

THE KWH PIPE CUSTOMER JOURNAL » ISSUE 11 » WWW.KWHPIPE.COM

# pipe world

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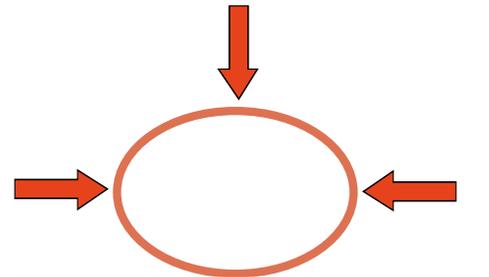
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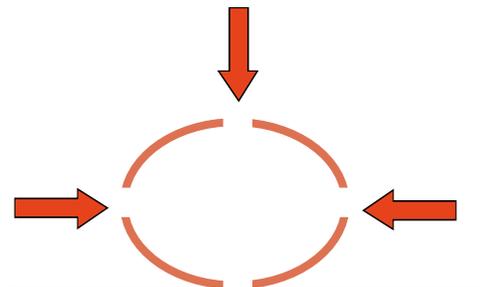
# *What similarities can be found between KWH Pipe's Weholite pipes and a low energy light bulb?*



- Low energy light bulbs last up to 10 times longer than conventional light bulbs. Weholite pipes (and tanks and inspection chambers) last up to 100 years.
- The low energy light bulb, in comparison, is the least expensive alternative from a long-term perspective. A Weholite pipe is clearly the most cost efficient alternative in the long-term.
- Low energy light bulbs come in various forms. Weholite pipes can be found in virtually all dimensions up to Ø 3500 mm. The material is also easy to work with and solutions can be found in many different areas.
- A low energy light bulb is environmentally friendly. Weholite pipes are environmentally friendly. A Weholite pipe is virtually unbreakable and possible welded joints are leak proof. Residual material can be reused or incinerated.
- Everybody knows that low energy light bulbs are the best solution.



Weholite is subjected to external pressure. Weholite is a flexible pipe that absorbs external loads and deforms, which means that it will not crack.



A rigid pipe is subjected to external pressure. The pipe does not deflect, and in the end it will crack.

**Contact your nearest KWH Pipe sales office for more information.**

[www.kwhpipe.com](http://www.kwhpipe.com)



**Member of the KWH Group**

# EDITORIAL

**K**WH Pipe, a key part of the KWH Group, has grown in the spirit of the traditions of its parent company. For 80 years, we have constantly reacted to the changes of the environment and fought unfavourable development, both locally and globally. The company was established in 1929 when the world was experiencing an economic crisis. One like that has not been experienced until now, when the global economy is once again diving.

When the company was getting started, the problem was funding: where to borrow capital from in order to begin operations? Similarities to the current times are evident. Now, solvency must be secured. However, while KWH is financially sound, loans are not readily available, especially at favourable terms.

Despite the difficult beginning, the Group and KWH Pipe have developed into the KWH of today; an internationally successful company with operations in many countries. We have been one of the leading players in the piping industry since the 1960s, when our technical development was rapid. More information regarding our history can be found in this publication and on our website at [www.kwhgroup.com](http://www.kwhgroup.com).

Similar to other companies, we have naturally benefited from good economic times and more importantly, from a professional and enthusiastic staff. Our personnel has demonstrated that the world's leading technical know-how can be developed, even if the springboard for such development is in a small country remotely located from global markets. The current strategy is based on a foundation tested by history. That foundation has been formed during the past 80 years and its most important element, according to our vision, is active new thinking.



**Peter Höglund**  
Group President

**ACTIVE PURSUIT OF RENEWAL** In order to apply niche strategies and to attain leading positions in our mature markets, we must pursue intensive, long-term development operations which enable us to adapt, produce business renewal and develop our operations through our unique expertise. This active renewal, adaptation, restructuring and development process is expected to create a solid foundation for future growth and profitability, allowing us to attain our ambitious economic targets.



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Thanks to the advantages of PE-HD, fresh water will soon be flowing to the inhabitants of the Mekong Delta in Vietnam.



## Snap Joint connections for sewage pipe system

NKI Neede, KWH Pipe's distributor in the Netherlands, has used DN 1 200 snap joint connections for Weholite pipes on a main sewage pipe system. Normally, the pipe material for this type of project is concrete, but here the whole pipeline was constructed of PE-HD. It is the first time NKI Neede has used snap joint connections of this size. ■

[www.nki-neede.nl](http://www.nki-neede.nl)

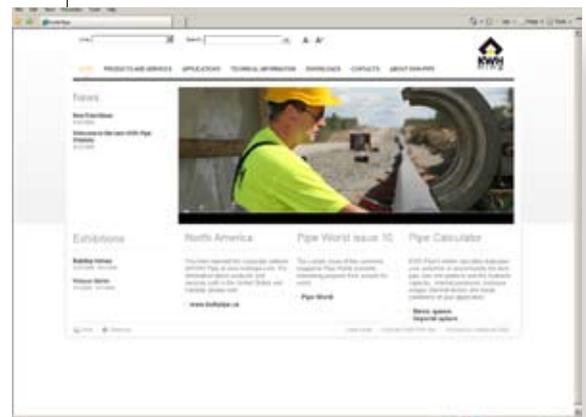


## Renewed website to be launched this summer

Our new website is under construction and we are pleased to announce the release of the renewed website in the summer of 2009.

We hope to serve you even better than before with a fresh new look and useful, interesting information regarding our latest solutions.

The international KWH Pipe site can be found on [www.kwhpipe.com](http://www.kwhpipe.com)



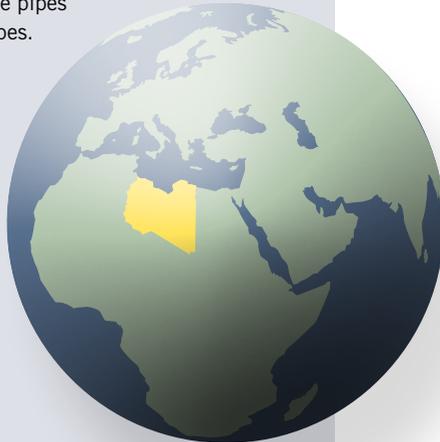
## Franchising agreement to Libya

KWH Pipe Technology will deliver full turn-key plastic pipe production lines to the Tripoli area in Libya. This will be the first full scale plastic pipe factory in the country. The investment is in line with local investment policies aiming to emphasise industrial investment that supports local economic growth.

The delivery includes solid wall production lines up to 1 200 mm in diameter for pressure pipes and up to 2 200 mm for Weholite pipes.

Additionally, KWH Pipe Technology will deliver a full set of machinery to produce segmented fittings for the pipes, factory auxiliary systems (plant cooling system, waste material recycling systems, etc.) and know-how. The products will be produced with KWH Pipe's brands.

Read more about the KWH Pipe Franchising Concept on [www.kwhtech.com](http://www.kwhtech.com)



## The Thailand sales office has relocated

This winter Wiik & Hoeglund, KWH Pipe's subsidiary in Thailand, has relocated its sales office to Cyber World Tower, Ratchada Pisek Road, Bangkok. Located in the middle of a new business district, this will be the place for domestic and export sales, marketing, technical and administrative operation. With a modern design and space utilization concept, the working environment is improved, and we are always ready to welcome KWH clients and guests from all over the world. The new office opened in January 2009.

**Wiik & Hoeglund (Public) Company Limited**  
(KWH Pipe Thailand): 2201-2204 35th Floor,  
Cyber World Tower A, Ratchada Pisek Road,  
Bangkok, 10310 (662) 612-8600  
» [www.wiik-hoeglund.com](http://www.wiik-hoeglund.com)



## New facilities in the UK

**KWH Pipe (UK) Ltd**, 7 Holdem Avenue, Bletchley,  
Milton Keynes, MK1 1QU » **Telephone** +44 1908 646 902  
**Telefax** +44 1908 646 911 » [www.kwhpipe.co.uk](http://www.kwhpipe.co.uk)

## New representative in the Iberian Peninsula

**Mr. Pablo Ramón**, C/Alameda San Mamés 43 6° E.I,  
48010 Bilbao, Vizcaya – Spain  
» **Telephone** +34 691 028 172 » [pablo.ramon@kwhpipe.com](mailto:pablo.ramon@kwhpipe.com)

## APPOINTMENTS



**Mr. Johnny Jakobsen** has been appointed factory manager in Vaasa, Finland as of 2.2.2009. He is responsible for the operative management of the pipe production departments and for operations development. Mr. Jakobsen has previously worked as a project manager at KWH Pipe Technology.

**Ms. Petra Bengs** has been appointed Human Resource manager at KWH Pipe Finland as of 19.1.2009. She has previously worked as customer service and export manager at KWH Pipe Finland.



**Ms. Marcella Pellas** has been appointed quality and environmental coordinator within KWH Thermopipe in Finland and Sweden, as of 2.3.2009.

**Mr. Tom Lindholm** has been appointed project manager, KWH Pipe Finland Quality Department, as of 9.3.2009. He has previously worked as project manager at KWH Thermopipe.



**Ms. Nina Tyni** has been appointed Business Manager, Housing Technology and member of the management team in Pipe Finland as of 1.5.2009. She has previously worked as Sales Manager for environmental products.

**Mr. Fredric Tidström** has been appointed Key Account Manager, Franchising & Licensing, and a member of the management team of the unit Tech Vaasa as of 1.5.2009.

Plastic pipes with the largest diameter in Finnish history are being installed at the biopower plant that is under construction at Keljonlahti in Central Finland. The pipes are to be used as transfer lines for cooling water.



# BIOWATER PLANT RECEIVES RECORD PIPES

**T**rucks loaded with three-metre diameter Weholite pipe have left the KWH Pipe plant in Vaasa every day, heading for the city of Jyväskylä in Central Finland.

Jyväskylä's existing main power plant is becoming too small to meet the demands of the growing city.

"Part of the existing equipment used in the power production will be removed due to tighter EU regulations. The new plant will generate energy sustainably using peat and wood," explains Project Manager **Pentti Huumo**, of the power company Jyväskylän Voima Oy.

The project has been in the planning stages for years, as the first plans were drawn in 2003–2004. The power company, that will be running the new plant, was formed in May 2006. Construction began with the felling of trees at the plant site in October 2007.

"Considering the construction site, this one is pretty challenging. We've moved nearly a million cubic metres of soil," says Huumo.

## Fragmental rock a surprise

According to the original plan, cooling water for the plant was to be drawn from nearby Keljonlahti Bay through a pipeline. The cooling water would be returned to the main body of Lake Päijänne via a rock tunnel measuring an approximately one kilometre-long.

When the bedrock and lakebed were analyzed, it soon became clear that the area would be a challenge.

"We found that the bedrock was highly fragmental. The plan was to build a tunnel 80 metres below the surface of the lake," explains Huumo.

The work began to look overwhelming. The tunnel would have run underneath the plant and the bay, and finally emerge from the tip of a neighbouring peninsula.

"On top of this, there is a large fuel depot nearby, and we didn't want to interfere with its operation. We had to come up with another plan," recalls Huumo.

## Solution found on the Internet

Just over a year ago, the power company decided to run the cooling water through a 1.3-kilometre long pipeline laid on the lakebed to the main body of Lake Päijänne.

Because water flows through the line at a rate of 5–6 cubic metres per second, the pipe also had to be of substantial size. "After looking at KWH Pipe's website, it soon became clear that it is possible with pipes this big," says Huumo.

Steel pipe was initially also an option. After a tender process, KWH Pipe's Weholite pipe was chosen as the pipe material for the project.

"The smooth exterior of the pipe is good for fishermen, because their nets won't get stuck on it," states Huumo.

Hannu Ahokas, Regional Project Manager for KWH Pipe, explains that the Keljonlahti delivery includes the design, welding, weighting and submersion of the cooling water pipes, as well as parts and equipment inspection. ▶





## LARGE-DIAMETER PIPES ENJOY GREAT POPULARITY

The market for large-diameter Weholite pipes is constantly growing. There is a particular interest in large tanks made from pipe.

"Tighter environmental requirements have increased the demand for large tanks," explains Kimmo Sinikallio, Operations and Maintenance Manager at KWH Pipe.

Weholite is a structured-wall pipe with smooth internal and external surfaces. The pipe is manufactured by spiral welding PE- or PP-profiles.

Weholite is used in complete pipe systems, which carry liquids or air. Contractors enjoy working with Weholite because the pipes are quick to install and easy to handle at the worksite. ■

### Working group to fine-tune plans

KWH established a working group, which focused on handling the installation of the Keljonlahti pipeline. A plastic pipeline of this diameter has never been installed in Finland, so there is a lot of new ground to cover. The largest pipe diameter used at Finnish construction sites to date is 2.4 metres.

"This is really a first for a project of this size, so there will be a lot of things we need to give attention to. The working group has already worked out all the project phases," explains Hannu Ahokas.

"This allows us to bring together know-how from a wide range of technical fields; the kind of know-how you'll find in an expert organization like KWH Pipe," says Ahokas.

How will the pipe behave? What kinds of things need to be taken into consideration due to its large size? Worksite plans and directives are affected by, for example, the size and weight of the pipe as well as the length of the welded sections and the challenges posed by submersion.

Huumo likes KWH Pipe's way of working.

"I was certainly convinced when we received a visit from a Norwegian expert, with whom we went through the technical aspects of the project. This particular expert had written a textbook on plastic pipe and has practical experience working in the oil and gas fields of Norway.

"This is the kind of input a customer appreciates," says Huumo.

### Minimal dredging necessary

The route of the pipeline on the lakebed has now been established, and it was found to be relatively easy. The only dredging necessary will be on the power plant shoreline, as well as on a stretch approximately 200 metres in length, where the discharge pipe is close to a channel.

"Dredging was completed on New Year's Eve – we just have to add some finishing touches," Huumo explains.

An excellent staging point for the three-metre pipe was found near the power plant site, where an old railway track that used to serve the logging industry can be found. Small transfer cars were built so that the pipe elements could easily be moved.

### Steady stream of pipes

During the whole spring a steady stream of pipes will make their way from Vaasa to the shores of Lake Päijänne in Jyväskylä.

"When we get to work in the morning, there are usually two truckloads of pipe waiting to be staged," explains Huumo. 20-metre pipes are welded together to form 300-metre sections.

"The first pipe section, which was used for process water intake, was completed in January 2009. The pipes are welded together into sections and flange joints are welded on the ends. Then, the sections are lifted onto the ice to wait for the weighting," says Ahokas.

The installation of the pipeline on the lakebed began in May and it is estimated to be ready in early summer. ■

## WEHOLITE PIPES FOR THE KELJONLAHTI BIOPOWER PLANT

- » The Weholite pipe is 3 000/3 330 millimetres in diameter.
- » One pipe length is 20 metres.
- » Pipes are welded into 300-metre long sections, i.e. 15 pipes joined end-to-end.
- » The overall length of the cooling water intake and discharge pipe is 1,714 metres.

# Carbon footprint

**As green issues continue to rise up the political agenda, the water industry is being forced to look towards more innovative solutions that play a part in reducing carbon footprints. Plastics specialist, Dr Vasilios Samaras, examines how a material traditionally thought of as being detrimental to the environment is now proving to be the 'greener' option.**

In an era where global warming is having a significant effect on our climate and catastrophic weather events are devastating local communities, the use of innovation is of vital importance.

Historically, the use of traditional materials within the water industry has not only propagated hydraulic inefficiencies, but also paid negligible attention to the environment. Independent research has demonstrated that the use of plastic pipes, contrary to traditional beliefs, sets the foundation that could position the water industry at the cutting edge of the environmental agenda.

When you consider that even a small construction site can produce approximately 0.8 tonnes of CO<sub>2</sub> per week we begin to understand the importance of looking at the whole picture rather than identifying the areas of least pollution. The main challenge at the moment is to analyse the carbon footprint in every project and then try to reduce it as much as possible without infringing too much on budget constraints.

High-density polyethylene (PE-HD) pipes have witnessed a strong growth in usage, par-

ticularly within the water industry. Research suggests they can contribute significantly towards the green objective. This will become more evident in the future as the water and construction industries begin the systematic evaluation of the carbon footprint for every individual scheme.

Delivery is one of the major areas in which the advantage of plastic pipes becomes apparent. This fact supported by the use of a simple carbon footprint calculator endorsed by the UK Environment Agency and made available on the internet at [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk).

For example, considering the CO<sub>2</sub> emissions on the delivery of 14 metres of 2.1 metre diameter PE-HD pipe (which would be delivered on one vehicle) compared to the equivalent length of concrete pipe (which would have to be delivered over a number of vehicles), it is clear that the CO<sub>2</sub> emissions of the plastic is just a fraction of the concrete. This is before we even take into consideration the installation time and plant requirements. This can be represented graphically as follows: (see figure1).

## PE-HD PIPE VS CONCRETE

- 2 100 mm PE-HD Pipe
- 2 100 mm Concrete Pipe

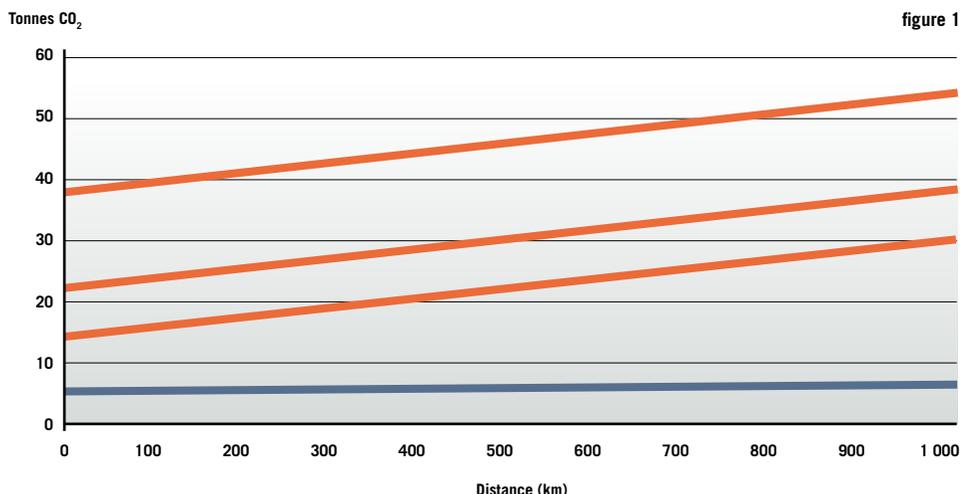


figure 1



figure 2



figure 4

Due to the different mixtures and production methods for concrete pipes, three different values have been used to demonstrate the best and worst case scenario. Even in the best case scenario for concrete pipes, the CO<sub>2</sub> emissions are 50 per cent higher than the PE-HD equivalent. It is also important to emphasise that there is a considerable increase in CO<sub>2</sub> footprint of concrete pipes the further they travel from their manufacturing base due to their heavy weight.

Of course, this is still a simple calculation. However, water authorities across the UK and the private consulting engineers attached to the AMP 4 programme are providing more extensive independent research that adds conclusive evidence to the debate. While the level of the results varies from project to project in every case, the outcome is firmly in favour of plastic.

On one particular flood alleviation project carried out by KWH Pipe's Weholite licensee in the UK, Asset, in the last few months it was calculated that the carbon footprint of the large diameter plastic pipe was only 15 per cent of the concrete equivalent.

These statistics contradict research that was endorsed by the UK Department of Trade and Industry that concluded concrete pipes used in gravity sewers were environmentally sound. The work omitted vital carbon contributing factors such as speed of installation, a reduction in plant requirements and one of the major offenders, transport to site.

Figure 2 clearly illustrates the advantages of transporting plastic pipes with reference to the carbon footprint. In figure 2, 140 metres of pipes are nested inside one another and are delivered to site in a single load.

Figure 3 shows a massive pre-fabricated section of a 300 m<sup>3</sup> CSO attenuation tank with a weight of less than five tonnes that was manufactured offsite, delivered and installed in just a few hours. To construct this on site us-

ing traditional methods would have taken at least eight weeks.

The 300 m<sup>3</sup> CSO attenuation tank consisting of 3 000 mm diameter pipes and prefabricated sections which is illustrated in Figure 3 was installed in a very populated area. The tank was placed in the open trench in less than five hours and the total installation including excavation of the trench and backfill took only a few days. This dramatically reduced the environmental impact, not only through the CO<sub>2</sub> emissions, but also through something which is almost impossible to measure; the effects of such a large scale construction on the local community (see figure 4).

The UK Government has set a challenging target to reduce the country's carbon footprint by up to 60 per cent by 2050 and it is therefore essential that the construction and water industries synchronize their efforts to ensure a significant reduction in CO<sub>2</sub>.

As the years pass we will encounter examples showing how PE-HD pipes stand up to the environmental test against its competitors. Meanwhile designers and specifiers can feel confident that they are working towards a greener agenda. ■

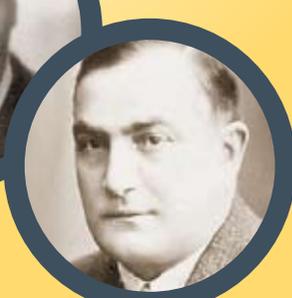
Dr Vasilios Samaras is technical engineer at water management specialist and Weholite licensee Asset International Limited.



figure 3

## 1929

- » Emil Höglund and Edvin Wiik establish the Wiik & Höglund timber company 28.8.1929.
- » The company makes its first export sales in October 1929.



## 1960

- » In the 1960s Wiik & Höglund focuses on research and development and in 1961 they are able to make 400 mm pipes. At this time larger diameter PE pressure pipes are considered nearly impossible to make from a technical point of view.
- » In 1962 the first international subsidiaries are established in Sweden and Norway.
- » In 1963 the company acquires its greatest competitor, Oy Nars Ab, and Finland's largest plastics company is born. In the same year a decision to wind up the timber business is made.
- » In 1964 Wiik & Höglund causes an international bustle, when the plastics factory engineers present their 600 mm pipe – the first in the world. The company also develops a welding machine for jointing pipes.
- » Not long after Wiik & Höglund presents a 800 mm pipe, and in 1966 the company is already producing 1000 mm pipes.
- » In 1966 a pipe factory is established in Germany.
- » In 1967 the company starts the production of polyethylene pipes in Canada.
- » In 1969 another record is broken as the first 1 200 mm pipe is produced.

## 1930

- » During the recession times are hard, but in the late 1930s Wiik & Höglund expands fast.
- » By 1939 the company is the biggest timber exporter in Finland.

## 1940

- » During the war Wiik & Höglund timber exporting comes almost to a halt.
- » After the war, things gradually get back to normal and profits grow. The profits are ploughed back into fixed assets, mainly forest.

# 8 DECADE



## 1950

- » Wiik & Höglund makes a crucial decision with a great impact on the future of the company in the autumn of 1951. Wiik & Höglund moves into plastics and begins production of plastic floor tiles.
- » In 1955 the first polyethylene pipes are produced and supplied to customers. The company is the first in Finland to buy equipment to make expanded polystyrene sheets. The product is marketed under the brand name Styrox.
- » In 1957 Wiik & Höglund acquires another plastics processing plant. The autumn of 1957 is a turning point in the history of Finnish industry using imported raw materials, as importing is deregulated and instead of a shortage of plastic raw materials, there is now actually an abundance.



## 1970

- » A number of large international piping projects in the 1970s lead to the setting up of a projects department. Pipe projects in Brazil, Iraq, South Korea and Thailand increase the company's familiarity with these markets.
- » A mobile extruder is developed for the project work for manufacturing pipes on site.
- » Marketing efforts are increased in Europe and in 1972 a sales office is set up in England.
- » In 1976 the company produces a 1 600 mm pipe. The production of pre-insulated pipes begins.



## 1990

- » In 1990 new factories are opened in Malaysia and Portugal.
- » In 1993 the first Polish factory is opened.
- » In 1996 factories are established in China and the USA.
- » In 1997 the diameter of the structured wall pipes reaches 3 000 mm.
- » The Polish factory relocates.

## 2000

- » In 2002 KWH Pipe launches WehoPuts mini wastewater treatment plants.
- » In 2006 the production of functional pipes WehoSlurry and WehoAntistatic begins.
- » In 2007 KWH Pipe starts the production of PEX pipes.
- » In 2008 the maximum diameter of the Weholite pipe has grown to 3 500 mm.
- » KWH Pipe is one of the world leaders in the production and development of plastic pipe systems.

# S OF KWH



## 1980

- » In 1983 the company opens a factory in Thailand.
- » In 1984 the KWH Group is born when the companies Keppo and Wiik & Höglund merge. The company is organized into divisions of which the largest is KWH Pipe.
- » In 1988 most of the divisions are demerged, which creates a clear separate identity for KWH Pipe Ltd.
- » 1986–1988 KWH Pipe strengthens its position in Finland by acquiring competitors.
- » After the acquisitions KWH Pipe produces PVC piping systems in addition to PE pipes. The company also develops Weholite and the double-wall pipe WehoDuo.
- » Already in the 1980s KWH Pipe develops products for pipe rehabilitation.





# Los Angeles County Expands with Weholite

**T**he Palmdale Water Reclamation Plant (WRP) is located in the City of Palmdale, in north Los Angeles County, California, USA. The plant began operating in the early 1950s with a capacity of handling  $\frac{3}{4}$  million gallons (2 900 m<sup>3</sup>) of wastewater per day.

Times have changed since then. Now, thanks to Weholite, the Palmdale WRP continues to provide primary and secondary treatment for 15 million gallons (56,800 m<sup>3</sup>) of wastewater per day, serving the surround-

ing population of approximately 150,000 people. The Los Angeles County Sanitation District – the owner of the Palmdale WRP – is committed to providing environmentally sound, cost-effective wastewater and solid waste management, converting the waste into reclaimed resources. All wastewater solids generated at the plant are processed at the site, anaerobically digested, stored, and then dewatered into biosolids and transported off site to be used as compost. The effluent is treated and reused to irrigate feed crops on adjacent property and a co-generation proc-

ess that heats water and produces electricity utilizes the methane gas produced during the digestion process.

A previous project phase successfully completed using Weholite, put KWH Pipe at the top of the list when it was time for the specifier to source the pipe for the second plant expansion. Weholite's proven ability to perform in a corrosive sanitary effluent environment was an ultimate advantage. Structured-wall Weholite, 2 metres in diameter and manufactured in 18m lengths, was ideal for this project site location that included flat desert-like terrain in long perfectly straight runs. A total pipe requirement of 370 m allowed for a cost effective and efficient installation.

### **Safety is a major priority**

One of Los Angeles County Sanitation District's major priorities for the project was safety. KWH Pipe technicians performed the on-site fusions as well as monitored the entire installation process, demonstrating commitment to the quality and safety of the project. KWH Pipe met and exceeded the expectations of both the contractor and the specifier.

Bob Corpening, the project manager from Professional Pipeline Contractors Inc had the following to say about KWH Pipe's products and services. "The portion of our work on this project went the smoothest and quickest working with the KWH Pipe team, even though this was our first time using this pipe

and the welding procedures. The joint testing device we had designed and made worked without a hitch. We did not have one faulty joint that related to the product or the welding procedure. I would recommend this product to any agency. Weholite is a very strong, light weight, and reliable product."

### **The expansion will continue until 2011**

Plant effluent will continue to be used for crop irrigation at agronomic rates. To achieve this, additional land will be developed for agriculture use, and storage reservoirs will be constructed to store plant effluent in the winter when crop water demand is low, and for use in the summer when it exceeds the amount produced by the Plant. The 2 m diameter Weholite pipe links two pumping plants approximately 400 m apart to allow the seasonal pumping options to occur.

The expansion at the Palmdale site will continue until 2011. There is expected to be at least one more effluent pipeline expansion before the completion of the project and once again, Weholite will be included in the specifications. ■

**THE LOS ANGELES COUNTY SANITATION DISTRICT IS COMMITTED TO PROVIDING ENVIRONMENTALLY SOUND, COST-EFFECTIVE WASTEWATER MANAGEMENT.**



# WehoCoat ready to take off





## WEHOCOAT FIELD JOINT COATING MACHINE

### Size range

- » 150–1 500 mm

### Capacity

- » Typical coating time of Ø 500 mm pipe: appr. 4,5 minutes including powder epoxy application

### Technical Specification

- » Chain-supported frame assembly including
- » Raw material feeding device
- » Flat die extrusion head
- » Induction heating assembly
- » Pressure roller assembly
- » Electronics & Instrumentation
- » Extruder and feed hose

**The WehoCoat development has reached a phase where it is ready to take off and conquer the field joint coating market by storm. The recent testing and fine tuning of the concept in real field conditions has brought the whole oil and gas pipe line industry closer to a safer future.**

In the beginning of 2006, KWH Pipe Technology, supplier of plastic pipe manufacturing technology and related machines, and Borealis AG, the world's leading supplier of raw materials for steel pipe coating, joined their efforts in developing a system to coat oil and gas pipeline field joints with new and innovative plastic materials developed by Borealis. The challenge was to design a machine which could apply a melt plastic layer on a field joint welding area in a controlled manner repeatedly without compromising the future pipe line integrity.

A development team was put in place where Borealis was bringing in the coating and plastic raw material know-how, and KWH Pipe brought long-term experience in designing and constructing machinery and equipment for the plastics industry.

The construction of the machine started late 2006. In the beginning of 2007, the machine was given the name "WehoCoat". The first testing and machinery demonstrations were done in early spring 2007. The WehoCoat machine performed as planned, and several test sessions were executed, including customer demonstrations at Borealis' Russian pipe coating seminar.

A sub-development program was set-up to find a solution for the heating of the steel pipe. At an early stage, it became clear that the solution should be an electrical-induction-based heating system. For the steel pipe surface to reach a temperature of 200° C in 15 to 20 seconds, conventional heating methods had to be abandoned. This was also in line with the chosen "high tech" philosophy – let's go even higher. During the winter 2007/2008, a suitable compact solution was found and custom-developed to suit the WehoCoat machine and the coating process.

This development was the final breakthrough in the project and the development team was ready to enter into the next phase of the journey towards an ultimate field joint coating solution. ▶

## Recent development and testing

The next real challenge for the WehoCoat development team was testing and demonstrations in real field conditions where it would be exposed to the elements. The Finnish natural gas pipeline operator, Gasum, agreed to cooperate in the testing process, and it was agreed to do several field joints in a real on-shore gas pipeline construction project.

At the time, Gasum had several pipe works under construction in Finland. The DN 500 mm 43 km pipe at a construction site called Kutinen-Kulju, in southern Finland, was selected for the testing process.

So far, the development team had worked in workshop and laboratory conditions, but now they were able to do field tests and the equipment used, including extruders, heaters and control cubicles, was loaded onto a truck and taken to the site.

Prior to the field session, several laboratory tests were conducted by the site team comprising of Borealis and KWH Pipe personnel. Before the field test, qualification tests were applied to demonstrate the quality of the coating. In the field test phase, several joints were coated; some of them were also peel tested on actual pipeline in the excavation. Testing results were dominantly excellent; showing pull strength values between 5 to 10 times better compared to conventional shrink sleeve methods.

During the field testing session, several demonstrations for customers were held as well. For example, a high-level delegation from Russia followed the tests on location.

## Borealis Innovation Award for the WehoCoat Team

With more than 40 years of experience in polyolefins and 30 years in the global pipeline industry, Borealis is moving ahead into the future as a leading innovator and trendsetter in the industry.

The WehoCoat team, comprising of employees from both KWH Pipe and Borealis, was awarded a highly prestigious Customer Solution Award at the annual Borealis Innovation Awards ceremony.

At the ceremony, awards in several categories, such as Innovator of the Year, Customer Solution Award and Co-operation Award, were presented and the nominees were analyzed according to strict criteria by the Award Committee.

“The awarded solution is a truly novel innovation on the market. The benefits of this

method will be far reaching and will help the pipeline owners sleep better at night” says the head of development, Leif Leiden at Borealis R&D centre.

## Future opportunities and next steps

During the development project, the prototype machine has experienced several modifications and redesigns to improve the coating process. In addition, the raw material has experienced further innovations. Today it can be said that the new field joint coating method, the machine, raw material and the coating process have reached a point where a first level commercial approach can be started.

A second generation WehoCoat design is already under way. All the learning and experience gained from the prototype and field testing have been analyzed. It will be implemented in the new version of the machine, and a market launch can soon begin.

thousands of kilometres of pipelines under construction at any moment. It is estimated that in the coming 5 years, there will be approximately 200,000 km of newly laid oil and gas transportation pipelines in the world.

When looking into the life span of a pipeline, it is the joint area which is always the weakest point. Today the joints are treated in the field and the methods for joint coatings are many. None of the joint field treatments and methods for joint coatings are even close to the quality of a typical factory coated three-layer steel pipe.

This is the niche where the WehoCoat machine, together with Borealis innovative plastic material, comes into the picture. WehoCoat is designed to produce a PE layer on the joint area with equivalent physical properties as the actual factory plastic coating of the pipe itself.

By using the WehoCoat solution for field joints in three-layer pipe systems, both on-

**A SECOND GENERATION WEHOCOAT DESIGN IS ALREADY UNDER WAY. ALL THE LEARNING AND EXPERIENCE GAINED FROM THE PROTOTYPE AND FIELD TESTING HAVE BEEN ANALYZED. IT WILL BE IMPLEMENTED IN THE NEW VERSION OF THE MACHINE, AND A MARKET LAUNCH CAN SOON BEGIN.**

At the same time, persistent work is already being done in introducing the new coating principle amongst the oil and gas pipeline industry, especially for the pipeline owners and operators who are paying the final price for the premature failures of oil and gas transportation pipelines.

The road map is crystal clear towards an ultimate field joint coating experience. The WehoCoat machine and the team are ready for the challenge to meet the conservative industry and to change the way of thinking on a large scale.

## Market drivers for development

While oil and gas reserves are becoming increasingly scarce, the exploration is heading further out to more difficult corners of the globe. Once the oil rig is set-up, the oil and gas pipelines will follow. No matter if it is on-shore, off-shore, in the Siberian sub-zero permafrost or the hottest deserts: there are

shore and especially off-shore installations, it is lifting the pipeline integrity to a new level. This would save vast amounts of money for pipeline operators and owners, not to mention reduce the number of oil- and gas-related environmental disasters and danger situations due to leakages and failures in the high-pressure pipelines.

## WehoCoat Machine

The WehoCoat coating concept brings in technology to tackle the weakest link on the pipelines: the “field joint”.

Together with Borealis, KWH Pipe Technology has developed a unique coating device for demand of field joint markets.

Taking all weather conditions into account, the WehoCoat device is definitely operational in the field and is the ideal equipment for extruding the field joint with molten polymers to achieve a joint at site as good as the factory coating. ■



Coating crew in action on the Gasum gas pipeline in Lempäälä, Finland, operating the coating machine are Jouni Purmonen, Borealis and Christian Glasberg, KWH Pipe.

**Many of the EU-funded investment programs relating to water supply and wastewater treatment systems currently under way in Poland are huge, complex, ventures with multi-million Euro budgets. It is, therefore, vital that individual tasks be completed expertly, swiftly, and cost effectively. The use of Weholite pipes in this specific project allowed for the fulfilment of these objectives.**

**T**he piping of an open discharge channel carrying treated waste water from the “Dębogórze” Sewage Treatment Plant in Gdynia is just one of hundreds of pro-ecological projects completed in Poland during recent years. As with similar projects aimed at upgrading local water supply and sewage networks to EU standards, the quality of material, speed and cost-effectiveness were of great importance to this project. By using Weholite pipes, it was possible to meet these objectives.

The 2.2-kilometre open discharge channel, running in an old riverbed from the “Dębogórze” treatment plant to the inlet of a closed channel outside the village of Kazimierz, was put into operation in the 1960s. For years, its existence had caused problems both to local farmers, whose lands were repeatedly flooded during the seasonal rise in wa-

ter levels, and to the Water Supply and Sewage Management Company, PEWIK Gdynia. PEWIK, who owns and operates the channel, was forced to pay compensation for damages to the farmlands. It also incurred costs related to day-to-day and periodical maintenance of the channel, including mowing and elutriation. Moreover, the local community expressed concern over the biological safety of the free-flowing treated waste.

Following Poland’s entrance to the European Union in May 2004, public utilities companies gained access to structural funds, which enabled them to launch a number of investments aimed at modernizing local water supply and waste treatment systems. One such investment is the “Dolina Redy i Chylonki water supply and waste water treatment” programme, implemented by PEWIK. Worth an estimated 66 million Euro, the program is designed to improve

# Improving wastewater treatment with the help of Weholite



and extend the water supply and sewage network in several municipalities, including the city of Gdynia, and to protect the waters of the Puck Bay. One task of the programme called for the piping of the open discharge channel running from the "Dębogórze" treatment plant. A project study for the task was completed in April 2005. After a tender, Budimex Dromex was named the general contractor for the installation.

### The optimal solution

Taking into consideration the desired flow capacity of the channel, as well as local hydrogeological conditions, the authors of the study recommended the use of non-pressure plastic pipes. Some of the plastic pipes' foremost qualities include low roughness, light weight in comparison to steel and concrete pipes, the possibility to produce pipes and manholes from the same material as well as the possibility to install the pipeline through submersion. Installation in an operating channel was one of the basic premises of the project study as the alternative of de-watering the channel and constructing bypasses was deemed time-consuming and too costly.

According to Jan Szustowicz of Budimex Dromex, the site manager for the project, the contractor briefly considered the use of glassfibre reinforced plastic pipes installed on a concrete base fitted with poles, with the channel walls braced with sheet piles. The idea was abandoned, however, as it was too expensive. Ultimately, the contractor decided to use PE-HD pipes, which met all of the project's requirements.

The pipes were produced and delivered by KWH Pipe Poland, which was handpicked as a supplier by Budimex Dromex. Between August 2007 and April 2008, KWH Pipe delivered 2 257 metres of Weholite pipes DN/ID 1 400-1 500 mm SN8 and 22 Weho manholes DNS 1 200 mm to the installation site. The majority of the pipes were manufactured and delivered to the installation site in custom-length, 15-metre sections in order to minimize the time needed to assemble the pipeline.

### Two methods of installation

Adding to their many qualities, the PE-HD pipes are also less susceptible to damage resulting from differential soil settlement. This was especially important in this particular project as the geotechnical analysis revealed two soil types along the channel route. The weak soils, including peat, occurred along a 1.2 kilometre section starting outside the village



of Kazimierz, while bearing soils comprised the remaining 1 kilometre of the watercourse. Hence, each section required different preparation of the channel bed. The pipeline was founded in bearing soils on a layer of well-compacted gravel whereas the gravel fill layer was additionally wrapped up in geotextile at the weak soil section.

Installation works began in September 2007 near the village of Kazimierz. Once the channel bed had been prepared and both the inlet and the outlet had been installed, the KWH Pipe service staff joined the pipes into eight 300-metre sections on dry land by means of extrusion welding, which provides for 100 % tightness and homogeneity of the pipeline. Special fittings significantly shortened the installation process.

The welded sections of the pipeline were placed onto steel joists HB300 and lowered into the channel. They were then assembled, and treated wastewater pumped into the new discharge pipe. Subsequently, the pipeline was backfilled, and an additional layer of humus was applied where necessary. The installation was completed in April 2008. The new pipeline covered almost the entire length of the open channel, except for a 64-metre discharge area adjacent to the treatment plant, which was reinforced with stone coating in order to decelerate the flow of treated waste into the new pipeline.

According to the contractor, the installation went smoothly and according to plan despite unfavourable weather conditions. Occasional problems related to obstacles along the channel route were resolved on the spot. Mr. Szustowicz, who has worked with KWH Pipe in the past, praises excellent organization of deliveries as well as the flexibility of the logistics team who handled the transport of the 15-metre pipes to the installation site.

### New priorities

Many of the EU-funded investment programs relating to water supply and wastewater treatment systems currently under way in Poland are huge, complex, ventures with multi-million Euro budgets. It is, therefore, vital that individual tasks be completed expertly, swiftly, and cost effectively. The use of Weholite pipes in this specific project allowed for the fulfilment of these objectives.

Furthermore, the qualities of PE-HD pipelines, such as durability, joint tightness and resistance to chemicals and adverse environmental conditions, helped reach the underlying goals of the project, i.e. improve local sanitary conditions and protect the environment. Considering the exceptional qualities and potentially unlimited number of Weholite applications, one can be sure that this will continue to be the pipe of choice for those wishing to cater to the interests of both man and nature. ■



# Fresh potable water for the Mekong Delta

Thanks to the advantages of PE-HD, fresh water will soon be flowing to the inhabitants of the Mekong Delta in Vietnam.

**T**he Dong Tam BOO Water Supply Project will provide fresh potable water to the Mekong Delta in Vietnam. The project, as a whole, encompasses a new water treatment plant; the Dong Tam Water Treatment Plant, complete with 45 km of transfer pipeline which will transport clean water from the treatment plant to the customers along the coastal line.

The Dong Tam BOO Water Supply Project is located in the Binh Duc Commune, Chau Thanh District in the Tien Giang province.

The project is being implemented by Dong Tam Water BOO Corporation (DTW), a subsidiary of Ho Chi Minh City Infrastructure Investment JSC (CII), who first developed the project together with its partners. The project is managed by GHD, an Australian consulting firm based in Melbourne.

Mr. Truong Khac Hoanh, deputy director at DTW, explains that before the project began, the residents around the river mouth of the Mekong River have relied on some small and decentralized water supply systems. The coastal region here suffers from high ground

water and high tides. This also causes fresh water in the area to mix with seawater, creating brackish water, which is not suitable for drinking. The government encouraged companies to invest in water supply projects so that a stable supply of clean water could be ensured. DTW took up this challenge to supply water for the coastal line in the province. According to Mr. Hoanh, approximately 1–1.5 million people will be able to reap the benefits of this project. When completed, the project will provide fresh potable water to the inhabitants in the area.

## PE-HD fulfilled the strength characteristics

The project is divided into two phases. At the completion of phase one, the capacity of the treatment plant will be 50,000 m<sup>3</sup>/day. During the next three years, the plant is expected to reach a capacity of 90,000 m<sup>3</sup>/day. As 45 km of clean water mains were to be built, the material of the pipes was of significant importance to the investors, and different material options were considered.

In the past, the commonly used material for transfer pipelines in Vietnam has been ductile iron. Due to the specific conditions in the project area, high ground water levels and brackish water leading to a very corrosive atmosphere, ductile iron was not a very good option. When choosing between non-metallic materials, glassfibre-reinforced plastic (GRP) and PE-HD were compared. DTW finally chose PE-HD, as GRP did not fulfil the strength characteristics needed for the project. PE-HD was also advantageous due to its longevity and ease of installation. It would also have been possible to use special coating for the ductile iron so it could resist corrosion and achieve the same life span as the PE-HD pipe, but this would have been very costly. "In the end, PE-HD pipes also saves us in operating costs due to time savings in the installation phase and its ease of installation", says Mr. Hoanh.

## Working on a tight schedule

Mr. Hoanh has had experience in working with KWH Pipe in a previous sewage project and saw potential for these products also in this project. Hence, Wiik & Hoeglund Plc., KWH Pipe's subsidiary in Thailand, was chosen as the manufacturer and supplier for all PE-HD pipes. The pipes supplied were PE 100 SDR 21, DN/OD 900 mm and DN/OD 800mm respectively. Due to the tight schedule of the project, the delivery schedule was of critical importance. According to Mr. Hoanh, Wiik & Hoeglund provided an advantage in production capability, flexibility and know-how which could accommodate the tight time schedule. The cooperation has run smoothly, with on-time delivery and good communication.

Construction started in the middle of 2008, and the treatment plant is planned to be ready for use by the first quarter of 2010. The project is well under way, and the supply of material and installation work for phase one is already completed. Mr Hoanh estimates that the project can be finished up to eight months before schedule. "Thanks to the advantages of PE-HD, fresh water will soon be flowing to the inhabitants in the Mekong Delta", Mr. Hoanh concludes. ■



## FACTS

- » Water treatment plant with capacity of 50,000 m<sup>3</sup>/day in phase one, and 90,000 m<sup>3</sup>/day in phase two.
- » 45 km clean water mains.
- » Pipes: WehoPipe DN/OD 900 mm and WehoPipe DN/OD 800 mm.



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