

THE KWH PIPE CUSTOMER JOURNAL » ISSUE 15 » WWW.KWHPIPE.COM

pipe world

**WEHOLITE GUARANTEES
A HUNDRED-YEAR
LIFESPAN**
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WON'T LET
THE PIPES FREEZE**
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**DON'T COUNT ON
LUCK TO PROTECT
YOU FROM FLOODING**
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Weighted Weholite DN/ID 2200 mm SN4, length 205 m, weight 200 metric tonnes. This intake was towed by tugboat to the installation site and the sinking was carried out in one day only.

What a lift for fast installations

KWH Pipe has helped many of its customers to dramatically speed up the installation of large pipes, especially in areas with a high water table or in underwater applications.

Weholite is a structured-wall, high-density polyethylene pipe that is so strong, and yet lightweight, that even long pipelines can be lifted into place. Welding is carried out on dry land. The result is absolutely watertight joints that are as strong as the pipe itself. Pipe lengths of up to 22 metres reduce the number of joints, which further speeds up the installation. If needed, the pipe can be weighted by filling the profile with non-hardening cement mortar.

To save time and money, contact us today!

- Lightweight
- Flexible
- Watertight system
- Corrosion-resistant material
- Cost-efficient, complete solution
- Durable system with a long life
- Pipe diameters up to DN/ID 3 metres
- Internal pressure up to 2 bar



BE PREPARED INSTEAD OF GOING WITH THE FLOW

think everyone has seen the pictures of Venice, Italy, where residents have to walk on wooden planks to stay above the floodwaters in large parts of the city about four or five times a year. The problems of Venice are of course unique, but we could soon be seeing wooden planks in our own cities. Increased precipitation due to climate change forces us to take a good look at our stormwater systems and our preparedness for coping with heavy rainfall.

Urbanization is one of the megatrends in the world of today and tomorrow. This means that more and more people live in cities and more land surface is being covered by hard surfaces such as asphalt and concrete. Old piping systems might not be properly dimensioned for the circumstances of the present and the projected future. Additionally, due to the scarcity of land, buildings are constructed in low-lying areas that previous generations deemed unsuitable.

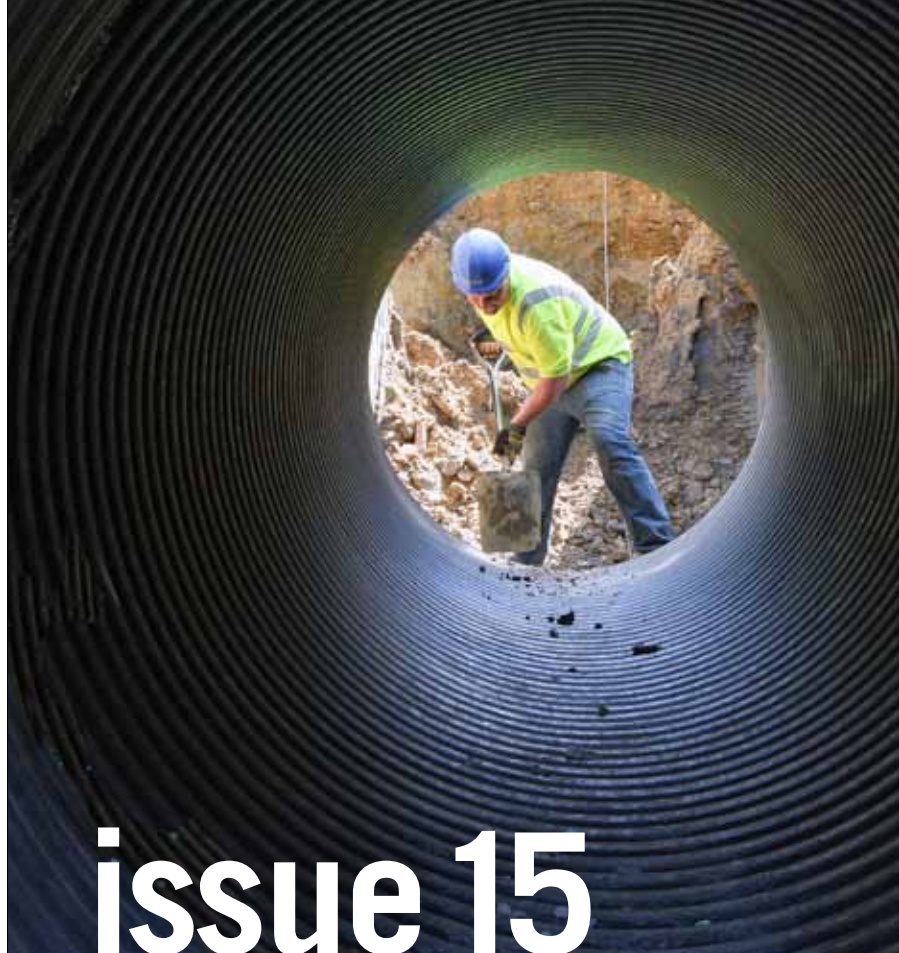
Hard surfaces can cause changes to natural water flow patterns. For example, more water runs off at a faster rate from streets and car parks than from lawns or a forest. Vegetation serves to slow the flow of water and increase its infiltration into soil and groundwater storages. This enables the water to flow more gradually into watercourses over a longer period of time. In the absence of vegetation the increased flow generally results in erosion and scouring of the receiving watercourses.

There are several ways to mitigate the consequences of increased stormwater runoff and the pollutants that it might carry. The best solution must be determined on a case-by-case basis and often you would have to employ several methods to achieve the desired result.

In this issue of Pipe World, we present projects where KWH Pipe has played a role in stormwater management, preventing extreme rainfall from destroying valuable property. Other articles include mining projects and hydropower. Let us take you on a trip of recent projects that display sustainable piping solutions in places from Quebec to Laos, Vladivostok to England!



Jan-Erik Nordmyr
President & CEO, KWH Pipe Ltd.



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Weholite for ventilation

A luxury residential building in Bangkok uses Weholite in its ventilation system.

The high-rise condominiums in the Sathorn district of Bangkok, Thailand, have become the most desired addresses in the luxury segment. Most of the new construction projects have adhered to green building principles in order to protect the environment. One of these is the Urbano Absolute, a 40-floor residential building with a stand-alone pavilion, developed by Pruksa Real Estate Plc. The new high-rise building with 593 flats is situated in the middle of the business district, where there are many embassies and offices of major international companies.

When it comes to obtaining construction permits in this district, the Environmental Impact Assessments (EIA) committee has to approve the project.

One of the issues that the EIA watches closely is that the ventilation system does not have a negative impact on other buildings and the nearby environment. For Urbano Absolute, 200 metres of 800 mm SN4 Weholite was installed to convey exhaust air from the main blower on the parking lot floor to a large garden with plants that can absorb the carbon dioxide. The designer, Mr **Taneth Chaipayong**, a mechanical engineer with W. and Associate Designs Co., Ltd., stated: "Utilizing Weholite for the ventilation system meant that it could be installed faster than with metal pipe and that it will have a longer operational life. Weholite is also lighter, which means that the load on the building is minimized." Mr **Suraphol**, Project Engineer for Teo Hong Silom Co. Ltd. and the main contractor for the project, stated: "I like the easy and fast installation of Weholite. We can work faster under a very tight construction schedule, which lowers costs, meaning that we can reduce the total budget." ■

Organisational changes aim to increase competitiveness

In Finland, KWH Pipe has reorganized its business in order to eliminate overlapping functions, flatten organisational structures and decrease overhead costs. The objectives of the organisational changes are to serve customers better, reduce costs and react more quickly to market developments.

Due to historical reasons, KWH Pipe Finland (plastic pipe systems), KWH Thermopipe (pre-insulated products) and Technology (plastics technology) operated independently under the umbrella of KWH Pipe Holding. As of 1 January 2012, these four organisational entities merged into the unified KWH Pipe Ltd. Support functions, for example purchasing and marketing, have been combined so that they now serve the whole company. Sales of pre-insulated products have been integrated with sales of plastic pipe systems to better serve large customers. The newly formed machinery and license sales department will focus

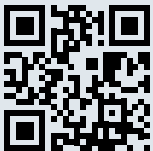
on fewer product areas than in the past and outsource some functions to its partner network. Extron Engineering Ltd was not affected by the organisational changes.

Mr **Jan-Erik Nordmyr**, President and CEO, says of the organisational changes: "The financial crisis that has swept through the world during the past few years has made it necessary that all companies take a good look at themselves and how to adapt. We believe that the changes we have made will make us more competitive. KWH Pipe is leaner and stronger and the sales team can now offer the broadest product portfolio in Finland". ■



We can't stop the rain – but we can help prevent flooding

When large amounts of rainfall overwhelm both natural and man-made drainage systems, the consequences in urban areas are almost always severe. Intense rainfall events are expected to become more frequent in some areas of the world as a result of climate change, and municipalities have started to plan how to minimize damage. Detention tanks made of Weholite are being used in many cities to help cope with flash storms that otherwise would have put the community at risk of storm drain overflows. The structured-wall, PE-HD detention tanks are lightweight and arrive at the installation site ready to be installed, which makes them easy to handle and reduces on-site costs and traffic disturbances. They are also, of course, watertight.



To see a video of how the detention tanks work, scan the QR code below or go to www.kwhpipe.com. ■

KWH Pipe invites US and Canadian engineers to interact on Facebook!



KWH Pipe has launched a Facebook page to promote the use of HDPE pipe in North America. It offers information, including pictures and videos, about projects that have made life easier for engineers and society, as well as about new products and upcoming events. <http://www.facebook.com/HDPEPIPE> ■

New offices in Poland and the United Kingdom

In Poland and the United Kingdom, KWH Pipe has moved to new locations. Our offices can be found at:

Poland:

KWH Pipe Poland Sp. z o.o. (Ltd)
ul. Dzielna 60
PL-01-029 Warsaw, POLAND

The telephone and fax numbers as well as all the contact information for the factory in Kleszczów remain unchanged.

United Kingdom:

KWH Pipe (UK) Ltd
17 Shirwell Crescent
Furzton Lake
Furzton, Milton Keynes, MK4 1GA, UK
Phone: +44 (0)1908 507 690
Fax: +44 (0)1908 507 704

APPOINTMENTS

Finland



Mr Jan Rolin, B.Sc. (Eng.), has been appointed Production Director, KWH Pipe Ltd. as of 1 January 2012. He has previously worked as Executive Vice President, District Energy.



Mr Juha Kainulainen, B.Sc. (Eng.), has been appointed Sales and Marketing Director, KWH Pipe Ltd. as of 1 January 2012. Additionally he has been appointed Managing Director of KWH Pipe Eesti AS in Estonia. He has previously worked as Executive Vice President, Pipe Finland.



Mr Cay Backlund, B.Sc. (Eng.), has been appointed Supply Chain Manager, KWH Pipe Ltd. as of 1 January 2012. He has previously worked as Purchase and Quality Manager, KWH Thermopipe.



Mr Jonny Talus has been appointed Purchaser, KWH Pipe Ltd as of 1 May 2012. He has previously worked as a Customer Service Representative, Municipal Technology in Finland.



Ms Sari Ahonen, BBA, has been appointed Customer Service Manager, KWH Pipe Ltd. as of 1 January 2012. She has previously worked as Customer Service Manager, KWH Thermopipe.



North America

Mr Michael Lesser has been appointed Regional Sales Representative for KWH Pipe Canada. Michael is based out of Denver, Colorado, and will focus on growing the Weholite business as well as promoting WehoEnergy Geothermal Vaults throughout the Rocky Mountain region.



Denmark

Mr Hans-Kristian Højen-Beck, has been appointed new Managing Director of KWH Pipe (Denmark) A/S as of 1 October 2011. He has previously worked as Marketing Manager, KWH Pipe (Denmark) A/S.



Mr Henrik Stray Dijohn, Manufacturing Engineer, has been appointed Customer Service and Supply Chain Manager, as of 1 February 2012. He has previously worked as Manager, Products and Customer Service.

Sweden



Mr Tobias Thorell, B.Sc. (Eng.), has been appointed Sales Manager for preinsulated products in Southern Sweden as of 1 March 2012. He has previously worked as Manager, District Heating Network, at Mjölby-Svartådalens Energi.

Europe



Mr Christian Vestman, B.Sc. (Eng.), has been appointed Manager, Project Services, as of 1 May 2012. He has previously worked as Project Manager, Project Services.



Mr Vesa Penttilä, B.Sc. (Eng.) has been appointed Manager, FPS solutions, as of 1 May 2012. He has previously worked as FPS coordinator.

Thailand



Mr Wiboon Sangwithayanon has been appointed Vice President, Sales & Marketing of Wiik & Hoeglund (Public) Company Limited, Thailand as of 2 April 2012.

Poland



Mr Maciej Przybylski, M.Sc. (Eng) and MBA, has been appointed Managing Director of KWH Pipe Poland Sp. z o.o. (Ltd) as of 11 June 2012. He has previously worked as Managing Director of Reyners Polska z.o.o.

Extron Engineering



Mr Jari Mylläri, B.Sc. (Eng), has been appointed Director, Machinery and License sales and Managing Director, Extron Engineering Ltd. as of 1 January 2012. He has previously worked as Executive Vice President, Technology.



Ms Minna Rantanen, B.Sc. (Econ.), has been appointed Office Manager, Extron Engineering Ltd. as of 1 January 2012.



She has previously worked as Project Assistant, Extron Engineering Ltd. **Mr Anders Nystrand**, B.Sc. (Eng) has been appointed Project Manager, Extron Engineering Ltd. as of 1 January 2012. He has previously worked as Project Manager, Project Services.



HUNDRED-YEAR LIFESPAN

The decision by the municipality of Sainte-Agathe-des-Monts in Quebec, Canada, to invest in a detention structure constructed from Weholite saved taxpayers' money and at the same time provided a durable and environmentally friendly solution for the CSO problem.

The practice of collecting both sanitary sewage and stormwater in the same piping system has been banned in many parts of the world, but the combined sewers still in use continue to give municipal engineers headaches. During big storms, when the system is unable to cope with the stormwater runoff, untreated wastewater is discharged into the environment. These combined sewer overflows (CSO) can cause serious water pollution problems, and therefore many countries require municipalities to make improvements to reduce or eliminate the consequences.



There are many ways to address the combined sewer overflow, such as CSO storage structures, expanding sewage treatment capacity, screening and disinfection facilities, retention or detention structures, and sewer separation. Communities may also implement “green building” techniques to reduce flows of stormwater into the collection system.

The town of Sainte-Agathe-des-Monts in Quebec, Canada, faced the problem of repeated overflows due to sewers being overloaded by stormwater. Looking for an analysis of the problem and the best long-term solution, the municipality decided to contact the international engineering consultants, The S.M. Group International (‘SMi’), which happened to have an office in Sainte-Agathe-des-Monts.

A closed structure was chosen

The experts and the municipality considered different options. In particular, they looked at increasing the capacity of the wastewater treatment plant so that it would be able to treat all combined wastewater coming from the existing system, without overflows. Another solution proposed was building a detention basin and temporarily storing the combined wastewater and conveying it to the treatment plant at a rate at which the treatment plant could cope. It was eventually decided to design and construct a detention basin and to look for high-performance products to accomplish this task.

The “Brissette Intercepting Sewer” project entailed the installation of a 3,000 m³ large detention basin for collecting and temporarily holding combined wastewater, which would eliminate CSO in nearby water bodies. A closed structure was chosen over an open reservoir.

Several critical elements

The project included several critical elements. First of all, the total cost, estimated at 3-4 MCAD, represented a hefty sum for a municipality of this size. In order to be eligible for subsidies from MAMROT, a government ministry in the Canadian province of Quebec, it was not allowed to specify a certain material in the invitation to tender. Also, receiving public funding required costs to be minimized. It was important, therefore, to opt for the most economical and durable option.

The project was also challenging from a technical point of view. The soil itself was made up of very dense glacial moraine, which made excavation to a depth of three to five metres very difficult. Next to the sewer main, there was a high-pressure gas transmission line and other infrastructure, which limited the space available for the manoeuvring of machinery during the installation. Also, the high water table in the area necessitated pumping in order to keep the installation site dry. The low total lifecycle costs and the ease of installation (which reduces the cost of manpower, equipment and the time required to complete the project) would therefore be decisive elements in the tendering process.

The performance of large diameter plastic pipes subjected to low pressure was an issue for close study, and the invitations to tender had to include both traditional and innovative installations. Authorities in charge of financing were extremely careful, because although the use of large diameter plastic pipes is common in the U.S. and elsewhere in Canada, no similar project had been carried out in Quebec. ▶



Easy handling

Mr. **Sylvain Racette**, an engineer at Soleno, exclusive distributor of Weholite products in Quebec, commented, “The challenge for our technical team was to respond both to the overall characteristics and to the specific demands of the project. One of the challenges we encountered was convincing government authorities to allow the use of large-diameter PE-HD pipe.”

It goes without saying that Soleno spared no effort to meet the requirements and to promote the durability and efficiency of KWH Pipe’s Sclairpipe pressure pipe and Weholite structured-wall pipe for an installation of this scope. Other selling points were their competitive advantage with regard to price and the hundred-year lifespan of the installation. The project was unique; Soleno’s strong points were the competence of its technical team and the quality and reliability of its products.

Soleno and KWH Pipe’s technical team prepared an optimal quote respecting the particular specifications established by the engineering consultants in response to physical constraints. The project consisted of 448 metres of DN/ID 2290 mm (90 inches) SN 3.5 Weholite pipe, for use under low pressure (1 bar), with an inspection chamber and riser in PE-HD, connected to 488 metres of OD 1520 mm (60 inch) SDR 32.5 Sclairpipe.

As it turned out, the outcome of the tendering process confirmed the calculations of the experts that large diameter PE-HD pipe would be the most economical and durable choice for the project. It offered superior resistance to corrosion, abrasion, chemical substances, road salts, soil movements and chemical reactions caused by sewer gases in combined wastewater. This is important, since combined sewers often carry harmful pollutants and debris.

**PE-HD PIPE
OFFERED SUPERIOR
RESISTANCE
TO CORROSION,
ABRASION,
CHEMICAL
SUBSTANCES,
ROAD SALTS,
SOIL MOVEMENTS
AND CHEMICAL
REACTIONS
CAUSED BY
SEWER GASES
IN COMBINED
WASTEWATER.**

The fact that Weholite is available in such large diameters allowed a reduction of the length of the installation. Their 15-metre lengths and light weight make handling easy, and welded joints provide a guarantee against leakage. Finally, their total cost (materials and installation) was lower than all competing materials.

Accomplished in twelve weeks

In this case, the project (completed in the autumn of 2011) was accomplished in twelve weeks and did not suffer from any delays.

The installation and jointing took only eight weeks, while a traditional installation, in the view of experts, could easily have lasted a few weeks more.

Mr. **Alexandre Foisy**, engineer at MBN Construction, Inc., commented on the project: “The use of Weholite pipes allowed us to complete this project in time, and also to adapt to a problematic work site. In fact, because of space constraints between a high-pressure gas pipe and the municipality’s sewer main, we had to make changes to our original plan. But the speed with which our partners in the project adapted permitted us to limit delays caused by the situation. Engineers responded quickly, and Soleno and KWH Pipe quickly supplied the parts necessary to make corrections.”

The decision by the municipality of Sainte-Agathe-des-Monts to invest in a detention structure constructed from Weholite saved taxpayers’ money, and at the same time they got a durable and environmentally friendly solution to their CSO problem. Experts say this choice enabled them to reduce the duration of the work on-site by a third. Other municipalities will surely follow the example of Sainte-Agathe-des-Monts when it’s time to invest in similar infrastructure projects. ■

Weholite is the watertight choice of pipes

Weholite pipe offered the most suitable solution for the outfall channel in Maricopa County, Arizona, thanks to its flexibility and thermal welded joints that are as strong as the pipe itself.

Established in 1959, the Flood Control District of Maricopa County (Arizona, USA) provides flood hazard identification, prevention, regulation and remediation to reduce the risk of injury, loss of life and property damage from flooding in the county. The District was formed in response to significant flooding events that plagued Maricopa County during its early history. The area's Sonoran Desert environment is conducive to flooding due to unique soil and topography characteristics, winter and summer rainy seasons, and numerous natural riverbeds, washes, and channels. During a rainstorm, these normally dry waterways can quickly become raging rivers causing widespread overland flooding when unchecked. Initially, the District focused on building dams (flood retarding structures), basins, and channels to prevent flooding. Unprecedented population growth and development in the county since the 1990s, however, shifted the District's emphasis to: dynamic flood education programs to inform citizens about flood hazards; the identification of specific hazard areas so county residents will make informed decisions about where to build; and the control of development that directly impacts waterways through a mandated drainage administration and floodplain management regulation program.

Protection and safety

An integral part of the flood control structures, called the White Tanks Flood Retarding Structure (FRS), had surpassed its original 50-year project lifetime and developed safety deficiencies since the time of its construction, including subsidence and embankment

cracking. There are three Corrugated Metal Pipe outlets that were originally installed without seepage control. Current standards require filter diaphragms around the outlet pipes to prevent internal erosion of soil in a seepage path along the outlet pipe. Investigations revealed voids around the old outlet pipes, which could result in a piping failure.

A Rehabilitation Plan and Environmental Assessment called for FRS to provide continued flood protection while complying with current safety and performance standards, which entailed rehabilitation measures, including: dam modification to address embankment cracking and foundation issues; raising the dam crest; reinforcing the auxiliary (emergency) spillway; and installing an upstream diversion and flood channel to safely convey floodwaters into the FRS.

The rehabilitation project was awarded to Lawrence Construction Company, Colorado's oldest and most experienced Colorado Department of Transportation (CDOT) pre-qualified contractor.

Polyethylene pipe is the most suitable alternative

The primary purpose of the outfall channel is to convey discharges from FRS no. 3 when that facility is drained after controlling a major storm event. The secondary purpose is to provide a conveyance for local drainage areas west of Jackrabbit Trail. Additionally, the outfall channel's route needed to

be changed, so that water could be discharged to a stream channel instead of into an irrigation channel or over natural desert terrain. The project was designed to provide 100-year protection from southeasterly storm water flows for properties located east of Jackrabbit Trail. Initially, it was recommended to construct the outfall channel of concrete encased steel pipe, but structured-wall polyethylene pipe proved to be the most suitable alternative. The project required the placement of pipes within a fissure-risk zone and demanded that pipe joints remain watertight in case fissures were to occur. Weholite, by KWH Pipe, fits the description thanks to their flexibility and thermal welded joints that are as strong as the pipe itself. White Tanks FRS No.3 Outfall Channel now conveys storm water through 914 metres (3000 feet) of both DN/ID 2 metre and 1.7 metre (78" and 66") Weholite PE-HD parallel pipelines through and along the White Tanks Mountains. The estimated construction time to install the Weholite parallel pipelines was twenty-five days. With the efforts made by the KWH Field Service Technicians and Lawrence Construction, the installation was completed in only fourteen days – another advantage over competing pipes. The KWH Technicians were able to weld an average of ten joints per day. The contractor leak-tested each joint to insure weld integrity and all passed without a single leak. The attention to detail, paired with the quick installation, helped make this project a great success for the Maricopa County Flood Control District, Lawrence Construction, and KWH Pipe. ■





Rain won't spoil Vladivostok's queen of bridges

The Golden Horn Bay Bridge in the Russian city of Vladivostok, completed in the summer of 2012, is one of the world's largest cable-stayed bridges. The vast scale and challenging weather conditions also place high demands on the water removal system for the bridge. The Wehoarctic system ensures that its pipes won't freeze – even in the harshest freezing conditions.

Russia's last stop. The final destination on the world's longest rail route, the Trans-Siberian Express. The home port of Russia's Pacific Fleet. The city has recently invested billions of euros in infrastructure construction in preparation for hosting the Asia-Pacific Economic Cooperation (APEC) Summit in the autumn

of 2012. Vladivostok is known for all of these things, and will also soon be known for having one of the world's largest cable-stayed bridges.

Two kilometres of insulated pipe needed

KWH Pipe is supplying a heavy duty drainage system for the queen of bridges.

"Twenty 40-foot containers carrying pipes

and other components have left the factory in Finland. The last containers left for St. Petersburg at the end of February. From there they travel by train across Siberia to Vladivostok," says Energy Technology Sales Manager Jan-Erik Svarvén from KWH Pipe.

A Wehoarctic system has been built for the bridge, in which cast iron funnels built into the structure of the bridge conduct rainwater into pipes passing below the bridge deck.

Over two kilometres of pre-insulated pipes with heat-tracing profiles are being delivered as part of the overall Wehoarctic solution.

One of the key advantages of the Wehoarctic system is its excellent insulating properties. The system uses the same insulation as is used for district heating pipes and elements

The Golden Horn Bay Bridge, which will be open to traffic from the summer 2012, is almost 1.4 kilometres long and its towers rise to 226 metres in height.



THE WEHOARCTIC SYSTEM FOR THE GOLDEN HORN BAY BRIDGE

- » cast iron funnels built into the bridge structure direct rainwater to pipes below the bridge deck.
- » over 2 km of pipes with heat-tracing profiles
 - Wehonal SN 4 250 mm PVC carrier pipe
 - PE 355 casing pipe
 - Wehonal SN 4 315 mm PVC carrier pipe
 - PE 450 casing pipe
- » pipe length 3, 4, 5 and 6 metres
- » over 300 insulated fittings



and has a thermal conductivity value of 0.025 W/m°C, i.e. almost twice the thermal insulation capacity of mineral wool.

“Good insulation and heat-tracing guarantee that the pipes will not freeze, even at extreme temperatures.” The pipe elements are pre-insulated at the factory, ensuring consistent quality every time.

“It is also essential that the insulation has excellent thermal performance, to enable the pipe elements to be as small as possible,” notes Jan-Erik Svarvén.

“This is particularly important for bridge installation, where space is critical. The system must also be lightweight.”

Fast installation and long life

Work on the Golden Horn Bay Bridge began in 2011, and the bridge will be opened in the summer of 2012. The Wehoarctic pipe system was installed in March 2012.

“Another advantage of the Wehoarctic system is its fast installation. The carrier pipes are connected with a pipe coupling, after which

a heat-tracing cable is installed. The joint is insulated with polyurethane half shells,” says Jan-Erik Svarvén.

The Wehoarctic system's casing pipes are watertight. Pipe supports are attached to the casing pipe and are also insulated. There are no thermal bridges in the system.

“Wehoarctic has a long life, and requires no maintenance,” says Jan-Erik Svarvén.

From freezing cold to monsoon rains

The bridge is being built by the Russian company Tihookeanskaya Mostostroitel'naya Company CJSC.

According to KWH Pipe's head of sales in Russia, **Ekaterina Tihomirova**, Wehoarctic was chosen because it is simply the best system of its kind.

“The system has proven itself in many locations in Russia. Large Wehoarctic deliveries have been made to St. Petersburg, Omsk and Labytnangi in northern Russia, in recent years.”

Demand is brisk, according to Tihomirova, because the pipes are well suited to Russian weather conditions: with harsh winters and acute temperature fluctuations.

The new bridge in Vladivostok will certainly face difficult weather conditions. Winters in the city are often formidable and, in late sum-

mer, Pacific monsoon rains are widespread in the region. When it rains in Vladivostok, it rains – often for several days straight.

The handsome new bridge will be serving its residents and the growing numbers of tourists to the city each year, come rain or shine. In September, the prestigious guests of the Russia 2012 Summit will also have the opportunity to admire the city's new landmark. ■

PE-HD liner protects steel pipes against mining slurry

The corrosion and abrasion resistance properties of polyethylene allow the Tite Liner® system to protect steel pipelines from a variety of chemicals and abrasives through a broad range of temperatures and pressures. In Laos, Southeast Asia, the Tite Liner® system protects the water and slurry transportation pipelines of mining operations.

Laos, officially the Lao People's Democratic Republic, is a landlocked country in Southeast Asia and has plenty of natural resources. In fact, more than 570 mineral deposits have been identified on its 236,800 km² territory. Mining of copper, silver and gold has lately become a big growth business in the country and the mining sector has made significant contributions towards Laos' economic development.

Recently, United Pipeline Systems USA, supported by Wiik & Hoeglund Plc., KWH Pipe's subsidiary in Thailand, introduced the PE-HD liner pipe technology, Tite Liner®, in Laos to help protect the water and slurry transportation pipelines of mining operations. The Tite Liner® system begins as a PE-HD pipe that is manufactured by Wiik & Hoeglund Plc. with a larger outside diameter (OD) than the inside diameter (ID) of the host steel pipe.

The Tite Liner® system temporarily reduces the diameter of the PE-HD pipe liner to allow for its insertion. When pulling is complete, tension is released and the liner pipe expands and creates a tight fit against the internal wall of the steel pipe. The tight-fitting PE-HD liner acts as a continuous barrier between the bare steel and the corrosive, abrasive mining slurry.

An efficient way to protect pipelines

The corrosion and abrasion resistance properties of polyethylene allow the Tite Liner® system to protect steel pipelines from a variety of chemicals and abrasives through a broad range of temperatures and pressures. It is an efficient and cost-effective way to protect new or existing pipelines, and its use can often extend the life of a pipeline far beyond the expected life of an asset. The low friction of the inner HDPE is an added benefit of the system. The Tite Liner® system comes in sizes from 50 mm to 1320 mm (2" to 52") in diameter, with larger diameters possible in certain situations.

"The quality of the inner PE-HD liner needed to be manufactured to close tolerances and had to be made with high-grade raw materials, in order to work perfectly with the Tite Liner® technology. Wiik & Hoeglund delivered in all areas and exceeded our requirements," **Jeff Schell**, General Manager of United Pipeline Systems USA mentioned.

He went on to say, "We were very pleased with the personalized customer service, communication and technical support provided by Wiik & Hoeglund Plc."

The project was completed and delivered in March 2012 and there will surely be more mining activity in Asia that will apply this technology.

KWH Pipe cooperates with United Pipeline Systems in several parts of the world for similar applications. ■





Safe, fast and economical

A smart choice of pipes means better worksite safety, environmental benefits and less time on-site. For these reasons, Weholite pipes were chosen for a new residential area built on a former industrial estate in Malmö, Sweden.

Since the Øresund Bridge that connects the Danish capital Copenhagen and the Swedish city of Malmö was inaugurated in 2000, the region has been booming. There have always been strong trade links between Eastern Denmark and Southern Sweden, but the bridge made it possible for the two countries to strengthen one another in a region without frontiers. It is one of the most dynamic regions in Europe – a trend-setting place where innovative ideas and products are embraced.

That also goes for construction, both when it comes to architecture (for example, the skyscraper Turning Torso) and working methods. When a new residential area was being planned for a former industrial estate, the City of Malmö awarded the construction of roads and municipal infrastructure to Skanska, an international construction company that has emerged from this very region.

Skanska takes sustainability seriously and has built this commitment into corporate policies, including their Code of Conduct and a Five Zero vision – zero loss-making projects, zero environmental incidents, zero workplace accidents, zero ethical breaches and zero defects. Emissions from greenhouse gasses are measured, so that the company can follow up on and reduce negative effects on

the environment by making smarter choices regarding materials and work methods.

Improving the working conditions of pipe installation crews

When Skanska bid for the project of installing water, sewage and stormwater pipes, they initially offered 450 metres of 1400 mm diameter concrete pipes for the stormwater network. However, calculations revealed that by changing the specifications to structured-wall Weholite PE-HD pipes from KWH Pipe, greenhouse emissions would be reduced by approximately 110 metric tonnes CO₂ equivalents. For example, transports could be significantly reduced.

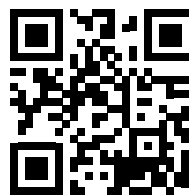
The installation was also cost-efficient. Although concrete would have been cheaper when looking at the cost of the pipes, the total installation cost of Weholite was in this case 10–15% lower. This was made possible because the installation time was merely 2.5 weeks compared to 2 months for concrete pipes. From a quality perspective, the local network owner VA SYD benefits from having a welded and, therefore, watertight stormwater system.

But that's not all: The installation method improves worksite safety and reduces the risk of workplace accidents. **Robert Fredriksson** and **Tommy Persson**, part of a pipe

installation crew at Skanska, have installed a number of pipes in trenches with water up to their knees, fearing cave-ins: “We don't have to worry about that in this project. It feels good to know that pipe installation is developing.”

Project Manager **Henrik Stackebo** explains: “Instead of lifting big and heavy concrete pipes in two metre lengths to the installation crew waiting in the trench, the PE-HD pipes are welded on solid ground. They are delivered to the work site in 22 metre lengths, ten of them are then thermally welded, before eight cranes lift the whole 220 metre-long pipe section into the trench. For this project, we only need to do that twice, which means that the crew doesn't need to spend as much time in the trench as they once did. This way of working is safer, faster and more economical.”

Installer Tommy Persson concludes: “It's been both interesting and fun to be a part of this type of installation, which makes our working environment so much safer for us.” ■



Scan the code with your mobile phone to view a film clip and interviews (in Swedish) from the installation. The video can also be accessed on your computer at: <http://qrs.ly/qs1uyf4>.

Don't count on luck to protect you from flooding

With a bit of good luck, a property can overcome rains without flooding, but fewer and fewer count on such luck. As its stormwater solution, a waste power plant to be built in southern Finland chose one-hundred-metre long Weholite tanks and in another Finnish city, modular cells will be the solution for new sheltered homes.

If the hardest rains in 50 years and a fire occurred at the same time, where would the rainwater and fire water end up? These kinds of questions were considered by the planners of the energy company Vantaa Energy and the consulting and engineering company Pöyry, as the drawings for the future waste power plant of Vantaa, one of the largest cities in Finland, were on the table.

The goal was to prevent flooding, even in the worst case scenario. An extra challenge had to do with the fact that it had been decided that the waste power plant of Vantaa was going to be constructed in a rock-bound hollow.

"It is like a tub surrounded by 10 metres of rock-face. Water is absorbed into the ground so slowly that it is better to collect it all and dispose of it," says Project Manager **Markku**

Vuorimaa from Vantaa Energy.

The waste power plant will be built on the eastern side of Vantaa, where the distance to the river Krapuoja is quite short, but this good salmon river should not be subjected to extra water.

It was decided that the stormwater drainage pipeline will be drilled through rock, built over the motorway and into an open ditch where the plant is allowed to discharge one hundred litres of water per second. So floods must be prevented at both ends of the pipeline.

"We decided to use a stormwater detention tank," says Project Manager **Jarmo Salo**, responsible for regional piping planning of Pöyry.

Pöyry will plan and build the power plant and supervise the whole project from the purchases through its commissioning.

From concrete to plastics

The material for the stormwater detention tank had to be selected first. Salo thinks that old habits would have directed the planners to choose concrete, if the rocky hollow had not defined its own criteria. That is, as the excavation proceeded, it was discovered that the tank had to be dug deep below the groundwater level in order to get a sufficient slope for the stormwater drainage system. Building with concrete was no longer a viable option.

He stated that it would be substantially easier and faster to install a polyethylene tank structure. Two 700-cubic-metre tanks from KWH Pipe were chosen as the stormwater retention tanks.

Strict schedule

The tanks are made of Weholite pipes with internal diameters of three metres and they are one hundred metres long. Their ten-metre ends were assembled in one of KWH Pipe's plants and were brought to Vantaa at the same time as the 20-metre pipes.

The pipes were welded together on-site and the tanks were pressure tested by KWH Pipe staff, after which builders from the contractors Destia anchored them into the excavated pit.

The installation was completed in December, and in January 2012 the tanks and the yard were already covered with portable buildings.

A STORMWATER RETENTION TANK MADE OF WEHOLITE PIPE

Weholite tanks are made of a corrosion-resistant PE or PP profile by spiral welding. Both the outer and the inner surfaces are smooth. The largest possible inner diameter is 3,500 mm (varies from country to country) and the transportable length is 30 metres.

The retention tanks are equipped individually. Thermal welding of joints makes the tank completely watertight.

Anchoring packages that are suitable for the site are planned for each tank. The anchored tank will be ready to use as soon as the feed and discharge pipes have been connected.



In principle, the tanks could have been used right away, but the excavation work was still going on. The entire stormwater system was put into operation in March.

Absolutely tight

In addition to the quick installation work, Jarmo Salo required that the tanks be absolutely tight. No groundwater should seep into the tank. Salo also wanted to pay attention to the scenario of dirtier substances getting into the clean rain water, for example along with fire waters.

"Then the pump is stopped and the water in the tank is examined. We can decide if the water is passed to a reservoir for contaminated water or discharged to the open ditch. It is also important that the solids that have managed to pass through the stormwater chambers settle down onto the bottom of the tank."

"A maintenance man can climb down into the tank and also wash it when needed."

In a normal state, the pumping station always pumps water when the water level exceeds a certain level, and the water will continue via the discharge chamber along the gravity discharge pipe to the open ditch. ▶





MODULAR CELLS OFFERED A SOLUTION

A flood may threaten a smaller area as well if the ground does not absorb the water and if the waters do not flow away from the area. This was the situation in Rauma, on the south-western coast of Finland, in a workplace where three sheltered homes for elderly people are being constructed.

According to **Vesa-Pekka Viitanen** of the city Rauma, the original idea was to pump the rainwaters directly over a hill into the nearby Rauma River. However, ultimately they chose an alternative based on stormwater detention.

“That way it was possible to use smaller discharge pipes and pumps, which became more energy-efficient.”

In Rauma, they decided to use a geocellular system. Typically, these modular cells are used for infiltration, but this would not have worked in clay soil. So a geocellular structure was made from the modular cells by wrapping them with a polyethylene film.

The contract began at the base of the construction firm Destia, where 450 modular cells were assembled. At the construction site, they were stacked in the excavation on a plastic film and formed a 17-metre-long, 6-metre-wide and 1.2-metre-high package. The film was wrapped around the structure and welded tight. The 120-cubic-metre geocellular system was completed.

“Only one working day, a little longer than a normal one, was spent at the construction site,” estimates Site Manager **Jarmo Laiho** of Destia.

The stormwater detention structure was ready to use as soon as the sewer and discharge pipes were put in place.

The start of a giant project

Markku Vuorimaa regards the completion of the stormwater retention system as a good intermediate point in the huge construction project.

“The system would have been needed already last autumn when a pit for the waste bunker was being excavated, 18 metres downwards from the upper rock surface level,” laughs Vuorimaa.

He is in charge of mechanical installations for the power plant, the biggest of which are still to come. The main installations – two waste boilers, the associated flue gas cleaning equipment, a steam turbine, a gas turbine and a heat recovery boiler – were already ordered last year, but it will not be possible to install them for a while. According to the plans, the basic work of the boiler hall will begin next autumn. The first loads of waste will arrive at the yard in the summer of 2014.

In Finland, there are already two similar waste power plants in use and another one is being built, where the steam is passed from

the waste boiler to a turbine and the turbine uses it to generate electricity or district heat. Additionally, a gas turbine will also be utilized in the Vantaa plant, which will increase the plant’s energy efficiency.

“There are not very many solutions of this kind in the world, in which the plant has both a gas turbine and also a heat recovery boiler,” states Vuorimaa.

Retention is becoming more important

District Manager **Marko Kuitunen** of KWH Pipe points out that polyethylene stormwater retention tanks are not just solutions for big industrial facilities; they are becoming more and more important and popular in various kinds of logistics centers and commercial centers. He states that the popularity of solutions for stormwater retention is not only explained by heavy rains becoming more common, but also by the expansion of built areas.

“They are needed when there are large roof surfaces and asphalt areas,” says Kuitunen. ■

Prestbury benefits from innovative flood management system

In response to severe flooding, which hit the south west of England in 2007, an extensive project to reduce the risk of further flooding has been commissioned to improve floodwater management in the village of Prestbury, in Gloucestershire.

The scheme, which costs £1.5 million in total, involves connecting two existing flood relief culverts and creating a bypass pipeline using Weholite, the UK's leading technology in structured-wall pipe, which is manufactured by KWH Pipe's licensee, Asset International Ltd.

The project is a collaboration between the Environment Agency, the Gloucester County Council and the Cheltenham Borough Council. The project is being delivered by Birse Civils and was designed to manage peak flows from the nearby Mill Stream and Noverton Brook.

The initial design of the scheme during the planning application stage included an open channel with a series of culvert crossings on roads, which were meant to act as a bypass channel. Due to the nature of the topography, following further detailed surveying, it was not feasible to excavate and build a suitably sized open channel across grazing fields because it would have significantly increased the land take and created safety issues.

Asset worked with the civil engineers

Royal Haskoning and Birse Civils during the ECI design stage, providing feedback on their preliminary sketches. When Birse Civils was appointed, Asset was able to provide them with the Weholite solution. The high-density polyethylene pipe allowed for a quicker, easier installation and reduced the requirement for land take.

Pre-fabricated inspection chambers a big advantage

Asset supplied 500 metres of DN/ID 1.2 m and 1.35 m pipe and a number of oversized, prefabricated DN/ID 2.2 m and 2.5 m inspection chambers.

Terry Tuck, agent for Birse Civils, said: "We were really impressed with Asset's bespoke flood alleviation solution. There were many advantages to using Weholite over more traditional methods in terms of making the installation easier and safer for my team and more economical for the customer.

"One of the biggest advantages was that the manholes were pre-fabricated offsite, which reduced the need for confined space working and reduced the need for people to enter excavations. The manholes and pipes

were light and therefore easy to transport, as well as easy to store, as we can double stack them. The manhole excavations were backfilled quickly, shortening the time required for the job."

Keeping homes safe

The project will reduce the risk of flooding to a one in 100 chance for 57 homes in Prestbury.

Commenting on the project, **Craig Burrows**, Technical Sales Engineer at Asset said: "By working in partnership with the Environment Agency and Birse Civils we have developed a flood alleviation system that will keep the homes in Prestbury safe from flooding for the significant future."

"Once again, our ability to offer a range of bespoke solutions, with them all fabricated offsite, has allowed us to provide exactly what the project needed as well as the additional benefits of easier installation and storage. The fact that we can nest the pipes cuts down on the amount of vehicles needed for transportation, which helps reduce cost as well as the project's footprint." ■



Floating pipes bring flooded mine back from the depths

Floating pipes delivered by KWH Pipe are being used to drain an open pit mine in northern Sweden that has been closed and flooded for thirty years. Once drained, the mine will be brought back into production.

KWH Pipe is carrying out a turnkey pipe contract for an open pit mine being reopened in Leveäniemi, northern Sweden. The contract includes the detailed design, material deliveries, welding and installation works, works in water, and pressure tests and commissioning of the pipes. Around seven kilometres of pipe will be delivered to the pit in total.

Swedish mining company LKAB is to reopen an open pit closed as unprofitable in 1983, situated in Svappavaara near Kiruna. Since the price of iron ore has remained high in recent years, the company has decided to increase its production capacity by taking the Leveäniemi open pit back into production.

Pipes drawn to the bottom as the water drops

The 90-metre-deep open pit has stood flooded for almost three decades. The pit holds around 30 million cubic metres of water, which the mining company intends to pump to a nearby river through KWH's pipes. According to LKAB's calculations, draining the pit will take 18 months.

After a nine-month installation phase, the piping was ready for operation, and pumping could begin.

"The star attraction of the project is the 1.2 kilometres or so of long, floating pipes. To begin with the pipes float on the surface as the water drains, but eventually settle along the deepest part of the truck route as the water level drops. The floating pipes are anchored in place by around forty concrete weights positioned along the pit bottom," explains **Christian Vestman** of KWH Pipe.

Due to the demanding nature of the installation, KWH Pipe was the only contractor able to present a preliminary plan for the project. ■



Europe's largest ever plastic culvert goes to Norway

Record breaking culverts speed up road project in the north of the Arctic circle.

In the northernmost part of Norway, winter temperatures can go as low as -50 degrees Celsius and the mountainous terrain makes the long distances even more challenging. But this oil-rich country, located at the very top of Europe, is now investing EUR 65 million in an infrastructure project to modernize the oldest road between the regions of East and West Finnmark and to make it possible to cross Ifjordfjell mountain the whole year round.

The road crosses several rivers and streams and the contractor needed large culverts that will stand the test of time, but also enable the crew to quickly complete the installation. The summer in the far north is short and during winter, construction work is impossible. For this reason, most of the 70 people involved in the road construction spent 14 days working long hours followed by 14 days off. North of the Arctic Circle, the sun never sets during the summer, which also made it possible to use night shifts from Monday to Saturday. Utilizing the time efficiently was a priority, so Weholite with its fast installation was a natural fit for this project.

Weholite benefits raise interest

Weholite structured-wall pipes have been utilized in many countries for culvert applications

using both normal installation methods and in sliplining damaged metal or concrete culverts. It is lightweight and easy to handle, does not corrode and withstands heavy traffic loads thanks to its flexibility. Pipe lengths up to 22 metres and a unique threaded joint facilitate its easy installation. KWH Pipe's partner Geosyntia has a great deal of experience delivering many types of products for road projects and has introduced Weholite to Norwegian road builders. Managing Director **Terje Ottesen** says: "Customers generally don't find talking about culverts is very interesting, but as we present the benefits of Weholite, they usually get excited once they realize that we can help them lower lifecycle costs and drastically shorten the installation time. Frankly, most of them didn't even know that polyethylene pipes of this size existed!"

Size did matter

In this particular project, size did matter. The 44-metre-long road culvert needed for the river of Vestre Guttojojoka had an internal diameter of 3.5 metres, which most likely is a European record for plastic road culverts. Additionally DN/ID 3 metre culverts and several smaller sizes were delivered. On the bottom of the culverts, a thick layer of rocks and pebbles slows down the water and makes

it easier for fish to make their way through the pipe. Sales Manager **Robert Osvaldsen** at Geosyntia describes the project as groundbreaking and very successful despite the challenges involved in transporting pipes of that size. The largest pipes were delivered by boat and loaded onto trucks. As they were four metres wide, local law requires the truck to have a police escort in addition to the regular wide load escort cars.



So did everything go as planned? "Well, everything ran smoothly except for when the pipes were temporarily stored in the harbour. They were not anchored properly and strong winds set one pipe in motion, rolling several hundreds of metres before ending up in the sea. But this only proved Weholite's durability as the pipe survived the ordeal almost without a scratch," Osvaldsen laughs. ■

The power of Weholite

Hydropower is the most popular renewable energy resource in the world, with a 16 per cent share of global energy output and counting.

In recent years, Poland has seen an increase in the number of hydroelectric projects, mainly small power plants that utilize local waterways for the production of clean, cheap energy. Recently, for the first time in Poland, Weholite technology was used to construct a penstock (pipe that delivers water to hydraulic turbines) for a small new hydro power plant in the city of Cieszyn.



Poland has a long tradition of hydropower. During the interwar period, the country boasted approximately 6,500 operating hydroelectric facilities, though today, after decades of historical and political turmoil, only a few hundred of them still remain. As a result, Poland uses only 15% of its hydroelectric potential, estimated at 13.7 TWh, which accounts for only 2% of the country's overall energy production. Fortunately, there have been many positive changes in this respect in recent years. Poland's membership in the EU means that the country has to comply with specific requirements concerning the use of renewable energy resources. The EU-imposed target of a 15% share of renewables-generated electricity in total electrical production by 2020 has injected the Polish energy sector with a new impulse for change. This has been accompanied by an ongoing and impassioned



“The Cieszyn installation was exceptional due to the plant’s location in the park,” confirms **Maciej Nadulski**, MEW’s Director for Investments.

“We had to prove that the plant would not be overly visible and that it would be integrated with the existing landscape – hence, the decision to hide both the pipeline and the powerhouse in the ground.”

MEW S.A. also appreciated other benefits of the projected pipeline, such as minimum maintenance costs, no adverse effect on the environment and better energy efficiency compared to an open canal.

PE-HD pipes, naturally

The investor carefully considered the choice of material for the pipeline. The technical design listed GRP pipes as the material of choice; however, MEW S.A.’s final decision was to use DN/ID 2200 mm Weholite PE-HD piping. The decision was based on the high quality of Weholite technology, the flexible terms of service offered by KWH Pipe and the company’s extensive global experience in hydroelectric projects. The Cieszyn power plant is the first hydropower installation in Poland to boast a Weholite pipeline; however, elsewhere in the world Weholite has been used for hydroelectric applications for years. One example is Canada, ranked in the top 5 of global hydroelectricity producers, where KWH Pipe delivers piping for many similar projects.

Durable, leak-proof and lightweight, Weholite pipes proved to be the ideal solution for the challenges presented by the Cieszyn project. Their low weight compared to other pipes made of traditional materials such as steel, cast iron or concrete made them easy to transport and install in the challenging terrain of the city park. Among Weholite’s other qualities, one should mention their resistance to corrosion, chemicals and damage caused by differential soil settlement. These properties ensure the exceptional reliability and long-life of an underground pipeline, as well as near zero operating costs.

MEW S.A. also greatly appreciated the smoothness of the pipeline’s inner surface. Thanks to a low roughness coefficient *k* and the monolithic joints of the penstock, as well as choosing to forego segment bends, the energy losses caused by water friction inside the pipeline are reduced to a minimum, which translates into greater energy efficiency for the power plant and greater return on investment. ►

debate on the country’s energy security and the need to diversify energy resources. Another new development has been the shift in the mentality of the Polish people, who are increasingly alert to environmental issues, including the problem of excessive carbon dioxide emissions related to burning fossil fuels for energy production. Last, but not least, the simple fact is that producing electricity from water is a highly profitable business. It is therefore natural that the construction of micro- and small hydroelectric power plants has become something of a hot topic in Poland. As a result, a number of companies have emerged that specialize in small hydroelectric projects, including MEW S.A., which has invested in the Cieszyn power plant.

Nature first

The investment project, worth an estimated 1.2 million euros, included the construction of a small hydropower plant with a capacity of

HYDROPOWER IS A CHEAP AND RENEWABLE SOURCE OF ENERGY, WHICH DOES NOT RELEASE HARMFUL GAS EMISSIONS INTO THE ATMOSPHERE.

0.56 MW that took advantage of the natural height differences of the Olza River. Typically, a power plant pipeline or canal is introduced at a curve in a river, shortcutting the river’s flow, which results in greater water drop than would be achievable at a weir. In Poland, pipelines are used at larger hydroelectric facilities, while smaller plants depend on open channels. The key factor for choosing a pipeline for the Cieszyn project was the plant’s location in a city park. The city authorities demanded that the design take into consideration and preserve the park’s functionality and aesthetics.

Easy installation

Construction started in October 2010 when trenches were made for both the powerhouse and the pipeline. Initially, a sample truckload of pipes was delivered to the installation site to ascertain the most suitable pipe lengths. In the end, the pipes were manufactured in 12.5 m lengths and transported from KWH Pipe's production plant in Kleszczów to Cieszyn. In all, between November 2010 and September 2011 KWH Pipe delivered 42 shipments of pipes with a total length of 510 m.

The pipes were laid out at ground level in 50-to-100 m sections and joined by means of extrusion welding. The joined sections were then lowered into the trench and welded together by the KWH Pipe service team, which was responsible for all of the welding work. Extrusion welding allowed for a leak-proof and monolithic pipeline and proved very well suited to the demands of winter installation. Weholite's built-in flexibility also proved extremely useful because it allowed for gentle bending of the pipeline, which made it much easier to handle and provided a cost-effective and time-effective alternative to using segment bends and thrust blocks.

Another great property of Weholite piping

is the option of prefabricating bespoke fittings. The final section of the penstock, a DN/ID 2200 mm tee designed to divide the water flow into two streams, one for each of the two turbines, was produced at the KWH plant and delivered to the project site with the assistance of a pilot car. In May 2011, after intensive construction work, the pipeline was secured in the ground and covered with soil. Work on the powerhouse was completed in June 2011, and in September 2011 flanges for joining the pipeline with the turbines were delivered. Considering the time needed for installing the turbines, the technical acceptance procedure and the start-up, the commencement of commercial operation was set for January 2012.

Weholite – the right choice

Hydropower is a cheap and renewable source of energy, which does not release harmful gas emissions into the atmosphere. In contrast to large-scale hydroelectric power stations that change the flow of rivers and adversely affect the environment, small hydroelectric installations continue to be perceived largely as eco-friendly and, as such, are considered the future of hydropower. In view of Poland's

growing demand for electricity, and the steady decrease in the supply of fossil fuels, such as hard and brown coal, which the Polish energy sector depends upon, hydropower will be a subject of growing interest.

The Cieszyn plant's location in a city park prompted MEW S.A. to adopt a series of terrain-specific technological solutions. Durable, leak-proof and lightweight, Weholite pipes proved perfectly suited to the demands of the

DURABLE, LEAK-PROOF AND LIGHTWEIGHT, WEHOLITE PIPES PROVED TO BE THE IDEAL SOLUTION FOR THE CHALLENGES PRESENTED BY THE PROJECT.

project, and allowed for a significant savings in time and money. As the number of small hydroelectric installations in Poland grows, using PE-HD piping for such projects will also become more common. The successful completion of the KWH Pipe pipeline for the Cieszyn hydroelectric plant once again confirms that product quality and know-how combined with decades of experience is quite simply a winning formula. ■



Made secure thanks to cutting-edge flood alleviation system

A project to reduce flooding in Hereford city centre has utilised the market leading, high-density polyethylene (PE-HD) Weholite technology as part of a scheme that will be a UK first for its use of energy dissipation technology.

The £4.2 million Yazor Brook flood alleviation scheme involves a 1.4 km long Weholite culvert, provided by KWH Pipe's licensee in the UK, Asset International Ltd, which has been designed to divert floodwater from the Yazor Brook into the River Wye to reduce flood risk in parts of Hereford.

The scheme, which is a part of wider regeneration plans for the city, is funded by Advantage West Midlands and is being delivered on behalf of Herefordshire Council by Swansea-based Dawnus Construction.

Dawnus chose Weholite, the UK's leading technology in structured-wall pipe, to construct a bespoke flood alleviation system for the project.

The unique capability of the high-density polyethylene (PE-HD) pipe is that it can be manufactured in long lengths, providing a solution to the problem of building across the busy A438 Brecon Road. The construction team was able to install a single length of pipe across the road and complete the job in two nights, causing minimal road closure disruption to the people of Hereford.

First of its kind in the UK

Asset supplied 1.4 km of DN/ID 2.0 m pipes for the scheme. The project is the first of its kind in the UK to use an innovative energy dissipation chamber. This works to remove energy from the water as a means of controlling the force of the water, which is then expelled from the pipes.

Jason Austin, agent for Dawnus Construction, said: "Weholite was definitely the correct choice for this project. The expectation was that the pipes would be installed at a rate of two per day, but due to the 14 m length and the fact that they are lighter and more portable, the construction team was able to install up to four pipes a day. This made the project more economical in terms of time and cost and also minimised the inconvenience caused by the necessary road closure."

Ready for future developments

The scheme, which was completed several weeks ahead of schedule, will help reduce the risk of flooding for a large number of proper-

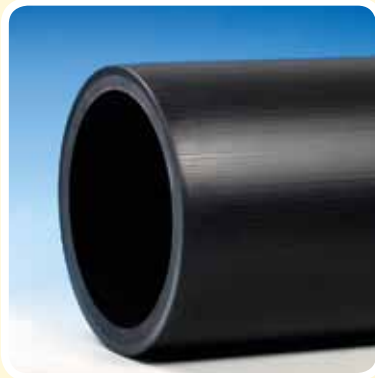
ties and businesses by diverting two-thirds of the floodwater from Yazor Brook safely and in a controlled manner into the River Wye.

In addition to time saving benefits, Weholite was also effective in terms of minimising the carbon footprint of the project. The manufacturing and transportation of the pipe was equal to 252 kg of CO₂ per linear metre of pipe, considerably less than an equivalent concrete pipe, which is 592.1 kg per linear metre.

Commenting on the project, **Simon Thomas**, Managing Director at Asset, said: "We are very proud to be part of a project as large-scale and ambitious as the Herefordshire regeneration scheme. This flood alleviation system will not only reduce the risk of flooding in this area, it will also allow for future developments to be built.

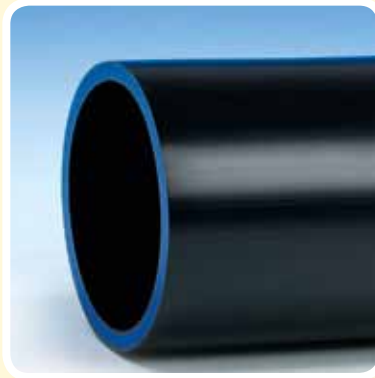
"We are pleased that the versatility of the Weholite solution contributed to keeping disruptions to a minimum. Helping to deliver a UK-first in terms of the energy dissipation chamber further defines us as an innovative company that prides itself on delivering tailor-made solutions for the water industry." ■

Add a layer of protection to your industrial operations



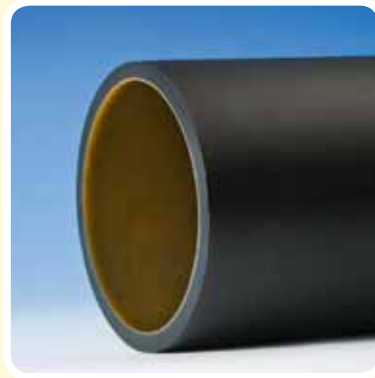
WehoSlurry

Superior abrasion resistance



WehoAntistatic

Safe transportation of flammable substances



WehoChem

Cost-efficient transportation of industrial chemicals

Durability, flexibility, corrosion resistance and long lengths – All of the advantages of PE-HD plus a customized polymer layer. Read more on www.kwhpipe.com/fps