of the pipes
- » The customer is the Technical Department of the City of Linköping

Maximum volume with designed solution

The Kalundborg Utility Company needed a new stormwater basin for the town of Snertinge, which is located on Sjælland Island near Denmark's capital, Copenhagen. The existing one – an open basin – lacked capacity and, owing to space restrictions, the company was looking for a closed basin solution to be located below a cycle track. In order to provide the sought-after maximum volume within the given area, Uponor chose a designed solution involving Weholite pipes of several dimensions. This solution provided additional capacity of 125m³ compared to the original proposal.

Uponor chose a solution using Weholite pipes with dimensions DN/ID 1,500, 1,200 and 1,000mm with manifolds.

The proposal in the original plan had consisted of 4x800mm of parallel plastic lines.

“Because some of the area in question was problematic due to sparse earth cover, I began thinking over our designed solution options, since we were looking for maximum volume. The Kalundborg Utility Company had sent a height map on which the elevations were indicated. That led me to consider a designed solution in several dimensions, balanced in accordance with the varying earth cover,” says engineer **Bent Rønfeldt** of Uponor.

To provide maximum volume in the given area, Uponor chose a solution using Weholite pipes with dimensions of DN/ID 1,500, 1,200 and 1,000mm with manifolds. This solution provided an additional capacity of 125 cubic metres compared to the original proposal.

A number of advantages with a plastic solution

“The Kalundborg Utility Company chose Uponor's Weholite solution, due to its greater capacity compared to the original proposal. We used this solution to upgrade the system to deal with 10 years' worth of rainwater,” says **Jette Malchau** of the Kalundborg Utility Company.

“Furthermore, we could see a number of advantages in the plastic solution. Our operations department evaluated the solution and was highly enthusiastic about the future operating costs. Because the Uponor solution is very cleaning-friendly, we estimate that, in the long term, the overall costs will be lower than for an open basin solution. The Uponor solution is also fully welded, which means greater safety with regard to tightness in the long term.”

Malchau continues, “Another factor involved in estimation was the amount of space at our disposal. A plastic solution would be easier to handle in the limited space available, due to its low weight.”

Another important factor was safety; the basin was to be located next to a kindergarten and, to avoid the risk of children falling into the basin, a closed basin was a much safer option.

“We had only one concern: the uplift pressure of the plastic basin. Uponor performed calculations on the basis of the indicated elevations, which decided the matter based on the three chosen dimensions. We were able to avoid an uplift safeguard by reducing the dimensions where there was least earth cover,” concludes Malchau.

A positive experience

The contractor **Jan Slott** comments, “Our cooperation with Uponor has been highly positive. The installation process was extremely efficient. Actually, I think that the installation time was half of what it would have been if the basin had been concrete. We were also able to use smaller machines, which reduced our operating expenses and resulted in lower CO₂ emissions. The plastic pipes could be installed quickly when they arrived in lengths of 12.5 metres.”

Jan concludes by saying that working with Weholite pipes has been a positive experience. He is certain to consider Weholite in future projects. ■

Weholite pipe can be used for the construction of tanks with a diameter of over three metres.

Weholite tanks have multiple uses

Durable and light Weholite tanks are easy to handle and can be sized and equipped for various purposes. Weholite is used for manufacturing products such as potable water, firewater, stormwater and chemical tanks, alkalisation plants, retention tanks, and separators. Weholite alkalisation plants use limestone, which guarantees an even and safe result.

With their layered construction, Weholite pipes are durable, flexible and light. They are manufactured from PE or PP profile using spiral seams. Thanks to the structure of the Weholite pipe material, tanks can be built with a diameter of over three metres.

Weholite can be used for manufacturing complete pipe and tank systems and highly versatile customised solutions.

"When used in tanks, Weholite is durable, watertight, light and hygienic," emphasises **Anders Andtbacka**, product manager at Uponor Infra.

Weholite is used for manufacturing products such as potable water, chemical, stormwater and alkalisation tanks. The tanks

are always customised to meet the customer's needs.

"There is no risk of corrosion in the case of a plastic tank, which can withstand almost all chemicals." In addition, Weholite tanks are often delivered for industrial use.

Nothing from the tanks themselves dissolves into whatever the tank contains, or into the environment.

Andtbacka points out that the other benefits of Weholite include fast and easy installation and commissioning. Weholite is light to handle, which speeds up the installation and commissioning of a tank.

"The system is built in the factory, ready for installation. This significantly reduces the amount of work and time spent at the installation site."

LIMESTONE ALKALISATION IS SAFE AND EASY

In most cases, water's acidity, that is its low pH value, poses no health risks and does not affect the taste of the water. However, it can cause corrosion-related problems in a water network and increase the level of impurities, which disturb hydraulics.

Lye or limestone can be used to raise the pH value of water, a process which is also known as alkalisation.

Limestone is used for alkalisation in Weholite tanks. Unlike for substances such as lye, there is no risk of over-dosing when using limestone. Such a system is easy to use and impurities can easily be removed from limestone by using air, or by rinsing with water. Another benefit of using limestone is operational reliability.

Weholite alkalisation tanks, which are factory-assembled and installation-ready, can be easily and quickly installed on site.

Clean water in all conditions

A new groundwater intake facility is being built in Kuhmo, which is located in Eastern Finland near the Russian border. A Weholite alkalisation plant, including a pumping station, will be installed alongside the facility. In Kuhmo, this project is regarded as a key investment for the future.

The project also includes the construction of a potable water pipeline and transfer sewer line to the centre of Kuhmo, around ten kilometres from the new water intake facility.

According to project engineer **Timo Piirainen** from the City of Kuhmo's water services, the project is above all an investment for the future. The objective was to ensure that people in Kuhmo could be provided with high-quality potable water under all circumstances.

"During the torrential rain of August 2012, surface water leaked into our main water supply facility, leading to a deterioration in water quality, and we had to take exceptional measures to continue our water supply. Similar and other risks related to water supply are also faced by our two facilities located near the centre."

The new water supply facility is located in an unbuilt and unditched ridge area, where there is no such risk.

It is estimated that the new facility will be able to deliver 500 cubic metres of water per day. This amounts to almost half of the water supply required by central Kuhmo.

"Another important issue is that the new water supply facility provides alkalised water ready for use. The water can be distributed directly."

Safe and quick installation

In Kuhmo, the preferred solution was a Weholite alkalisation plant and a pumping station.

"A concrete tank cast on site would be a more labour-intensive and time-consuming option. Due to concrete construction, the excavations would also have remained open for longer. This would have increased the risk posed to groundwater quality during construction on the site. We came close to reaching groundwater level at the construction site."

"An alkalisation plant of 30 cubic metres and a pumping station of 100 cubic metres were rapidly installed. The tanks were in place within a couple of days."

The citizens of Kuhmo have no previous experience of Weholite tanks, but have closely followed feedback from elsewhere.

"The tanks are already used a great deal. The alkalisation results and user experiences have been good," Piirainen says.

"Water quality is our top priority. We don't want to take any chances with water quality. That's something we always take into consideration when selecting partners," Piirainen emphasises.



A leak-proof and **hygienic plant** quickly in place

People who live on the shores of Ala-Kitkajärvi, Kuusamo, in Northern Finland will soon enjoy high-quality, alkalised potable water.

A major project is about to be completed in Takkusalmi, located north of Kuusamo, when a new pumping station and alkalisation plant are constructed in the area surrounding a ridge. The chairman and CEO of Takkusalmi water cooperative, **Jouko Käkelä**, is delighted with the boost about to be given to the area's water supply. The cooperative already has a pumping station and alkalisation plant at the other end of this network of 80 kilometres surrounding Ala-Kitkajärvi.

"In the new Weholite alkalisation plant, the pH value of groundwater can be increased from 6.5 to 7.3. Iron and manganese remain in the limestone, from where they are removed. This will ensure that the network stays in good condition," says Käkelä.



Installation was quick and easy.

"We received a complete package delivery from Uponor. The internal pipes and pipe supports had already been installed in the system at the factory. This made it easy to connect external piping to them on the construction site."

Plastic plant the number one option

"For us, a plastic plant was always the number one option. These are considerably faster

to construct than concrete tanks. A tank made of plastic suitable for food storage is also watertight and hygienic."

The system contains two tanks and a pumping station.

"Water is pumped from a well into an alkalisation tank of nine cubic metres, from where it flows freely into a water tank of similar size. From there, water is then pumped into the network."

The water cooperative in Takkusalmi has 234 members. In addition to the village of Takkusalmi, the water supply network covers four surrounding villages. Rukatunturi, a popular ski resort and a recreational centre, is located only 10 kilometres away, and there are also many cottages in the area.

Known for its sandbanks and deep-water areas, with its clear water the rugged and unregulated Kitkajärvi has been called the largest spring in Europe. People living along the lake's shores will soon be able to enjoy high-quality, alkalised water.

From the ground towards **the future**

Demand for geothermal energy is increasing. The public has become more aware of renewable energy resources and desires a clean, green and efficient alternative to traditional heating. WehoEnergy Geothermal Vaults are designed to meet the requirements of a customer's projects.

Geothermal energy is an environmentally friendly and renewable energy source, which uses the ground's ambient temperature to help deliver heating and cooling for both residential and commercial applications. By incorporating geothermal heating and cooling energy systems into projects, we can reduce greenhouse gas emissions and help to create a cleaner and brighter tomorrow.

In 2011, the Canadian operations identified this niche and launched their own Geothermal Vaults product.

Working diligently with the customer base to identify customer requirements, Uponor Infra saw the need to enhance this approach by incorporating design modifications, including efficient circuit layout and end caps made of Weholite profile panels.

Improvements in production efficiency enabled Uponor Infra to pass cost savings onto customers. Based on working together with the sales team and engineering department, factors such as providing 3D shop drawings and improving customer response time were the key to boosting success. A recently created vault solution, unique for single residences, will be introduced in early 2015.

Today, customers testify that Uponor Infra has the finest vaults in the business. The revenue generated by this product has tripled from its modest beginning in 2011.

Leak free and corrosion resistant

WehoEnergy Geothermal Vaults are manufactured from high density polyethylene and are combined with high quality components to provide the most efficient and longest lasting geothermal vault on the market. Since most of the vault is fabricated from Weholite, it has the same material and structural qualities as pipes made of the same material. Vaults are made of the grey Weholite PE-HD pipe material since, for inspection purposes, end-users prefer a lighter interior.

They are designed to meet the customer's specific geothermal needs and are leak tested before shipment.

Both WehoEnergy Geothermal Vaults and WehoEnergy Geothermal Manifolds come prefabricated from Uponor Infra manufacturing facilities; this helps to reduce costs and installation time for installers. ■

Uninterrupted water supply

A groundwater supply facility and an alkalisation plant are being built in Rovaniemi in Finnish Lapland, near the Arctic Circle. Weholite was chosen for this project on the basis of good user experiences in the past.

In the autumn of 2014, the municipal public utility of the City of Rovaniemi, Napapiirin Vesi, was granted permission to build a groundwater intake facility and to extract groundwater from the Nuoralampi groundwater area, which is located north-west of the city.

A Weholite alkalisation plant will also be constructed as part of the groundwater intake facility.

"The water in Nuoralampi has been tested. Since its pH value is only 5.95, alkalisation is necessary," says **Jouni Räisänen**,

director of water services.

Napapiirin Vesi has had previous experience of Weholite alkalisation plants. In 2008, a Weholite alkalisation plant was constructed as part of the city's water supply facilities.

"The fact that the plant has functioned so well led to our interest in purchasing another, similar solution."

Two filters will be installed in the new alkalisation plant, which will have an hourly flow of 30 cubic metres.

"When one of the filters has to be rinsed,

the other will be used. There will be no breaks in water distribution," explains Jouni Räisänen.

The Napapiirin Vesi project also involves a state water treatment project, which will include the construction of a transfer sewer from three nearby villages to a central treatment plant in Rovaniemi. A water supply line will be placed in the same excavation.

"The idea is that Nuoralampi's alkalised water is used in the surrounding areas, while the rest is distributed to users in the city centre." ■



WEHOENERGY GEOTHERMAL VAULTS

- » A leak-free and corrosion-resistant high-density polyethylene Weholite structure
- » A light-coloured interior for improved visibility inside the vault
- » Available with self-balancing headers
- » Butt-fused manifolds
- » Pressure temperature ports on all outlets
- » High-quality valves
- » Designed for easy pressure testing and purging
- » Design assistance available
- » Lightweight design
- » Custom fabricated
- » Lighting, sump pump and inline fan available



Quality with an excellent warranty

Quality, with an excellent warranty and a complex system by a sole manufacturer, were the requirements for developing buildings on terrain that not only lacks previous construction, but also covers a vast area of Marupe, Latvia.

In the autumn of 2014, the implementation of a large-scale project was begun in Marupe, a district on the outskirts of the Latvian capital, Riga. The developer is Vastint Latvia SIA, part of the Vastint Group, an international real estate organisation with 25 years of experience.

Overall, the 13-hectare site will be occupied by around 12 hectares of mixed construction. Office buildings will be built along the motorway, forming a buffer zone for residential construction which will be situated close to a private houses area. A spacious green zone with existing valuable trees will

separate the both areas. Construction begun on a meadow, far from the city's infrastructure. The area had an abundance of groundwater, and a drainage system that was out of order.

Arteries of a building

Generally, the beginning of a zero-cycle construction stage is preceded by the area's development and organisation, with external engineering networks, trunk roads, water supply and sewage systems, a stormwater drainage system and gas pipelines all in place, and with a complete renovation of land improvement systems. Uponor product systems form part of the construction of

pipelines that stretch out for kilometres and which are used to supply water or gas and to drain municipal sewage, stormwater or groundwater from land improvement systems.

"Underground communications are a building's 'arteries', and the building's viability fully depends on them, just as the health of a tree depends on that of its root system. No building can exist without its 'arteries' being established in the soil," says Janis Sivins, project manager at Vastint Latvia.

Uponor is establishing and providing a safe basis for such arterial systems, enabling the construction of active business and convenient residential areas for the near future. The



The residential buildings will have 665 apartments.



UPONOR PIPING SYSTEM SOLUTIONS FOR THE PROJECT

- » **Construction area:** 13ha
- » **Office park:** Business Garden Riga, 42,000m²
- » **Residential buildings:** Lindenholma, 665 apartments
- » **Uponor pipeline installation scope:**
 - land improvement drainage: 1,143m (including 396m of IQ DN/ID 800mm)
 - potable water: 1,385m
 - municipal sewage: 880m
 - stormwater drainage: 1,150m
 - gas pipeline: 771m

building and communications plan includes the existing, valuable trees – none of which will be cut down or suffer damaged roots.

Engineering construction performed in two stages

The large-scale engineering construction project consists of two parts, with Uponor products being used in both. One part involves the restoration of drainage systems – the rebuilding of the channel, and its reconstruction and cleanup. The other consists of the establishment of a new network.

The first task was to lower and drain the high groundwater level; this was performed simultaneously to the reconstruction of the land improvement system, within as well as beyond the construction area. In order to provide sufficient stormwater drainage, 800mm diameter IQ pipes were used under the planned drainage ditches, with the aim of draining the water into the overflow wells and further on into open ditches. Uponor specialists supplied the pipelines in accordance with the design specifications, participated in the project by providing technical support, and addressed issues relating to the establishment of the pipeline and its anchorage and connection to the overflow wells and existing drainage systems.

Sustainable solution for 50 years

Uponor IQ polypropylene pipes, which are available in a wide range of sizes, were used in the construction of stormwater drainage and the overall drainage system. Construction of the municipal sewage system was based on pipes from the Uponor Ultra Classic product group, which are smooth and highly capable of maintaining rigidity and retaining their geometry under the influence of soil pressure. Such systems are essential for applications that require the maintenance of a steady flow on flat ground. Smooth-walled pipes do not sink into the ground, as sometimes happens to pipes with a corrugated surface; furthermore, this sustainable solution will serve for 50 years or even longer. Pipes from the Uponor

Profuse product group were used to establish the penstock and gas supply systems. These polyethylene pipes have a polypropylene liner that prevents damage during transport and installation.

All Uponor material supplied for the implementation of this large-scale project is made of polyethylene or polypropylene, which are environmentally friendly in terms of production of the raw material, the manufacturing process and the product's utilisation.

Invaluable experience

"We are gaining invaluable experience from developing buildings on terrain that not only lacks any previous construction, but covers a vast area, requiring the establishment of underground infrastructure stretching for several kilometres before the construction process can begin," says Janis Sivins.

"Until now, our projects have involved installing an external network of a few dozens of metres of pipeline and connecting these to the main systems. On this occasion, the requirement was for quality with an excellent warranty, and a complex system from a sole manufacturer. Uponor matched these criteria. Wherever possible, we use system products belonging to one brand with a consistent installation and connection technology." ■

Weholite is manufactured worldwide

Weholite has successfully entered new markets in recent decades and is currently being manufactured on five continents by eight licensees and Uponor Infra's own factories in Finland, the Nordic Countries, Europe, North America and Asia.

In the early 1980s, Uponor Infra received several inquiries about large-diameter pipes. This resulted in the development of the large-diameter Weholite pipe. In 1983, the first prototype was developed at Uponor's Vaasa factory in Finland, leading to the first pipe installation, in which two road culverts with an ID of 500mm were installed near the city. In 1989, production began at the Uponor Infra factory in Thailand.

The first Weholite license in South Africa was granted in 1993. The "Weholite family" has been growing steadily ever since and Weholite licensees can now be found in the UK, Iceland, South Africa, Oman, Chile, Japan, Malaysia and Brazil. In addition, one production line was delivered to Libya, but is not yet operative due to local circumstances.

"Over a period of 30 years, Uponor Infra Technology has delivered a total of 35 production lines to customers worldwide and our own factories," comments **Tapio Alanen**, marketing manager of Uponor Infra Technology.

Weholite's properties ensure a long service life

Weholite is a continuous production process, based on several patents relating to the optimisation of raw material usage in the manufacture of structured wall plastic pipes in a wide range of ring stiffness classes.

The structure of the Weholite pipe provides a favourable weight/ring stiffness ratio compared to other lightweight pipe concepts. The product is primarily designed to compete against traditional materials, such as concrete and steel, in the larger

diameter range up to DN/ID 3,500mm for non-pressure applications such as gravity sewerage, drainage, stormwater, road culverts and retention tank systems.

The pipe is used extensively worldwide in gravity and low pressure applications with intakes, outfalls, stormwater, sewage and other liquids of various kinds. Weholite fabricated assemblies are designed for special functions, such as chambers, retention tanks and wastewater treatment units for remote regions.

"The Weholite pipe's smooth surfaces enhance flow rates compared to steel, cast iron or concrete," states Tapio Alanen.

The lightweight polyethylene pipe is continuously extruded and thereby provided in any shippable length, facilitating rapid installation. Its corrosion resistant properties ensure a long service life.

Weholite pipe is mainly jointed by extrusion welding, with the joints meeting the standards for leak-proof joints.

"The Weholite pipe system has been successfully used in many thousands of projects in different parts of the world. That's why

THE WEHOLITE PIPE SYSTEM HAS BEEN SUCCESSFULLY USED IN MANY THOUSANDS OF PROJECTS IN DIFFERENT PARTS OF THE WORLD.

we feel entitled to say that we have valuable know-how on the manufacture, installation and use of the product."

A trustworthy brand around the world

Many Weholite licensees have a background as plastic pipe manufacturers who have sought to differentiate themselves by offering a unique product such as Weholite.

"The new licensee gains a globally well-known product family and a brand which provides market credibility. This means that the marketing is already half-way there. An unknown pipe manufacturer may also pose a risk during large pipe projects in different parts of the world," Tapio Alanen adds.

Since Uponor Infra is a plastics pipe producer as well as a pipe production equipment manufacturer, its decision to produce Weholite production machinery alongside the pipe manufacturing process was sound.

"In addition, we have had the opportunity to develop pipe systems and technology based on regular feedback from customers, our own factories and licensees."

Consequently, under license Uponor Infra can supply a complete production machinery set-up, including straight pipe production, fitting manufacture, joint fabrication, field joint equipment and quality control.

"The machinery to be delivered can consist of three different Weholite production lines covering a pipe-size range of DN/ID 400-2,200mm, 800-3,000mm and 1,200-3,500 mm, as well as optional equipment for jointing, fitting fabrication and the testing of pipes."

Licensees receive all the necessary support

"The licensees have access to R&D, training and support services such as technical, product, laboratory and project services. Of course, trademarks, references, patents, product standards and product or application related know-how are also at their disposal."

As a member of the Uponor Infra Family, a licensee gains a network of contacts and information sharing. Actual information on issues such as product and technology development, standard updates and presentation material is regularly distributed to licensees. Practical assistance is provided on technical matters, such as those associated with production, manufacture and installation. Support is also available for everyday marketing and customer relations.

"Most of the licensees have developed niche products based on Weholite, which enable them to find new market segments and grow their business," explains Tapio Alanen. ■

The most important sustainability in the world

Tomorrow's infrastructure faces enormous challenges and crucial changes.

For Uponor, this is the driving force and source of inspiration that motivates us to devote every day to creating solutions that simplify life on Earth. We have more than 60 years of experience in developing and manufacturing sustainable pipe systems which protect and transport water, air, electricity, data and telecommunications. It makes no difference if the solution is for a single pipe or a complex system, with our knowledge of human needs and environments, we will always promise to lay the foundations for a secure and functional future.

Uponor is a leading international provider of infrastructure systems.
The Uponor Group operates in more than 100 countries.

www.uponor.com/infra

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simply more