



COMPLETE SERVICE PACKAGES FROM KWH PIPE

A large sewage water project in Warsaw | Pipe helps to reopen highway

PIPE WORLD – THE KWH PIPE CUSTOMER JOURNAL



Stands up to everything



Weholite is also suitable for extending and renovating existing culverts.



*Renovation, road E 22, Gamleby, Sweden
Weholite DN/ID 800 mm, length 81 m*

Heavy loads, acid soil, vibration and stress, soil movement and erosion, the extreme temperatures of a Nordic climate. Correctly installed, Weholite can take almost anything. Weholite adapts and flexes with the load and does not break. Weholite is not subject to rust or corrosion. Weholite pipe is lightweight and has an ingenious threaded joint that makes installation quick and easy. A safe and long-lasting road culvert gives light at the end of the tunnel.

The Weholite culvert system

Weholite culverts

- With threaded joints
- Culvert extensions

Fittings

- Skew-cut culvert ends

Joint fittings

- Internal extension socket



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Moving closer to the customers

KWH Pipe has been producing pipes for 50 years and during that time, plastic piping has become the material of choice for more and more applications in more and more countries. In the early days, customers only wanted to buy pipes, but in the 21st century, customers have increasingly been asking us to provide solutions for their problems. In many cases, solving these problems means designing, producing and installing pipe-work for our customers.

KWH Pipe is one of the most experienced pipe producers in the world with home markets in Europe, North America and Southeast Asia. We are involved in projects for distributing water, transporting and treating sewage, flood protection, pipe rehabilitation, district heating and various industrial applications on a daily basis. Investments in infrastructure are a prerequisite for a better quality of life and therefore, projects such as these need to be handled by the best in the business. All our experience, combined with expert know-how from trusted partners makes it possible for KWH Pipe to fulfil our customers' needs.

In order to be truly close to our customers, KWH Pipe offers services such as project development, financing, design, welding, supervision and consulting in addition to providing pipes and fittings. In cases where we feel that our role is essential to the project as a whole, we even assume responsibility as turnkey supplier. Our Project Services department operates globally, with support from people who know local conditions.

In order to be able to operate globally, KWH Pipe has developed containerized pipe production lines that can be shipped anywhere in the world and quickly mobilized to produce pipes right where they are needed. The focus of this is large-diameter pipes, where logistics have previously made projects difficult or, at times, even impossible.

Our customers have also asked us for quicker, less expensive installations and we have taken on this challenge. KWH Pipe now offers pipes up to 500 metres long, with the possibility of using our mobile production lines, or the new permanent long-length production facility in Sweden, or both. In this issue of Pipe World magazine, we present a selection of projects and installations that demonstrates our capacity to add value to your projects.

We are ready to take on new challenges – anywhere in the world!

Jan-Erik Nordmyr
Editor in Chief
Director, Project Services

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PIPE WORLD

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New KWH Pipe Franchisee

| **ON SEPTEMBER 7TH 2005** KWH Pipe and Ames Chile Industrial entered into a KWH Pipe franchising agreement. The agreement is the first of its kind and a historical milestone for KWH Pipe, who since the beginning of 2005 has actively been promoting the new business concept (more about KWH Pipe franchising in Pipe World 1/2005).

The cooperation between KWH Pipe and Ames Chile Industrial began in 2003 when Ames started production of Weholite pipes in Chile. Ames has been involved in PE-HD pipe business for many years and from the headquarters in Santiago the company has executed pipe installations for mining companies and supplied agricultural drip irrigation systems all over

the vast country of Chile. The step to convert from Weholite licensing into KWH Pipe franchising has been logical, according to Mr. Leonardo Diez, Managing Director and main owner of Ames. "KWH Pipe is associated with high quality and has a good reputation on the Chilean market and being a KWH Pipe franchisee Ames can differentiate from being just one in the crowd of pipe manufacturers", says Mr. Diez.

There is a growing market for PE-HD pipes in Chile and in order to meet the demand Ames has decided to invest in a new extruder line for PE-HD pressure pipes up to 1,200 mm. The extruder line is expected to be delivered during the first half of 2006 by KWH Pipe Technology.

Technology to Kazakhstan

| **KWH PIPE** has supplied preinsulated pipe production technology to Astana, the capital city of Kazakhstan.

The buyer is TOO Eurasia Trade NS and the pipe production technology has been supplied to a factory known as TOO KZTI (Kazakhstansky zavod trubnoi izolyacii).

The sizes of the pipe to be manufactured in the factory range from DN65 mm to DN700 mm. The scope of supply includes an extrusion line for PE pipes of up to 1,000 mm, equipment for insulating straight pipe elements with PU, equipment for manufacturing fittings, machinery for on site pipe installation and quality control equipment.

The delivery from Vaasa took place in July 2005 and commissioning was completed in September 2005.

Extension of WehoPuts product range

| **THE PRODUCT RANGE** of wastewater treatment units was extended this autumn with the launch of KWH Pipe's new WehoPuts 5.

WehoPuts 5 is an SBR unit which is capable of cleaning the wastewater of one family. WehoPuts 5 is a chemical sewage treatment plant that uses an active-sludge method; a process in which microbes are used to clean the sewage. Chemicals are added in order to precipitate phosphorus.

The new product has been developed in Finland according to Finnish regulations. Easy handling, installation and maintenance of the product were taken into consideration during the design process.

To crown it all, we are proud to present the unit's outstanding appearance, which has been designed to look like natural stone.



KWH Pipe 40 years in

| **THE HISTORY** of KWH Pipe in Denmark goes back 40 years. In the 1960s, a company called Rias imported PE pipe to Denmark. This part of the company's operations grew so big that Rias chose to turn it into an independent company, named Forenede Plast. It was located in Roskilde and was soon bought up by Wiik & Höglund, since it traded in their products anyway.

Forenede Plast initially moved to an address in Roskilde that had been acquired by Rias, but after a short time, it moved to other premises, still in Roskilde. There, the company stayed until 1972, when it moved to Rye, as better storage facilities were available there.

In Rye, the company grew slowly but steadily. In 1982, it established its own factory in Denmark, enabling Forenede Plast to produce its own PE pressure pipe. To begin with, the annual output was about 2,000 tonnes and the biggest

pipe diameter was 500 mm.

In 1986, Forenede Plast was split into two companies: KWH Plast, Wiik & Höglund A/S – which concentrated on plastic products especially for folders and ring binders – and Forenede Plast, which focused on plastic pipe. Both of them continued to share the same premises and have enjoyed very successful cooperation ever since, with joint accounting, a shared warehouse and joint celebrations.

This constellation continued unchanged, but in 1991, the names were changed to KWH Plast (Danmark) AS and KWH Pipe (Danmark) AS Forenede Plast, respectively. The 'Forenede Plast' part has since been phased out and today the company is simply called KWH Pipe (Danmark) AS.

Operations steadily expanded both at the factory in Middelfart and the sales and administration offices in Rye. Production volume at the factory has grown annu-



APPOINTMENTS

Europe



KWH Pipe Europe

Mr **Jan-Erik Nordmyr**, M.Sc. (Econ.), has been appointed Director, Business Area Europe as of 1st September 2005. Mr Nordmyr continues, as previously, as Director for the Project Service Group.



Mr **Juha Kainulainen**,

B.Sc. (Eng.), has been appointed Business Area Manager, Environmental Business, in the European area organization as of 1st November, 2005. His responsibilities cover development of the Environmental Business within selected European countries together with Pipe's European business units. Juha will also continue as the Business Manager for the Environmental Business in Finland.



KWH Pipe Poland

Mr **Roman Bedynski**, M.Sc. (Eng.), has been appointed Deputy Managing Director of KWH Pipe (Poland) Ltd with responsibility for the production as 15th September 2005.



Mr **Janusz Zadrosz**,

Manager of Gliwice Sales Office in Poland, has been chosen to represent TEPPFA (The European Plastic Pipes and Fittings Association) as Coordinator for Central and Eastern Europe as of September 2005.



KWH Pipe Sverige

Mr **Björn Eliasson**, B.Sc. (Econ.), has been appointed Sales Director of KWH Pipe Sverige AB as of 26th August 2005.



KWH Pipe Finland

Mr **Tom Lindholm**, B.Sc. (Eng.) has been appointed Director for KWH Pipe Finland as of 1st September 2005 with responsibility for management, result and coordination of KWH Pipe Finland's plastic pipe business. Mr Lindholm is located in Vaasa. Mr Lindholm has been working in different tasks within the District Energy business, latest as the director of the Thermopipe unit.



KWH Pipe, Thermopipe

Mr **Jan Rolin**, B.Sc. (Eng.) Director of the District Energy Group, will also be the Director of the Thermopipe Unit. Mr Rolin is located in Karjaa.



Mr **Mikael Masar**,

Marketing Manager, will also be vice director of the Thermopipe Unit. Mr Masar is located in Vaasa.

Denmark

ally, and today it is nearly 6,000 tonnes per annum with a biggest pipe diameter of 1,600 mm. All this has been possible due to new equipment and longer production lines. However, the potential for expansion in Rye was ultimately exhausted, as every spare space was utilized to the limit. Suitable new premises were found in the town of Svinninge on western Zealand. These offer much better facilities for sales, service and administration, as well as storage facilities and a production plant.

This has proved an advantage on all counts: it has made it possible to hire additional employees, and it is now possible to work with more large components – pipes, inspection chambers, tanks and so on – at the same time.

Today KWH Pipe and KWH Plast are better equipped than ever to continue to succeed in a fiercely competitive market.

North America



KWH Pipe Canada

Mr **David Siteman** was appointed Sales and Marketing Manager for KWH Pipe (Canada) Ltd. as of 17th October 2005. Most recently, Mr Siteman held the position of National Sales Manager at IPEX.

Excellent complete service packages suit most KWH Pipe customers. Project Services will help when unusual services are required for major deliveries of large-diameter pipes.

Project Services increase customer options

Jan-Erik Nordmyr is in charge of KWH Pipe's Project Services. According to him, the contents of deliveries are put together case by case.

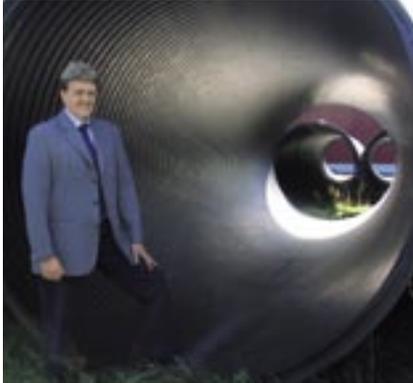
"The reason for developing Project Services was purely the desire to improve our service: we wanted to use the concept to go further at the customer interface than was possible with the conventional mode of operations. We want to give the customer ad-

ded value by offering more than just pipes and pipe components," explains Mr Nordmyr.

"In exports, for instance, project-specific solutions are an additional step towards the customer. We can produce added value by supplying more than pipe deliveries. One example of this was a submarine pipeline in Turkey. It was a turnkey project that included production, transport, welding, trenching



“WE CAN PRODUCE ADDED VALUE BY SUPPLYING MORE THAN PIPE DELIVERIES.”



Jan-Erik Nordmyr is in charge of KWH Pipe's Project Services.

and sinking. It was completed in five weeks,” says Nordmyr.

Submarine pipelines are a good example of our Project Services, supported by a fixed project production line at the waterfront in Wallhamn, some 50 kilometres north of Gotthenburg, Sweden. “Good applications for us are marine outfalls and intakes for desalination plants, sewage plants, power plants and the process industry,” lists Nordmyr.

KWH Pipe's new mobile production line expands the service package. In the case of major deliveries, it allows for production near the installation site and in general in places where the company has no production units within reasonable transportation distance. Many countries only have production units for small-diameter pipes.

With the help of the mobile production line, KWH Pipe can accept large-scale projects anywhere in the world. Thus the company can meet the needs of renovation projects, mining enterprises and all kinds of special projects.

“Transportation is a major cost factor in large-diameter pipe deliveries. If a pipe has a diameter of one metre, for instance, every shipment carries a lot of air. All the mobile production line needs is raw material which can be brought to the site in standard containers,” says Nordmyr, giving one of the major reasons for developing a separate mobile production line. ■■

Mobile Extrusion – production at site

Good customer service requires a capacity for different modes of operation. Mobile Extrusion is one of the forms KWH Pipe's Project Services services take. What is new is taking pipe production to the customer's site. KWH Pipe's rapidly assembled and dismantled mobile production line is currently undergoing test runs in Vaasa, Finland.

“With the mobile line we can take production where it's needed. As the high-density polyethylene (PE-HD) used as raw material is available all over the world, a lot of money is saved in transportation costs. Apart from raw materials, we only bring the fittings from our plants, so freight is not a major cost item,” says Project Manager Anders Nystrand. Other advantages include flexible production and smaller risks of damage during transportation and handling.

“Apart from being suitable for distant locations, the new mobile line can be used to help our production plants in major projects by shortening delivery times,” says Nystrand, describing the novelty. The customer can monitor the pipe production process and ensure the project schedule is adhered to.

The new line can produce pipes with a diameter of 630–1,600 mm and up to 500 metres long. Potential customers include potable water and sewage purification plants, feeder lines, pressure piping and similar projects requiring large-diameter piping. Apart from the public sector, our customers include industry, mines and power plants.

“Besides water, these pipelines also carry slurry from mines, for instance. An interesting use is the district cooling plants in Hawaii and Toronto, Canada, with large intake piping leading cold water from the sea bottom or a lake to cool the circulation water in heat exchanger systems,” explains Nystrand.

INDEPENDENT UNIT

“The new production line cooperates with KWH Pipe production plants. Key production staff comes from the nearest plant

and the auxiliary staff are local. The local Site Manager handles all practical aspects, production management, logistics, financial administration and so on.”

“If we supply not only piping but also welding, installation preparations or the entire installation, as we like to do in certain cases, the number of staff naturally rises,” Anders Nystrand points out.

In order to make the new production line easy to move and start up, KWH Pipe has developed components for it that support the operating mode. The line is completely independent, and the unit has its own cooling water, electricity, pressurized air and raw material supply systems.

“Our production line will be used on very different sites all over the world. In all cases the customer benefits from lower transportation costs, better logistics and flexibility. In many places we'll probably be able to produce longer pipes than would be possible otherwise,” says Nystrand, describing the operation of the mobile unit, which will soon be leaving for its first project sites.

MOBILE PRODUCTION

Project Services focus on following products:

- WehoPipe solid wall pipes of dimensions OD 630–1,600 mm with pressure range 3.2 bars to 20 bars
- Weholite structural wall pipes of dimensions DN/ID 1,000–3,000 mm with ring stiffness classes SN 2, SN 4 and SN 8.





“A GOOD BASIC PRODUCT IS THE FOUNDATION OF ANY COMPREHENSIVE PACKAGE.”

“When a pipe is produced on site, the risk of damage during long and laborious transportation and handling is reduced. Thus we bring flexibility and KWH Pipe’s skilled staff to the site,” continues Nordmyr.

CUSTOMERS WANT MORE

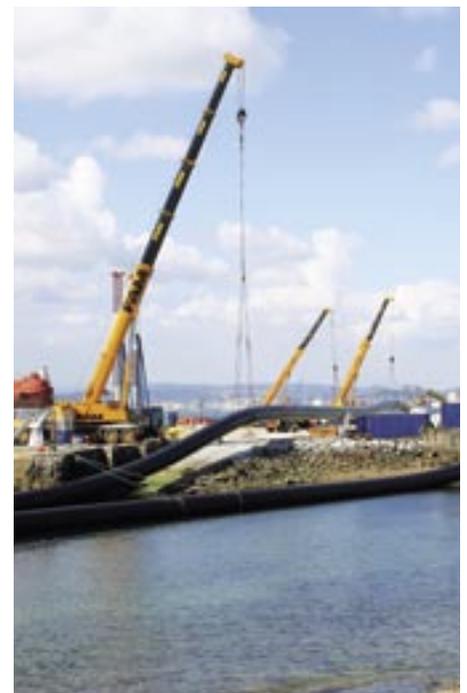
“We have noticed that our customers, for instance in the public sector and industry, are looking for more and more comprehensive services. This need is answered by our Project Services’ comprehensive delivery packages, which, in addition to pipes and fittings, may include planning, design, installation and financing,” says Nordmyr.

“As a company, we have developed from a pipe manufacturer into a producer of pipe systems and then further into a supplier of comprehensive solutions. I would like to underline, however, that we supply comprehensive solutions only when our customers so require. Contractors are good and important

cooperation partners for KWH Pipe now and will be in the future. We are not competing with them,” emphasizes Jan Erik Nordmyr.

There are also situations in which KWH Pipe has provided customer service either by granting a product licence or by agreeing on a joint venture solution with a partner. Franchising is a new concept giving local entrepreneurs an opportunity to produce plastic piping utilizing KWH Pipe technology, assistance and the KWH Pipe brand. This is an illustration of the fact that in the modern world, services must be produced flexibly, without prejudice and without being stuck with conventional procedures.

“Although the manufacture of pipe products is a core operation sector with us, our operations are largely about services produced on the basis of customer preferences and needs. Nevertheless, a good basic product is the foundation of any comprehensive package,” says Jan-Erik Nordmyr.



Wallhamn going to great lengths for the customer

Cost and time savings in transportation, less welding on site and a markedly shorter project period than is normal can be achieved because it is no longer necessary to weld the pipes first and then feed them into the water. Thus the customer does not need to rent storage for the pipes. In a nutshell, these are the advantages that brought KWH Pipe the order of sewerage piping for a wastewater treatment plant to be built in Santona, Spain, near Santander.

“The customer UTE Berria Consortio (OHL-SATO-SIEC) hoped we could make a 3,020-metre pipeline with a diameter of 1,600 mm. We produced SDR 26 PE 80 pipes as the customer ordered in 500-metre long sections supplied by our project production line in Wallhamn (Tjörn), Sweden,” says KWH Pipe’s Project Manager Christian Vestman.

Wallhamn is one example of KWH Pipe’s desire and ability to develop customer-oriented operating models. A geographically excellent location for the line was found in collaboration with port authorities and municipality of Tjörn. They offered a sheltered harbour with direct access to the North Sea. The warehouse is situated only 50 metres from the edge of the water. Wallhamn’s production

is entirely project-based and it is an extension of KWH Pipe’s plant in Borås, Sweden, whose experienced staff, laboratory and other support functions are available to it.

“With the exception of some of the more sensitive components, the production line in Wallhamn is complete so that work can start quickly when new deliveries are agreed on. Wallhamn’s project staff comes primarily from plants in Sweden, Finland and Poland. Shipments are usually transported to the customers by sea during summer when the weather is good,” says Vestman, explaining the operating principles of the unit.

Pipes can be floated from Wallhamn to Europe, from the Baltic Sea to the Mediterranean, the Black Sea and even North Africa. The pipelines going to Santona, Spain, were towed by a tugboat without any problems.

MANY HEAVY WORK PHASES ELIMINATED

Christian Vestman explains that Wallhamn is no different from the company’s other production lines except in terms of location. All other KWH Pipe plants are at least 20 kilometres from the coastline. If the delivery had been taken to Spain by road, it would have

been necessary to saw the pipes into sections with a maximum length of 13 metres. Wallhamn can supply piping that is 500 metres long, as is often requested by customers, or even longer, as was the case with Santona. It is easy to calculate how many welding jobs are eliminated on a site when the piping comes from Wallhamn.

“In the case of Santona, a lot of loading and unloading in and out of trucks and the job of moving the piping into the sea were also eliminated. Fewer welding jobs also mean more even quality in the pipes,” Vestman points out.

“At Wallhamn we can also load large diameter pipes onto a ship, if a customer orders shorter pipes to be delivered on board a vessel,” says Vestman, expanding on the unit’s potential. The experienced staff, quality systems and laboratory at the Borås plant can be utilized in quality assurance.

The winners are customers, who can have fast, economical deliveries, plus the Tjörn municipality and port, who have found a suitable tenant for their facilities. And naturally KWH Pipe, too, in being able to provide its customers with better service.

Pipe production for the Santona wastewater treatment plant began on May 20 and ended at the end of July. The piping arrived on the installation site in August. The delivery included some welding in Spain. In addition to KWH Pipe’s personnel, partners in Sweden and Spain participated in the work.



Twenty-kilometre dia. 1,000 mm and 1,400 mm PE pipeline has connected southern Warsaw with the “South” sewage treatment plant and the Vistula river.

The project “Construction of supply and discharge pipelines for the South Sewage Treatment Plant” involved connecting the sewage system in southern Warsaw with a newly built South Sewage Treatment Plant by means of delivery and discharge sewers. The project was performed by several contractors, including the PE pipes supplier for the whole project – KWH Pipe Poland, main contractor for part 1 Hydrobudowa – 6 S. A and main contractor part 2 – Hydrobudowa 9 Poznań.

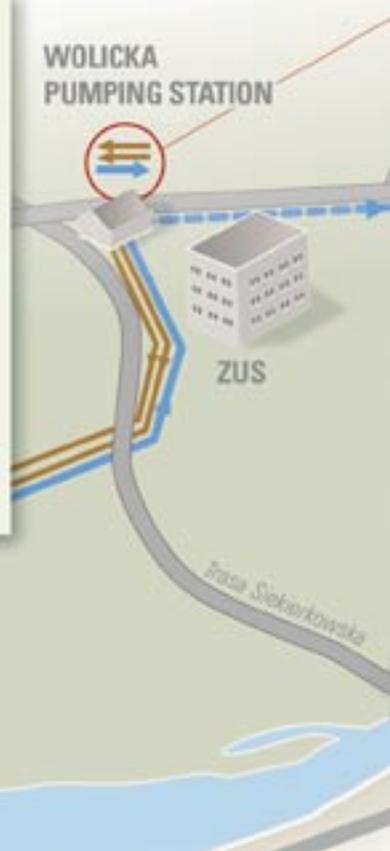
A part of this complex project was made in a conventional trenching technology, and

the whole section under Czerniakowska street and under the road tunnel under Augustówka street was made using a modern microtunnelling method. [pic. 2, pic. 4]

THE SEWERS

South Sewage Treatment Plant is the largest ecological project in Warsaw in recent decades. It cost about 100 million euro. To date, over 70 percent of Warsaw sewage went to the Vistula untreated, posing a problem for the agglomeration itself and also for other towns and villages situated downstream.

Difficult, yet successful project

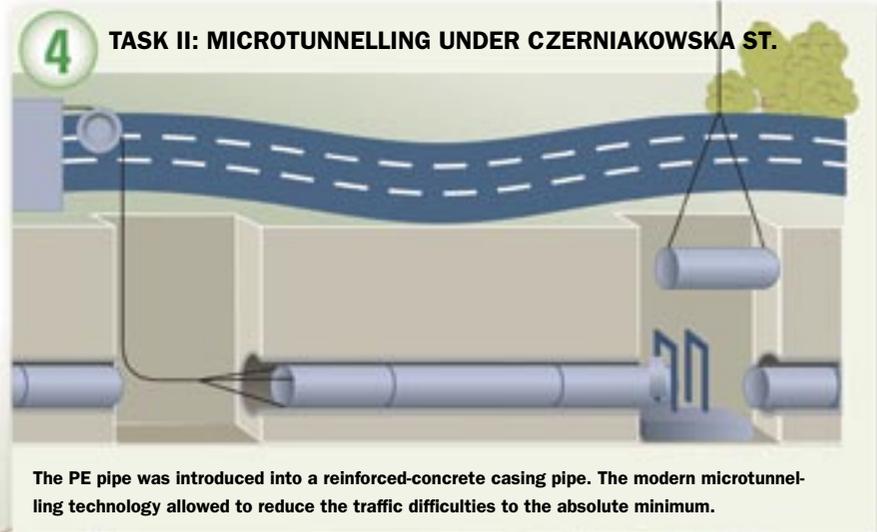
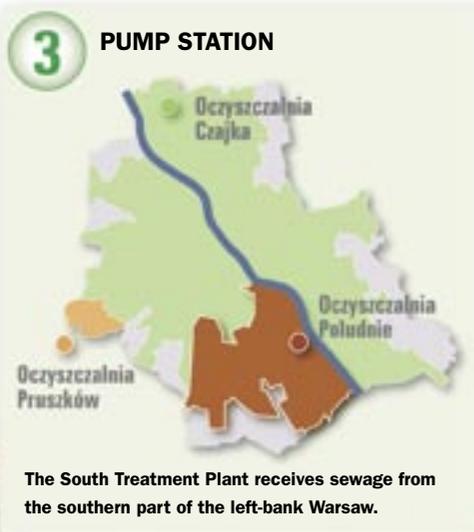


Now, the new treatment plant receives sewage from the southern part of the left-bank city, i.e. from the boroughs of Moko-tów, Wilanów, Ursynów and Powsin [pic. 3]. An imperative for the “South Treatment Plant” operation was construction of delivery and discharge sewers. In other words, we had to build main sewers connecting the plant to the Warsaw sewage system and the pipelines to enable the discharging of treated sewage to the Vistula.

CHALLENGE

The work on the delivery and discharge sewers were split up into two parallel tasks. The first one, made by Hydrobudowa 6, involved the construction of three parallel pipelines between the Wolicka pumping station, located at the junction of the Siekierkowska thoroughway and Czerniakowska street, and the South treatment plant in Zawady. The pipelines (3 x 5,340 metres) ran mainly through green areas

and barren lands, so the open-cut technology was mainly employed. However, the tunnel under Augustówka street (about 300 m in length) was made with the modern and demanding microtunnelling technology, i.e. drilling deep under the ground level [pic. 2]. Many obstacles were found during drilling, such as steel sheet piles driven 20 years ago and not marked on the maps, or drainage chambers. All obstacles were however successfully overcome.



BIG PIPES

The sewage and treated sewage are transported in the PE pipes manufactured by KWH Pipe Poland.

The forced pipelines to the sewage treatment plant comprise two parallel dia. 1,000 mm (1 m) pipes, and the sewage discharge pipeline comprises a single dia. 1,400 mm (1,4 m) pipeline.

Technical specification of the pipelines:

- Supply pipelines: PE DN1,000
PN6 L=10,578 m (2 x 5,289 m)
- Discharge pipeline: PE DN1,400
PN6 L= 9,063 (5,340 m and 3,723 m)



LEGEND

- Two supply pipelines: WehoPipe DN1,000
- Discharge pipeline WehoPipe DN1,400
- ... Microtunnelling



Joining the PE pipes with the KWH welding machine.

Over a year, over 16 kilometres of pipeline of dia. 1,000 mm and 1,400 mm was installed connecting the pump station and the treatment plant.

The other task – the 3,712-metre pipeline – runs under Czerniakowska street. This section was made with microtunneling technology as the investor (the city of Warsaw) decided to minimize difficulties for the citizens. The pipeline was built under Czerniakowska street, which is one of the major communication lines in the city. The employed technology meant that Czerniakowska street never had to be entirely closed to traffic. The only gruelling thing was the need to build a few chambers and, as a result, to close one of the three lanes in Czerniakowska over short sections. The 2-metre diameter tunnel was drilled under the roadway (depth from 7 to 11 metres) using cutting-edge drilling equipment. The contractors encountered many obstacles, i.e. bomb craters filled with rubble, varying geological conditions, and the drilling heads had to drill between existing water pipelines, foundations, or pillars of Łazienkowski Bridge.

The deadlines for both project parts

were very tight, so the work in tunnel was two-shift, simultaneously with four drilling heads.

The project which Hydrobudowa-9 made in such a short time was very complex and posed a great engineering and organizational challenge. For overcoming all obstacles, the company received the renowned Tytan – 2005 prize in the category “Project of the

Year – New System” awarded by the Polish Association of Trenchless Technology and the Polish Foundation of Trenchless Technologies. In 2004, the same award in the “Company of the Year” category went to KWH Pipe, the pipe supplier.

It is worth mentioning that the contract also involved the works in connection with the entry of the pipeline to the Vistula, in-

EXCELLENT PROPERTIES

The PE pipes were chosen for this project due to their excellent operational properties:

- durability
- long service life
- corrosion resistance
- homogenous joints
- high abrasion resistance
- flexibility and resistance to hydraulic surge
- easy jointing into very long sections



Dia. 1,400 mm PE pipes in the factory in Kleszczów.



cluding reinforcement of the bottom of the river against the current, near the intersection of Czerniakowska and Solec street.

Thus, two dia. 1,000 mm PE pipelines transported the sewage from the pump station to the treatment plant and then the treated sewage to the discharge point located near the Monument of Military Engineers.

QUALITY ABOVE ALL

Pivotal for the durability and reliability of the sewer system was the quality of the pipes, the method of installation and joining technology. In this project, the PE pipes were laid in the reinforced concrete casing pipes, made during the microtunnelling works. The empty space between the casing pipe and the main PE main duct was

filled with a special concrete mixture. KWH Pipe supplied the pipes for the pipeline and transport sewers, totalling 19,641 metres. The PE pipes have excellent properties – they are trouble-free, resistant to corrosion and abrasion. The PE pipes are joined by welding successive sections. This is a great advantage, as this technology not only guarantees absolute tightness, but also exceptional durability of the whole pipeline, including the joints.

It is worth adding that using flexible PE pipes, which can be bent in the excavation, has also contributed to reduced costs, as many expensive bends and fittings were not needed.

SUMMARY

In total, the “Construction of supply and discharge sewers for the South Sewage Treatment Plant” project cost about 23 million euro. The works were performed between May 2004 and September 2005 and 62% of them were financed from the European Union funds – ISPA and Cohesion Fund – as well as from the funds of the Warsaw Municipality, the National Fund for Environmental Protection and Water Management and partially from the loan granted by the European Investment Bank (EIB).



Installation of dia. 1,400 mm PE pipes in the pit under Czerniakowska St.

A discharge pipe for a wastewater treatment plant was laid at the bottom of the sea off St. Petersburg, Russia in July. The operation was unique in many ways.



Unique operation at the bottom of the sea

The Southwest Wastewater Treatment Plant, or SWTP, the new wastewater treatment plant in St. Petersburg, was inaugurated at the end of September in a lavish ceremony. The plant's discharge pipe, which was supplied by KWH Pipe, was installed the previous summer.

According to Konstantin Ptsarev, Managing Director of Sprut, the most challenging part of the installation work, laying the pipe at the bottom of the sea, went more or less as planned. The site is located in the Gulf of Finland, four kilometres offshore.

Ptsarev's company, Sprut, was responsible for assembling the new pipeline and connecting it to the existing piping. The total length of the line welded by ZAO KWH Pipe is 550 metres.

Sprut was established in 1995. Even though he has done underwater installation work before, Ptsarev considers the operation carried out in July unique in many ways.

"The pipe had a record diameter of two metres and was of exceptional length. Moreover, this was the first time a new pipe was connected to an existing pipeline."

Sprut was chosen to lay and connect the pipe on the basis of a competitive tendering process. The company had already been involved in the construction of the piping for the wastewater treatment plant. In addition to assembling the extension, Sprut also manufactured two steel angle sections which were installed between the three sections of the 550-metre pipe.

KWH Pipe carried out the welding on the pipes and installed the diffusers. Representatives of SWTP, Sprut and KWH Pipe met several times to plan the operation and KWH Pipe also kept its partners informed about the different stages of the laying.

Markku Seppänen, the Finnish supervisor of the SWTP project, says that a decision was made to transport the pipe sec-

tions by road. According to him, "Everything went well despite a two-day delay caused by a strike by Finnish frontier guards."

PIPE INSTALLED IN THREE SECTIONS

The pipe was laid at the bottom of the Gulf of Finland on July 1 and the operation took a total of 13 hours. As Sprut has a staff of only 17 (five engineers + 12 others), subcontractors were also involved in the work. Weholite pipes were used, and as Markku Seppänen, who took part in the operation points out, "Everything went without a hitch even though the pipe had a total weight of 150 tonnes."

The bottom of the sea at the site had already been dredged a year before. The pipeline now laid runs parallel with a second pipeline from the wastewater treatment plant. Each of the two lines is nine kilometres long.

The pipes were welded into three 160-metre sections on land. Before being laid



on the bottom of the Gulf of Finland, they were sealed at both ends to prevent water from flowing in.

“Diffusers were welded at the top of the last section at intervals of 2.5 metres. Four supports were also installed for each diffuser to keep it in place,” explains Seppänen.

Eight divers were involved in the underwater installation work. At the site, the sea is 6–7.5 metres deep.

Before the pipes were towed out to sea, temporary steel weights suspended from ropes were attached to them so that the pipes could be lowered to the bottom. The pipe was towed out to sea in three sections which were joined where they were to be laid. Following this, the position of the guide piles was checked, the line positioned and the laying initiated.

After the pipeline had been lowered to the bottom of the sea, it was put in its final position with about 90 pairs of concrete weights supplied by the contractor and placed on both sides of the pipeline.

“The 2.1-tonne concrete weights were fastened to steel channels attached to the pipeline. Cranes and divers were used to pos-

ition the weights correctly. U-shaped beams had been welded at the bottom of the channels to keep the pipe stable, to prevent it from turning in an uncontrolled fashion and to keep the diffusers in a vertical position,” explains Seppänen.

The pipes were successfully pressure-tested before being towed out to sea. Certification documents were then drawn up and the sections prepared for towing.

According to Ptsarev, few problems were encountered.

“Some stages took longer to complete than planned but this was because of the weather, an important factor when working offshore. Some of the equipment used also had to be repaired in the course of the work.”

PLASTIC INCREASINGLY POPULAR

Weholite was chosen as the pipe for the St. Petersburg project because it is lightweight, easy to handle and reasonably priced. Plastic is also an excellent long-term solution as it does not corrode in seawater.

“Weholite pipes are much better suited for lining, for example, than steel pipes. Steel pipes can easily rupture during the process and they are also highly unpredictable in other respects,” says Seppänen.

“The sandwich structure of the Weholite pipes made the laying process easier. Ten-millimetre holes were drilled into the outer surface of the pipe, at the top and bottom. As a result, water flows in from the holes at the bottom and the air comes out from the holes at the top. This makes it easier to balance the pipe with water,” explains Seppänen.

According to Pentti Moilanen, Business Manager for KWH Pipe Finland’s exports, Weholite is a fairly new product in Russia.

“Steel and concrete pipes are more widely used as the country’s pipe industry is still very much on a traditional basis and relies on steel and concrete as its materials. However, plastic is gradually catching up.”

The St. Petersburg project was KWH Pipe’s first pipe-laying contract in Russia and a good reference project for the future.

According to Pentti Moilanen, the laying site attracted large numbers of interested visitors. “The company has received a number of enquiries about large-diameter Weholite pipes and one contract has already been concluded,” he points out.

According to Ptsarev, the operation gave a boost to his company and he is also very satisfied with the amount of experience Sprut was able to amass during the project. The European Bank for Reconstruction and Development (EBRD), which provided funding for the wastewater treatment plant, has requested a detailed report of each stage of the construction work. Ptsarev also praises his Finnish partners for their cooperation, which was based on detailed pre-planning.

HEADS OF STATE ATTEND THE INAUGURATION

Covering work was carried out on site in August–September. The smooth pipe sections were covered with soil dredged from the bottom of the sea, while for the diffuser sections a three-layer cover of sand, soil and erosion-preventing crushed granite was applied.

The work on the SWTP wastewater treatment plant was completed by the end of September. Sewage water had already started flowing into the plant at the end of June so that start-up and testing of the process could begin.

The plant was officially inaugurated on September 22 in a ceremony attended by the Finnish and Russian presidents and representatives of the Swedish government.





During the last year ZAO KWH Pipe accomplished a lot of projects in St. Petersburg and other Russian cities.

ZAO KWH Pipe Projects in Russia

The company has operated in Russia for 10 years now and many kilometres of pipelines for water supply and sewerage have been installed. All projects are important for us but now we would like to present four which are interesting by reasons such as first implementation of a new product, complex solution, continuation of a successful cooperation or a prior importance for St. Petersburg which made the project very prestigious to execute.

ZAO KWH Pipe cooperates in construction and relining of pipelines practically with all big project organizations and construction companies in St. Petersburg. Among them are Vodocanal, Uros, SMU-303, Vodoley, Legal, Energostroy, Vodokanalstroy, Mostotryad-19, Cosmos, Lenspetsgazstroy, Severergosantehmontazh and many others.

CONTINUATION OF COOPERATION

Successful installations and quality of products lead to continuation of cooperation. Projects such as the reconstruction of the Southwest Wastewater Treatment Plant (SWTP) and reconstruction of sewage and

water supply systems on the street "Engelsa prospect" are good examples of that.

Collaborating in the reconstruction of the SWTP, ZAO KWH Pipe supplied more than 42 km of pipes. In March 2005 the company won the tender for the second stage of the SWTP reconstruction, which this time involved supplying Weholite pipes for water discharge to the Finnish Gulf.

Another project which was carried out in several stages was the reconstruction of "Engelsa prospect". The customer of this reconstruction is the Committee for Municipal improvements and Road services. At the first stage in 2002 516 m of Ø 1,200 PN10 WehoPipe were supplied, in 2004 – 1,200 m Ø 1,200 PN10 WehoPipe. For the third stage of reconstruction ZAO KWH Pipe manufactures about 2 km of Ø 1,200 SN10 WehoPipe and nearly 1.5 km of Weholite pipes for two sewerage systems – 825 m Ø 700/778 SN8 and 672 m 800/900 SN8. The main contractor – SMU-53 chose KWH Pipe because of the high quality of the products, reliability and good relationships established during three years of cooperation.

VANTOVY BRIDGE (GUYED BRIDGE)

One of the most interesting and prestigious projects was executed in the summer of 2004. For the first time in Russia pre-insulated WehoArctic PVC pipes were supplied for a pilot project at Vantovy bridge in St. Petersburg.

It was the first section of construction for the highway encircling St. Petersburg in the district from Priozerskoye highway to the highway "Rossia" ("Russia").

The general contractor Mostotryad No. 194 called this pipeline system "the most complicated engineering construction of the encircling highway". This project was the first in Russia not just because of the type of pipes used but also from the point of the pipes being laid inside of the middle strip of the bridge. Pipes were used for storm sewerage on the bridge and were intended to solve the problem of wastewater gathering from the surface of the bridge.

The complex system of WehoArctic PVC pipes Ø 250/355 M4 lengths 6, 5 and 2 metres was supplied to be installed inside the bridge. The total length of the pipeline system is 1,784 metres. WehoArctic tees, bends and joints were supplied together with pipes.

The project of Vantovy bridge was the first installation of WehoArctic piping in Russia, but the interest for such types of systems are very high at the moment and new projects are already under negotiation.

"FLIDERER PLANT"

Among other projects we can mention the "Fliderer" factory producing materials for thermo protection. Pipeline systems were ordered by the general constructor "Renaissance Construction".

Small diameter (Ø 90–225) PE100 PN10 WehoPipe with a total length of about 3 km were installed for a water supply system and 1,542 m of Ø 400 Wehonyl pressure pipes with fittings for sewerage system.

The installation of both water supply and sewerage systems were complicated but welding works also required excellent skills and much experience. KWH Pipe's welders carried out excellent work.



The local Project Unit in Denmark handles projects from start to finish to secure perfect results. The unit is the only one that can construct inspection chambers and tanks of up to 3,000 mm diameter.

Combining products with service gives the best result

office staff and specially trained welders, whose work includes adapting pipes and fittings to the exact locations and conditions that a particular assignment entails.

The Project Unit is also responsible for planning and construction of large-diameter Weholite inspection chambers and tanks. KWH Pipe is the only company in Denmark that can deliver these in sizes of up to Ø 3,000 mm, or even bigger to meet special needs.

The local Project Unit at KWH Pipe (Danmark) A/S in Denmark handles projects and service, and is backed up by KWH Pipe's production plant. The unit handles tendering, planning, project management and practical implementation from start to finish throughout a project when specialist knowledge about pipes and pipelines is needed. The unit is involved in the entire process in order to secure a perfect result.

It is also this unit that prepares – when necessary – the technical drawings and plans, and prepares the ground for the implementation of actual assignments.

SERVICE TEAM

In many cases, the separate sections of pipe also have to be welded together on site. Naturally, the unit also has a service team of its own, that travels anywhere in Denmark in 'mobile workshops' and handles any on-site welding or jointing.

Whether it is a question of butt welding or electro fusion, the result is always a 100% leak-proof and durable pipe.

PRODUCTION PLANT

At KWH Pipe's big production plant in Denmark (in Svinninge on western Zealand), there are 22 people who work for the Project Unit alone. They include engineers,





Shipping at Sweden's busiest port, Gothenburg, was able to slip in and out of the harbour without interruption when a plastic pipeline was laid just off the harbour in May. The design was exceptional in that the pipe was weighted without external concrete weights.

Curved underwater pipeline at Gothenburg

The Ryaverken combined district heat and power plant is under construction in Gothenburg, Sweden. The plant is intended to be brought on stream at the end of 2006.

The new underwater pipe will act as an outfall line for the excess heat produced by the plant. The outfall pipe will be used when the power plant cannot generate dis-

trict heating and the excess heat has to be discharged. The water that will flow through the pipe will be cooled as it will pass through a heat exchanger. The total length of the pipeline is about 150 metres. KWH Pipe supplied the Weholite pipes for the plant's outfall line, and took care of the welding. The pipeline was welded from individual pipe lengths of 10–15 metres, which

was the optimal length in terms of transportation and flexibility for the welding work.

“According to regulations from the environmental authorities, the pipe to be delivered had to be uniform and leak-proof. A plastic pipe had clear advantages over other materials in this respect,” explains Anders Andtbacka, KWH Pipe's Weholite Product Manager.

The other factors influencing the choice of the pipe were its easy installation and submersion. “According to regulations from the environmental authorities, the pipe had to have sections with bends of a certain angle. Underwater pipes are normally straight and have as few fittings as possible that would hamper the sinking process,” comments Andtbacka.

A curved shape was needed for the section of the pipeline on land that was connected to the power plant. A bend was also necessary for the central section where the pipeline passes underneath the quay.

The internal dimension of most of the pipeline is 2,200 millimetres, except for the last 10 metres of the pipe which has an internal dimension of 2,400 millimetres. The expanded section was made in the piping to decrease the flow rate into the sea at the outfall. The wastewater from the pipe flows towards the central flow of the river Göta Älv.

END OF THE PIPE FIXED WITH PILES

The sinking operation on the pipes was carried out at the end of May during week 21. The welding took a week and the sinking was completed in 2.5 days. The pipes were delivered to the site from KWH Pipe’s plant at Borås, about 70 km away. KWH Pipe also acted as consultant to the contractors, a company in Gothenburg called GDA, which in practice managed the towing of the pipes, the pumping of the concrete and the sinking. According to Andtbacka, project planning was carried out as teamwork.

We know the characteristics of the pipe and how to handle it, while the contractor, on the other hand, has practical experience of the equipment and knowledge of local conditions. We met the contractor a couple of times during the six months before the project was launched.

The installation site is located in Gothenburg’s harbour area, where the depth of the water is about 6–7 metres. Work on the seabed was carried out prior to the project as the seabed was uneven.

“The positioning of the line had to be level, so a gravel bed was laid under the pipeline. At the end of the pipeline the seabed drops steeply, so piling was required for about a 40-metre section,” explains Anders Andtbacka, who supervised the sinking process on site.

PARTIALLY FILLED WITH CONCRETE

The pipeline was welded using the extrusion method before being lowered into the sea. The straight pipes and two bends were welded together on the seashore in the harbour area about 10 metres off the coast. The most exceptional element about the project, according to Andtbacka, was that no external concrete weights were used, but the pipe’s structural wall was partially filled with concrete.

“We took advantage of the pipe’s wall structure. After the welding, the pipes were lowered into the water and towed to the site where the concrete was to be pumped.

Pumping the concrete inside took 4 hours, and it was then allowed to cure overnight.

“In the morning, the pipeline was carefully and slowly towed to the installation site four kilometres away using a tugboat. The tug took 2 hours and laying the pipeline in place took half a day.”

Four steel yokes were bolted around the last 40 metres of the pipeline. Holes were made in the yokes beforehand through which piles were driven into the seabed. The steel yokes were designed so that they would be as heavy as the concrete weights.

“The whole pipeline was finally covered with gabions which not only act as additional weight but also as mechanical protection. There is, after all, a great deal of traffic above the pipe,” comments Andtbacka.

The pipeline was connected to the land section in September and work to cover it was carried out over the next few weeks depending on the schedule of other work.

THE TOWING WENT ACROSS THE MAIN SHIPPING LANE

There were 3–10 workers at the site at different stages of the project. Divers were present at two stages; before the sinking they checked that the seabed was in the right condition, and afterwards they checked to see the pipeline was in place.

In addition to the tugboat, another boat was also used on a few occasions. The second vessel ensured that the pipeline that was being towed did not block the path of other boats. In other words the boat acted as the ‘rudder’ during the towing operation.

Gothenburg is Sweden’s busiest port. The towing route for the pipeline went across the harbour’s main shipping lane. However, it was not necessary to stop harbour traffic because of the sinking operations.

“In terms of the weather, it is best for it to be calm during the sinking. This time there was not much wind, but it rained now and then. The weather did not affect the work at all, and everything went smoothly,” smiles Andtbacka.



THE PIPES FOR RYAVERKEN

- Weholite DN/ID 2,200 and 2,400.
- Total length 147 m.



The district-heating pipes ordered by the Latvian power company are already supplying heat for the residents of Riga. The heavy-duty piping for the project launched in September 2004 was delivered by KWH Pipe Thermopipe, which was also closely involved in the planning work and calculations.

District heating for Riga with a big pipe



The new TEC-1 power plant supplied to Latvenergo by Siemens has two gas turbines, two heat recovery boilers and a steam turbine turning a generator and district-heat exchangers. There is also a separate unit with two hot-water boilers for district heating. The power plant is thus equipped for producing both electricity and district heating. The district heating generated by the plant is supplied to households through the Riga City Net, the city's district-heating network.

The contractor, YIT Industria, was responsible for the lion's share of the piping work at the site. DN1,000/1,200 Wehotherm pipes installed and welded by YIT Industria were used for connecting the new power plant to the Riga City Net.

According to Mikael Masar, KWH Pipe Thermopipe's Marketing manager, this was

the company's first pipe delivery to Latvia for some time and may well open up new business opportunities in the region. After all, the Baltic States are an attractive and steadily growing market.

STRICT TIMETABLE FOR HEAVY-DUTY PIPE

Two 115-metre-long DN1,000 pipes were laid in an excavation. As there are two pipes running side by side, one functioning as the flow pipe and the other as the return pipe, the total length of piping installed is about 230 metres.

"In addition to delivering the heavy-duty pipes, KWH Thermopipe was also involved in the planning work and calculations." Masar is keen to point out that the TSC joints were the responsibility of the on-site KWH team and that supplying the required large-

diameter pipes for the project was something out of the ordinary for the company.

"A large-diameter pipe requires firm joints and a skilled team." Masar emphasizes that the forces at bends and on bases had to be carefully calculated, while Jari Ahlbom, the site manager in Riga, points out that scheduling the work was quite a challenge. This was because it coincided with the period when heat consumption in the city was at its peak.

"Latvenergo is responsible for supplying the households in Riga with heat and hot water. Thus, as Ahlbom who works for YIT Industria's energy department points out, "The breaks in the power supply had to be planned very carefully and back-up systems used for heating households during the stoppages." Nevertheless, everything went off without a hitch.



Two 115-metre-long DN1,000 pipes running side by side to handle flow and return.

WORKING IN DIFFICULT TERRAIN

The excavation work for the pipeline was the responsibility of a local civil engineering contractor who had already worked for Siemens during the construction of the power plant.

According to Ahlbom, the digging of the four-metre-deep excavation was anything but straightforward. The power plant situated in low-lying wasteland, which meant groundwater problems as the water entering the excavation had to be pumped into a nearby canal, while strong protective structures had to be erected to prevent the walls of the three-metre excavation from collapsing.

“Not only that, there was a plethora of old piping and plastic pipes containing electricity cables, and about ten of them had to be moved to make way for the district-heating pipeline,” Ahlbom points out.



TRIED AND TESTED JOINTS

A local building contractor cast a concrete base for the pipes, which ensured that they stayed in place. T-pieces and valves were then installed in the existing main lines and after being connected the pipes were MT inspected.

“The network was pressure-tested at welded joints by filling the pipes with oxygen-free water supplied by the Riga City network,” says Ahlbom. The KWH Thermopipe team had installed leak indicators for providing early warning of any leaks.

Insulating the seams was also a KWH Thermopipe responsibility. After YIT Industria had carried out the basic installation, welding and jointing, the KWH Thermopipe team fitted the TSC joints and plastic sleeves and applied the foam insulation.

“We exposed the seam sections so that the KWH Thermopipe team could do its job,” says Ahlbom.

NO LEAKS!

Testing was the only thing that remained after the KWH Thermopipe team had installed the sleeves. After pressure tests at 0.2 bar had shown that the joints were 100 per cent solid, the sleeves were insulated with polyurethane.

“Laying the polyurethane is a demanding job, as the ingredients have to be in exactly the right proportions,” says Ahlbom.

Finally, in accordance with KWH Pipe Thermopipe’s instructions, the temperature in the Riga City Net was raised to 67–70 degrees. Everything went as planned and normal operations could be started.

“As planned by KWH Pipe Thermopipe, certain sections of the pipeline were covered with a plastic film. To allow for thermal movement after back-filling, about 80 sheets of foam plastic were installed at bends,” says Ahlbom.

To make monitoring easier, four DN250 inspection units were also installed in the pipeline.

Ahlbom believes that there will be more work for foreign companies in Latvia in the future, too.



Weholite helps to reopen highway

A major highway was forced to close in Canada, when a large metal arch culvert suddenly collapsed. Fortunately, new pipes were installed so quickly that the highway could be re-opened within 72 hours.

On September 13, 2005, a large 7.5 metre span metal arch culvert collapsed, near Trois-Rivieres, on Autoroute 40, the principal highway between Montréal and Québec. Only the adjacent service road was unaffected. All four lanes of traffic (2 lanes in each direction) were immediately closed as a result. Work was taking place in the vicinity of this culvert.

The Province of Quebec has used corrugated metal pipe as culverts for cross road drainage for many years. However many of these culverts are seriously corroded, due to the extensive use of winter salt.

AGGRESSIVE RENOVATION

The government of Quebec is well aware of the deterioration of Autoroute 40 in the area. Approximately 10 million dollars had already been budgeted to replace several culverts in this area over the next several months. The Ministry of Transportation of Quebec (MTQ) has been aggressively stabilizing many of these culverts by relining

them while they are still sufficiently stable to permit the relining to take place.

Mr. Vianney Lelièvre, a Sales Representative for KWH Pipe (Canada) has been working closely with MTQ to promote the use of Weholite for this application. MTQ's highway maintenance personnel carry out many of these relining projects themselves and Vianney attends at the site for all major reline projects they undertake.

THE RIGHT PIPES FROM ANOTHER PROJECT

Vianney, and Daniel Crevier, The Regional Sales Manager for KWH Pipe in Québec, were able to redirect some 84" (2.1 m) Weholite pipe, originally intended for a reline project elsewhere on Autoroute 40, to this site.

After working feverishly with MTQ's Regional engineering personnel to ensure that the 2 parallel 84" Weholite pipes were appropriate for burial under 20' of cover, the pipes were installed in time to per-

mit the roadway to be reopened within 72 hours after the highway's collapse.

A SOLUTION FOR THE CRITICAL LOCATION

It has been determined that the highway collapse was caused by the undetected erosion of soil around the culvert that occurs when corrosion of the metal culvert creates relatively small holes in the pipe. Large voids are created around the culvert as soil is washed away. For a while the asphalt or concrete pavement bridges across these voids, but eventually the roadway fails catastrophically – as in this case.

Concrete pipe culverts experience the same 'washout' problems as well. Although concrete pipe is usually more resistant to roadway salts than corrugated metal pipe, washout of the soil around the pipe still occurs. Ice forms in the space between the bell and spigot of adjacent pipes and pushes them apart. After a few years of service, the gaps between adjacent pipes can be several inches.

MTQ will be evaluating during the winter of 2005–2006 if a number of 120" (3 m) Weholite pipes will provide the stable corrosion resistant, and hydraulically sufficient solution for this critical location on Autoroute 40.

Raw water transmission pipelines for Thailand

In 2005, Thailand experienced water shortage problems over a large area but most severely in the country's Eastern Territory.

The government and industry worked together to establish a water pipeline project to deal with the water problem. Wiik & Hoeglund manufactured and supplied the PE-HD pipes for three projects.

The government set up a critical project to supply water to around a million farmers in the agricultural sector and a thousand factories in the industrial sector. The Royal Irrigation Department of Thailand (RID) was ordered by the Ministry of Agriculture to take responsibility for tackling the water shortage problem by constructing the water transmission pipeline. The project was located at Hauy Lahan, using the pumping station at Rayong, with the transmission pipeline running from Ban Lahan to the Nong-Palai Reservoir, a total length of 11,000 m.

The project alleviated the water shortage problem in the industrial sector and saved more than 20 km² of agricultural land from drought by discharging 20 million cubic metres of water per year. The construction work began in September 2005 using 11,000 metres of PE-HD pipe OD 900 PN6.3 manufactured and supplied by Wiik & Hoeglund Plc. The construction work was performed by Wiik & Hoeglund with local civil contractors and included a hydrostatic pressure test that was completed in a record time of 45 days, thus meeting the cost targets that were set. The project cost was USD 7 million.

A TURNKEY PROJECT FOR A PETROCHEMICAL PLANT

Rayong Olefins Co., Ltd. (ROC) is one of the leading petrochemical companies in

the Asia-Pacific region. The company's plant is now producing 800,000 tonnes of ethylene and 400,000 tonnes of propylene a year.

As a result of the drought crisis, ROC commissioned an urgent turnkey project to lay a 4.5-kilometre-long PE-HD raw water supply pipeline (OD 400 and 630 mm PN10) to draw water from Site 7 to Site 3. The project was expected to be completed within 30 days.

The turnkey project was awarded to WH Pipe (Thailand) and Wiik & Hoeglund Plc. Installation of the PE-HD pipe began in August 2005 and involved a process where WehoPipe was joined by butt fusion ensuring leak-tight joints. WehoPipe is light, easy to install and flexible, which meant that the installation work was finished within 2 weeks, which was ahead of the project schedule.

The project was considered a success as PE-HD pipes can resolve water shortage problems in a short time.

PIPES FOR EASTERN THAILAND

In July 2005, the droughts in the Rayong and Choburi Provinces in the Eastern area of Thailand caused a shortage of water: especially in the industrial area in Rayong. This project was designed to develop the underground water reserves to supply the industrial plants and provincial water works in the Eastern provinces that had been hardest hit by the prolonged drought.



This water project was developed by Eastern Water (Thailand) Co. Ltd and is located at Choburi. The transmission pipeline runs from the Bangphra Reservoir to Bangphra 2 Water Treatment Plant, a total length of 4,125 m.

Construction work started in July 2005. Wiik & Hoeglund Plc manufactured and supplied 4,125 metres of PE-HD pipe OD 710 PN6.3 for this project. The construction period, including a hydrostatic pressure test, was completed in 30 days and cost 20 million baht.

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