21 days

the WEHOLITE **JOURNAL**

WEHOLITE PROVES TO BE A REAL ASSET

for Giant's Causeway's new visitor centre

PLASTIC PIPES PUSH THE GREEN AGENDA

according to a recent study evaluating environmental impacts of both HDPE and concrete pipes

SWEDISH WATER PURIFICATION PROJECT A SUCCESS

drinking water upgrade project completed using Weholite

ISSUE # 2

Enchantment

WEHOLITE

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ASSET International Ltd.

INTRODUCTION

21 days
the WEHOLITE JOURNAL

It takes 21 days to change a habit

– Dr Maxwell Maltz

Welcome to the second edition of 21 Days, the journal of Weholite: a forum where we share our experience and achievements with our partners world-wide.

It has undoubtedly been a tough few months. The UK narrowly avoided a double dip recession which has highlighted our stagnant economy. This problem is particularly prevalent in the construction industry. However it's hoped that new optimism in the housing market, backed up by UK Government incentives will give a more positive contribution for the rest of 2013.

In terms of a vision, I firmly believe that we should be renewing our focus on creating a strong national identity with British manufacturing, which has always been key to a prosperous economy.

Britain's manufacturing industry was once the envy of the world. So why is it now in decline? We should endeavour to continue to be a nation known as a hotbed of innovative engineers and this should be promoted around the world in order to support economic growth.

On the topic of great British engineering, in this issue, you will see a wide range of projects that have utilised Weholite technology in the UK including; the creation of the Giant's Causeway's visitors centre in Antrim, Northern Ireland, a storm water attenuation project at a new housing development in Kent and the world's largest Weholite flood alleviation tank in Scotland.

As climate change continues to remain high on the agenda across the world, new and innovative ways of working to reduce carbon footprints are being sought. Our main feature, Plastic Pipes Push the Green Agenda (page 10-11) evaluates the environmental impacts of the two most widely utilised products in the construction industry.

If this isn't enough we also look at Hydropower, the most popular renewable energy resource in the world and investigate how Weholite technology was used to construct a pipe that delivers water to hydraulic turbines for a new hydro power plant in the Polish city of Cieszyn.

Simon Thomas,
Editor
Managing Director of Asset International Ltd.

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Go with the flow
During the recent adverse weather conditions the past year, the capabilities of the UK's aging water infrastructure to handle higher flow rates became an important factor determining the severity of flooding. [pages 6 & 7]

Swedish water purification project a success

One of Sweden's largest drinking water producers is upgrading its process system to improve the drinking water supply to its 850,000 residents across the Skåne region. [page 8]

Weholite pipes prove to be a real Asset for Giant's Causeway project

A project to supply a bespoke header pipe work system for ground air heat exchanger at the new Giant's Causeway's visitor centre in Antrim, Northern Ireland. [page 9]

Plastic Pipes Push the Green Agenda
An article that evaluates the

environmental impacts of two of the most widely implemented products in the water management industry based on the complete findings from the study: "A comparative analysis of the carbon footprint of large diameter concrete and HDPE pipes." [pages 10 & 11]

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World class **accreditation awarded** for commitment to carbon reduction

Asset International Ltd, has been awarded certification to the world class, ISO accredited CEMARS standard by the Achilles carbon reduction programme.

Achilles works with organisations to help them establish carbon reduction leadership for their organisation and across their supply chain.

The Carbon Emissions Measurement And Reduction Scheme (CEMARS) certification was presented to Asset in recognition of the company's commitment to measuring, managing and reducing greenhouse gas emissions in a robust and credible way.

Speaking about the accolade, Dr Vasilios Samaras, product manager at Asset, said: "We are delighted to be recognised for our steadfast commitment to reducing our carbon footprint. Manufacturing firms don't always have the best reputation when it comes to eco credentials and we were determined to turn this perception on its head.

"Several white papers produced by the Hydro-Environmental Research Centre at Cardiff University have considered the subject of carbon footprints in the water management industry. The results suggest that HDPE pipes are a more carbon efficient product for use within water management systems as opposed to traditional materials. Therefore, it could be inferred that HDPE pipes have the potential to actively aid the construction industry in its formidable task of reducing GHG emissions in accordance with the UK government's forthcoming targets."

Key targets set by Asset to reduce greenhouse gas emissions over the coming years include a reduction in electricity consumption by 6% and more efficient internal transportation.

Frances Darton, Sustainability Sector Manager at Achilles commented, "Asset International's certification to the CEMARS carbon standard demonstrates the organisation's commitment to working in a sustainable way and in an energy efficient environment. As the UK drives towards a low carbon economy, organisations like Asset International are leading the efforts to manage and reduce emissions and operate in environmentally responsible ways. This ensures that Asset is able to develop a relationship with customers, contractors, suppliers and wider stakeholders, to encourage and support wider sustainable development".

Record breaking quarter bucks national trend for falling output figures

In 2012, Asset International Ltd. announced record sales of its Weholite products, breaking their monthly sales record for the third consecutive month, despite official figures that manufacturing output in the UK is in decline.

Asset, which is part of the UK-based infrastructure, building and construction products group, Hill & Smith Holdings, achieved £1.65 million in sales during July, the highest ever for the company despite the UK's manufacturing sector shrinking at its fastest rate for more than three years in July, according to official figures.

In its 16th year of trading, Asset has a forecasted turnover for 2012 of more than £15.3 million, £4.8million up on 2010 totals, signifying 46% growth in just two years.

Asset credits large-scale projects within the UK water industry for increased demand of its patented high-density polyethelyne (HDPE) pipe systems known as Weholite, as well as a recovery in the new build housing market.

Simon Thomas, managing director of Asset, commented: "We've also witnessed a huge increase in orders from abroad, particularly Scandinavia, where we have recently completed some large scale, cutting edge projects. Orders have also come in from the Caribbean and Falkland Islands and there have been numerous enquiries from Africa."

"We've had to more than double our workforce to cope with demand - in 2011 we employed 42 people, now we have 89 employees."

"It's undeniable that we're bucking the national manufacturing trend", says Simon, "the last three months have brought bumper order levels and the future forecast is equally bright. We are predicting a 10% increase in sales over our 2012 projections for the current year, that's 13% growth on last year, which is a real achievement given the current market conditions."

Weholite has strong presence at International Pipe Conference

Matthew Cowle, presented his carbon footprint paper outlining the latest research on the environmental impacts of HDPE pipes at the 2012 XVI Plastics Pipes Conference in Barcelona.

Matthew, a PHD student at the Hydro-environmental Research Centre of Cardiff University School of Engineering, presented the white paper focused on the environmental impacts of two of the most widely utilised products in the construction industry.
The complete findings from the study; "A comparative analysis of the carbon footprint of large diameter concrete and HDPE pipes" were backed by Carbon Clear Ltd and can be found in the full report. Simon Thomas, managing director at Asset International comments: "As a leading supplier of Weholite, the largest HDPE pipe on the market, the Plastic Pipes Conference is one of the most important industry events for us.

"Plastics are among the most researched materials in the world and the rapid technological and manufacturing developments made in recent years have allowed for continuous innovation. Here at Asset, we take our environmental responsibilities seriously, so it was important to support the research."

Graham Bennett demonstrates **best practice** with **promotion**

Asset International Ltd, has promoted Graham Bennett to operations manager.

Bennett has been an employee since 1996. He started his career at Asset as a young apprentice, Graham then moved into the Weholite division working his way up to production manager. His new role as operations manager will see Graham oversee the manufacturing side of the business, including; machine design, production, operation and support.

Simon Thomas, managing director at Asset International comments: "As we grow and our numbers increase, the demands on the business become more and more complex. In order to maintain our competitive advantage, it is vital to remain flexible, in line with our business strategy. With this in mind, it was necessary to develop our organisational structure.

"Graham has always been a valuable and highly regarded member of our team, and his new position will enable us to strengthen our ability to adapt quickly and easily to the ever-changing markets in which we operate."

Within the last eighteen months, along with his team, Graham has improved efficiency and systems, and developed a strong and effective team environment within the pipe plant.

In addition to his appointment, Graham has achieved the highest grade of 'distinction' in the NEBOSH health & safety examinations, demonstrating his commitment to his own development, his team and the company at large.

The NEBOSH national general certificate meets the academic requirements for technician membership (TechIOSH) of the Institute of Occupational Safety and Health (IOSH) and associate membership (AIIRSM) of the International Institute of Risk and Safety Management (IIRSM).

New advertising **campaign causes fascination**

Asset International Ltd's recent advertising campaign, based upon the seven triggers of 'Fascination', was announced as a finalist for the Institute of Welsh Affairs, Creative Marketing Campaign.

The Institute of Welsh Affairs and Western Mail created the awards to celebrate and recognise the breadth of business achievement in Wales, in all its variety, with nine special categories.

The Creative Advertising Campaign award highlights the importance of successful marketing campaigns for an organisation. Judges considered the goals and achievements of the campaign, the process of research, planning, implementation and measurement. As finalists, Asset clearly demonstrated tangible and specific examples of success.

Simon Thomas, managing director at Asset comments: "The idea behind the campaign was to create intrigue. The fact that we operate within the manufacturing industry does not mean there is no room for creativity."

The campaign focuses on the seven universal triggers: Lust, Mystique, Prestige, Power, Vice, Alarm, and Trust. It was chosen to demonstrate how 'Fascination' plays a role in every type of decision made. With this in mind, Asset was keen to deliver an advertising campaign that was different.

For the first time in the company's history social media was being used to raise brand awareness. By using Twitter as a platform to convey personality, the business was able to develop the image of the company and create mystique.

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Go with the Flow

During the recent adverse weather conditions, the past year, the capabilities of the UK's aging water infrastructure to handle higher flow rates became an important factor determining the severity of flooding. Hydraulics - a subject often disregarded in the industry - plays a key role in ensuring effective water management. Research now demonstrates how plastic is hydraulically more efficient than concrete or clay piping. These traditional materials are also more susceptible to blockages in extreme weather conditions, leading to requirements for high jetting pressures which subsequently incurs high operating and maintenance costs. Here leading plastic pipe expert Dr Vasillios Samaras outlines the importance of the hydraulics factor in ongoing plastic versus concrete and clay debate.

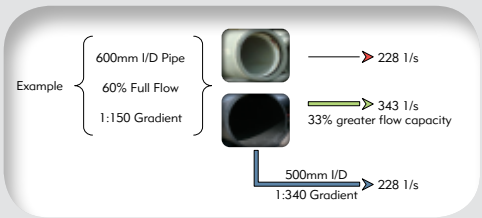
Even by conservative estimates, flow capacity is 30% greater in a high density polyethylene (HDPE) pipe than in a comparably sized concrete pipe. The reason is that HDPE pipes have a roughness coefficient (ks) of 0.03 in comparison with concrete which is 0.15. A simple comparison (see figure 1)_illustrates the significance of this difference.

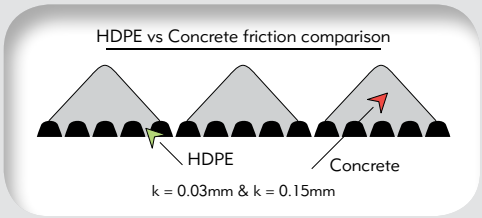
The example below demonstrates that the HDPE pipe has a 33 % greater capacity than the same diameter concrete pipe. An alternative way to look at this is that, in order to achieve the same flow rates as that of a concrete pipe, a smaller diameter HDPE pipe could be installed, at a shallower gradient. This in turn reduces installation time since smaller excavations are needed, providing subsequent environmental benefits, such as a reduction in the carbon footprint and less disruption to the local community.

This theory of HDPE pipes' superior behaviour over those made of conventional materials has been supported by extensive independent testing in Poland and is clarified further by Dr William B Rauen of the world renowned Hydro-environmental Research Centre at Cardiff University.

"The roughness coefficient (ks) characterises the vertical size, orientation, geometric arrangement and spacing of the roughness elements. Drainage pipes with rougher surfaces (i.e. with higher ks values) will typically have a lower flow capacity due to increased drag caused by the wall. This occurs as a consequence of the pattern of dynamic pressure distribution formed over the roughness elements, with energy-consuming local accelerations and decelerations of the flow. The flow capacity of drainage pipes can thus be maximised by using pipes with the smoothest possible surface finish."

Figure 2: *Hydraulic test of HDPE pipes in Poland (Technical University Swietokrzyska).*





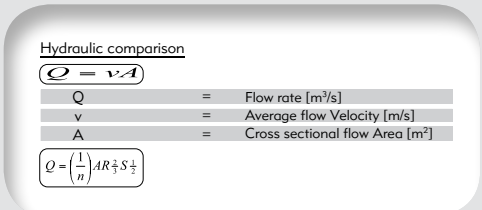


Figure 1: *Hydraulic comparison of HDPE with concrete pipe.*

A further look to the properties of HDPE reveals its high abrasion resistance.

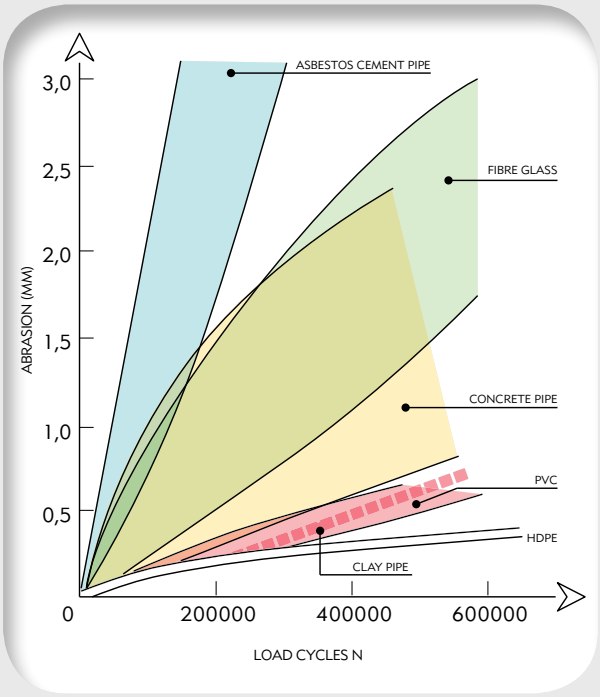


Figure 3: *HDPE has a superior abrasion resistance than concrete pipes.*

Moreover, it is important to emphasise that few materials offer better overall chemical resistance to corrosive acids, bases and salts. In addition polyethylene is unaffected by bacteria, fungi or even aggressive naturally occurring soils. Even hydrogen sulphide, the scourge of concrete pipes has no affect on HDPE.

Kamila Gornas, an environmental engineer from the University of Technology in Wroclaw, Poland stresses that another distinct advantage of PE is that it provides the lowest bio film formation potential of all the common water pipe materials in use today.

Bio film is the natural habitat for bacteria in water systems and forms on any surface in contact with water. You cannot necessarily see it, but surfaces feel slimy to the touch. The bacteria migrate from the bulk water to a surface in a low flow or stagnant areas of the system and attach by producing a slime layer. Dangerous pathogens like legionella, salmonella, camphyllobacter and even viruses, present as bacteriophage, can inhibit biofilms.

One of the main disadvantages of bio film is that bacteria produce acids that will cause extensive corrosion to tanks and pipes. Biofilm growth can cause flow restrictions in pipes, increasing pumping costs and reducing system efficiency. Moreover the effluent produced can cause taint, taste and odour problems.

Once installed, polyethylene pipe will not be affected by micro-organisms, such as those found in normal sewer and water systems since polyethylene is not a nutrient medium for bacteria. Furthermore, siltation does not occur in the way it does in other materials such as concrete and long-term flow characteristics therefore remain constant.

This in turn results in greater hydraulic efficiency, far less risk of blockages and ultimately far lower maintenance costs.

In summary, designers specifying pipe materials should balance any relatively small initial cost saving in using traditional materials such as concrete and clay against the superior performance of the plastic option and the rapid payback on operating and maintenance expenditure. Added to that is the greater peace of mind during the asset life, not only to the water company but also to the general public.

Dr Vasilios Samaras PhD is Technical Engineer at water management specialist company, Asset International Limited, based in Newport, south Wales.

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Swedish water **purification project a success**

One of Sweden's largest drinking water producers is upgrading its process system to improve the drinking water supply to its 850,000 residents across the Skåne region.

Sydvatten AB, a municipally owned drinking water producer is implementing an innovative installation of high density polyethylene (HDPE) Weholite pipes for its latest venture into improving southern Sweden's drinking water supply.

KWH Pipe Project Services working as a sub-contractor for BCA, installed a new pipeline, made up of 235m of 1400mm internal diameter Weholite pipes to be used as a marine raw water intake pipeline in the lake Vomb sjön to one of the water treatment plant.

The bespoke installation involved welding the Weholite pipes into strings. When complete, the profile was filled with wet concrete to provide ballast for the submersion. By utilising a temporary train track, the pipes were smoothly conveyed into the lake before being towed out by a tug boat and submerged down using the control S-bend technique and air balloons.

Commenting on the assignment, Christian Vestman, project manager at KWH Pipe, said: "We have successfully completed a number of marine installations across the world over the last five years and are continuously working to find new and innovative ways to design and implement our Weholite solutions.

"The Weholite system is becoming the product of choice for new projects and upgrades within the construction industry thanks to its high quality, sustainability and design in value engineering aspects."

The project was completed in three months due to the efficient installation process possible with Weholite, in comparison with more traditional materials. Its lightweight design and ability to be manufactured in longer lengths made the pipes easier to transport and install, saving time and reducing costs.

Weholite proves a **real asset** at **Giant's Causeway project**

Asset International Ltd., the leading manufacturer of Weholite HDPE plastic sustainable drainage and water management products, has recently entered the ecological heating sector, and one of its first projects was to supply a bespoke header pipe work system for a ground air heat exchanger at the new Giant's Causeway Visitors Centre in Antrim, Northern Ireland.

The award winning building, which is owned by the National Trust and was designed by Dublin based architects, Henehan Peng, cost £18.5 million to build and took 18 months to complete. Central to the philosophy behind the design was the issue of ecology and sustainability and the entire complex was designed with this ethos in mind. This is perhaps best represented by the aesthetics of the building, which is hidden from the coastal landscape by a grass roof.

To underline the success of the project, the Visitors Centre has already achieved a BREEAM 'Excellent' award, which measures overall sustainability in design, materials, energy, construction management and ecology. Something which Asset International, a CEMARS (Certified Emissions Measurement And Reduction Scheme) accredited firm is proud to be a part of.

Crucial to the BREEAM status was the heating system utilised within the centre, which operates a REHAU designed ground-air heat exchanger system; an innovative zero carbon method of heating and cooling a building. The system (also known as 'earth tubes') draws air through underground Weholite pipes at a depth of 1.5 metres, which pre-cools the air in the summer and pre-heats it in winter, using the near constant temperature of the ground (7-12°C).

Asset supplied 125 metres of 1050mm diameter Weholite pipe work to REHAU for use in the ground-air heat exchanger system. Weholite is being used as the main header pipe within the REHAU air heat exchanger system. The header pipes carry air to and from the patented heat transfer pipes into the base of the visitors centre. It also acts as a conduit for all of the condensation produced in the damp winter months.

Asset International Ltd also provided all of the air-tight access shafts to complete the system. The shafts provide an access point for maintenance, as well as housing the sumps and pumps that remove the condensed water created in the system.

The unique design of Weholite pipes made it the perfect choice for this ecologically focused project. Weholite is a structured wall product, which means that there is an air barrier between the inner and outer wall of the pipe. This barrier reduces the thermal co-efficiency of the pipe, meaning that once the air has passed through the heat transfer pipes the Weholite header pipe minimises the residual energy loss until it reaches the main building.

Steve Richmond, Business Team Manager for Renewable Energy at REHAU, commented: "Due to the bespoke nature of a ground-air heat exchanger system, it is important that the header pipe and access chambers are fabricated to a high standard to ensure optimum performance. Working with a UK fabricator such as Asset, we could liaise closely together on the final fabrication design. The Weholite pipe matches the requirements for a ground-air heat exchanger header pipe to compliment our unique AWADUKT Thermo antimicrobial pipework."

Technical engineer at Asset, Paul O'Regan, added: "Weholite lends itself to underground air duct systems such as the one installed at the Giant's Causeway Visitors Centre, due to its versatility and ability to be fabricated easily into complex arrangements. This is a key attribute when the air duct has to navigate around a multitude of other services that need to be installed below ground.

"An added bonus is that we were able to assemble and test pre-fabricated sections at our factory in Newport, South Wales, minimising the installation time on site and increasing the confidence of the customer."

Plastic pipes push the **green agenda**

As global warming continues to have a significant effect on our climate and catastrophic weather events devastate local communities, the water and construction industries are being forced to look towards more innovative solutions that play a part in reducing carbon footprints.

Matthew Cowle, PHD student at the Hydro-environmental Research Centre of Cardiff University School of Engineering, evaluates the environmental impacts of two of the most widely implemented products in the water management industry using the results of his study into the two materials. Complete findings from the study; "A comparative analysis of the carbon footprint of large diameter concrete and HDPE pipes" can be found in the full report.

In recent years climate change, as a result of global warming, has become an increasingly prevalent topic within both political and corporate policies. This is primarily due to an increase in the levels of global greenhouse gases (GHGs), in particular carbon dioxide (CO_2), found within the earth's atmosphere over the last 200 years, since the start of the industrial revolution. Recent figures suggest this increase could be as high as 40%.

The Intergovernmental Panel on Climate Change (IPCC) recently predicted that if GHG emissions are allowed to continue undeterred at current rates, it will lead to a deeply alarming and potentially disastrous increase in global temperature of between 2°C and 4°C by 2100 [1]. These figures have therefore placed climate change as one of the greatest challenges of the modern age and have prompted a political call for immediate action.

The UK government, through the 2008 Climate Change Act, is committed to reducing its GHG emissions by 34% and 80% on 1990 levels by 2020 and 2050 respectively. This undoubtedly has had an enormous impact upon all UK industries, especially the construction industry, which is one of the largest contributors to the country's overall GHG emissions, accounting for over 50% of the UK's carbon emissions. This has been addressed within the UK's water management industry with the appointment of carbon managers, whose task is to assess and minimise the GHG emissions of both current and proposed projects.

The contribution of GHGs towards global warming is conventionally quantified in terms of carbon footprint and most commonly expressed in terms of carbon dioxide equivalent (CO_2e).

By assessing the potential carbon footprint, in terms of the CO_2e of different design solutions, the most environmentally sustainable option (in terms of carbon efficiency) can be ascertained. The new study relates to the UK pipe industry and examines the carbon footprint in terms of CO_2e of reinforced concrete (RC) pipes and high density polyethylene (HDPE) pipes, the two mostly commonly used pipe materials in water management.

Although in recent years numerous studies have been conducted by UK water authorities and pipe manufacturing companies in relation to the carbon footprint of both products, the latest study considers the cradle-to-gate impact. For instance, in 2010 an independent report published by Anglian Water Services Ltd. found that substantial savings in carbon emissions could be achieved through the use of HDPE pipe as opposed to traditional concrete, for a proposed contact tank project. In terms of the carbon emissions associated exclusively with the manufacturing process, i.e. excluding the impact of transportation, it was found that the proposed HDPE solution created only one quarter of the carbon emission compared to the equivalent concrete solution. Conversely, a report by

the concrete pipeline systems association (CPSA) found that the embodied carbon, which includes all carbon until the product leaves the factory gate (EC) of a 2100mm internal diameter concrete pipe was 35% lower than that of the equivalent sized HDPE pipe; such discrepancies have been evaluated within the new study and address the overall impact from manufacturing to site.

The study predominantly focused on large diameter pipes, with internal diameters of 600mm to 1800mm. The results encompass both cradle-to-gate (manufacturing) and cradle-to-site (manufacturing plus transport) in terms of carbon dioxide equivalent (CO_2e).

The government has set a challenging target to reduce the UK's carbon footprint by up to 80 per cent by 2050 and it is therefore essential that the construction and water industries synchronise their efforts to ensure a significant reduction in CO_2 emissions.

Findings from the study show that HDPE pipe has the potential to actively aid the construction and water industries in their task of reducing GHG emissions in accordance with both European and UK government targets.

When looking at the cradle-to-gate comparative analysis of the EC of HDPE and concrete pipes, the study shows that concrete pipes have a 21% greater EC compared to the average HDPE pipe (see figure one). On average concrete pipes have a 34% greater EC than 2kN/m² HDPE pipe's EC, and 8% greater EC than 4kN/m² HDPE pipes.

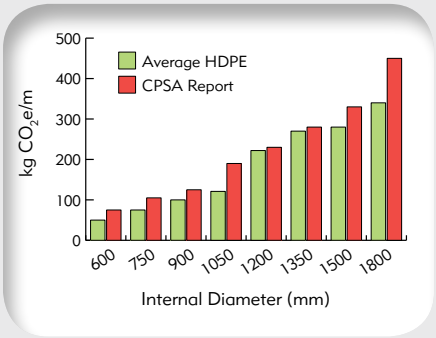

Figure 1: *Average HDPE Pipes vs. concrete pipes*

However, for a fair and comparative analysis, it is important to consider the transportation involved in importing and exporting concrete and HDPE pipes to provide carbon footprint calculations for a holistic process. When looking at the cradle-to-site figures, concrete pipes have a considerably higher carbon footprint in terms

of $kgCO_2e$ than HDPE pipes, when either distance travelled or pipeline length was increased. In both cases, the concrete pipe's carbon footprint tends to increase at roughly one order of magnitude greater than that of HDPE pipe's carbon footprint.

Furthermore, it was found that if either the distance travelled, or pipeline lengths were increased, there would be a negligible increase in carbon footprint for the HDPE pipes assessed.

The GHG emissions were assessed in terms of varying distances travelled and tonnage transported and the data is based on a consistent pipe length of one. Findings show that the carbon footprint in terms of $kgCO_2e$ for concrete (RC) pipes is over an order of magnitude, greater than that of HDPE pipes, as distance travelled increases. Concrete pipes, on average, produce 95% more $kgCO_2e$ per unit length of pipe, per km travelled when compared to HDPE pipes.

The study, A comparative analysis of the carbon footprint of a large diameter concrete and HDPE pipes, has been backed by Carbon Clear Ltd. which concluded that the findings within the report fairly represented the comparisons between the two materials.

Considering the evidence identified, HDPE pipes have proven to be a more carbon efficient product when compared to the industry's traditional material, concrete. In order for the industry to take advantage of these findings it needs a shift in attitude towards adopting smarter and more carbon efficient ways of working if it is to meet the formidable task of reducing emission by 80% by 2050.

Matthew Cowle, is a PHD student at the Hydro-environmental Research Centre of Cardiff University School of Engineering. To see the full report, please visit www.weholite.co.uk/technical-and-downloads/

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Weholite is the **watertight choice of pipes**

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

Established in 1959, the Flood Control District of Maricopa County (Arizona, USA) provides flood hazard identification, prevention, regulation and remediation to reduce the risk of injury, loss of life and property damage from flooding in the county. The district was formed in response to significant flooding that plagued Maricopa County during its early history. The area's Sonoran Desert environment is conducive to flooding due to unique soil and topography characteristics, winter and summer rainy seasons, and numerous natural riverbeds, washes, and channels.

During a rainstorm, these normally dry waterways can quickly become raging rivers causing widespread overland flooding when unchecked. Initially, the district focused on building dams (flood delaying structures), basins, and channels to prevent flooding. Unprecedented population growth and development in the county since the 1990s, however, shifted the District's emphasis to: dynamic flood education programs to inform citizens about flood hazards; the identification of specific hazard areas so county residents will make informed decisions about where to build; and the control of development that directly impacts waterways through a mandated drainage administration and floodplain management regulation program.

Protection and safety

An integral part of the flood control structures, called the White Tanks Flood Retarding Structure (FRS), had surpassed its original 50-year project lifetime and developed safety deficiencies since the time of its construction, including subsidence and embankment cracking. There are three Corrugated Metal Pipe outlets that were originally installed without seepage control. Current standards require filter diaphragms around the outlet pipes to prevent internal erosion of soil in a seepage path along the outlet pipe. Investigations revealed voids around the old outlet pipes, which could result in a piping failure.

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

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

Polyethylene pipe is the most suitable alternative

The primary purpose of the outfall channel is to convey discharges from FRS no. 3 when that facility is drained after controlling a major storm event. The secondary purpose is to provide a conveyance for local drainage areas west of Jackrabbit Trail. Additionally, the outfall channel's route needed to be changed, so that water could be discharged to a stream channel instead of into an irrigation channel or over natural desert terrain. The project was designed to provide 100-year protection from south easterly storm water flows for properties located east of Jackrabbit Trail. Initially, it was recommended to construct the outfall channel of concrete encased steel pipe, but structured-wall polyethylene pipe proved to be the most suitable alternative.

The project required the placement of pipes within a fissure-risk zone and demanded that pipe joints remain watertight in case fissures were to occur. Weholite, by KWH Pipe, fits the description thanks to their flexibility and thermal welded joints that are as strong as the pipe itself. White Tanks FRS No.3 Outfall Channel now conveys storm water through 914 metres (3000 feet) of both DN/ID 2 metre and 1.7 metre (78" and 66") Weholite PE-HD parallel pipelines through and along the White Tanks Mountains. The estimated construction time to install the Weholite parallel pipelines was twenty-five days. With the efforts made by the KWH Field Service Technicians and Lawrence Construction, the installation was completed in only fourteen days – another advantage over competing pipes. The KWH Technicians were able to weld an average of ten joints per day. The contractor leak-tested each joint to insure weld integrity and all passed without a single leak. The attention to detail paired with the quick installation, helped make this project a great success for the Maricopa County Flood Control District, Lawrence Construction, and KWH Pipe.

Keeping water at bay

Asset International Ltd. has supplied a bespoke water management solution to prevent flooding at a new housing development in Kent.

Taylor Wimpey, one of the UK's largest homebuilders, required a drainage solution which was approved by Southern Water and would be able to adapt to tight site conditions. The half a million pound project will benefit 320 new homes, in the seaside town of Herne Bay, Kent.

Asset's specialist water management solutions team provided two 3.5 diameter Weholite pipe systems, designed as storm water attenuation tanks. These will be used to help reduce peak flow at the housing development by restricting the flow of excess water caused by heavy rainfall before releasing it gradually via an outfall back into the ground. In addition, a pumping chamber will pump water from lower levels back into the outfall for release.

A Taylor Wimpy representative commented: "Our Herne Bay development called for a bespoke implementation due to space restrictions on site. As Weholite pipes are lightweight and easy to manoeuvre, they could be easily offloaded from the lorry and placed directly into the trench, which also removed a number of health and safety issues and saved a considerable amount of time.

"Asset's ability to create a custom drainage solution to our exact specifications was highly impressive. The team were reliable, fast and efficient and the project was a complete success due to their professionalism and drainage expertise."

Technical engineer at Asset, Paul O'Regan, added: "This is the first project we've undertaken with Taylor Wimpey in the Southern Water region in adoptable drainage, so we're delighted that we could find a perfect solution, while saving them time and money.

"The Herne Bay project is a great demonstration of the versatility of our Weholite product and how it can be used even in the tightest of spaces."

Asset worked in conjunction with ground contractor, Galamast, on the project which involved undertaking structural calculations and construction drawings.

The power of Weholite

Hydropower is the most popular renewable energy resource in the world, with a 16 per cent share of global energy output and counting. In recent years, Poland has seen an increase in the number of hydroelectric projects, mainly small power plants that utilise local waterways for the production of clean, cheap energy. Recently, for the first time in Poland, Weholite technology was used to construct a penstock (pipe that delivers water to hydraulic turbines) for a small new hydro power plant in the city of Cieszyn.

Poland has a long tradition of hydropower. During the interwar period, the country boasted approximately 6,500 operating hydroelectric facilities, though today, after decades of historical and political turmoil, only a few hundred of them still remain. As a result, Poland uses only 15% of its hydroelectric potential, estimated at 13.7 TWh, which accounts for only 2% of the country's overall energy production. Fortunately, there have been many positive changes in this respect in recent years. Poland's membership in the EU means that the country has to comply with specific requirements concerning the use of renewable energy resources. The EU-imposed target of a 15% share of renewables-generated electricity in total electrical production by 2020 has injected the Polish energy sector with a new impulse for change. This has been accompanied by an ongoing and impassioned debate on the country's energy security and the need to diversify energy resources. Another new development has been the shift in the mentality of the Polish people, who are increasingly alert to environmental issues, including the problem of excessive carbon dioxide emissions related to burning fossil fuels for energy production. Last, but not least, the simple fact is that producing electricity from water is a highly profitable business. It is therefore natural that the construction of micro- and small hydroelectric power plants has become something of a hot topic in Poland. As a result, a number of companies have emerged that specialize in small hydroelectric projects, including MEW S.A., which has invested in the Cieszyn power plant.

Nature first

The investment project, worth an estimated 1.2 million euros, included the construction of a small hydro power plant with a capacity of 0.56 MW that took advantage of the natural height differences of the Olza River. Typically, a power plant pipeline or canal is introduced at a curve in a river, shortcutting the river's flow, which results in greater water drop than would be achievable at a weir. In Poland, pipelines are used at larger hydroelectric facilities, while smaller plants depend on open channels. The key factor for choosing a pipeline for the Cieszyn project was the plant's location in a city park. The city authorities demanded that the design take into consideration and preserve the park's functionality and aesthetics.

"The Cieszyn installation was exceptional due to the plant's location in the park," confirms Maciej Nadulski, MEW's Director for Investments.

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

MEW S.A. also appreciated other benefits of the projected pipeline, such as minimum

maintenance costs, no adverse effect on the environment and better energy efficiency compared to an open canal.

PE-HD pipes, naturally

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

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

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

Easy installation

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

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

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

Weholite - The right choice

Hydropower is a cheap and renewable source of energy, which does not release harmful gas emissions into the atmosphere. In contrast to large-scale hydroelectric power stations that change the flow of rivers and adversely affect the environment, small hydroelectric installations continue to be perceived largely as eco-friendly and, as such, are considered the future of hydropower. In view of Poland's growing demand for electricity, and the steady decrease in the supply of fossil fuels, such as hard and brown coal, which the Polish energy sector depends upon, hydropower will be a subject of growing interest.

The Cieszyn plant's location in a city park prompted MEW S.A. to adopt a series of terrain-specific technological solutions. Durable, leak-proof and lightweight, Weholite pipes proved perfectly suited to the demands of the project, and allowed for a significant savings in time and money. As the number of small hydroelectric installations in Poland grows, using PE-HD piping for such projects will also become more common. The successful completion of the KWH Pipe pipeline for the Cieszyn hydroelectric plant once again confirms that product quality and know-how combined with decades of experience is quite simply a winning formula.

New storm water drainage systems improves river and bathing water quality

Asset International Ltd, in partnership with KWH Pipe UK Ltd, has supplied a Weholite storm water attenuation tank to help improve river and bathing water quality in Irvine and Kilmarnock, Scotland.

The £49 million Scottish Water project at Meadowhead was commissioned to reduce overflow from combined sewers in Kilmarnock and Irvine spilling into the local river system in the event of heavy storms. The completed project will bring significant environmental improvement to local rivers and to the coastal waters of Irvine Bay in the Firth of Clyde

The specialist water management solutions team from Asset and KWH Pipe provided a 10,000m³ attenuation tank and 300 metres of associated pipework in 2.1 metre nominal diameter.

"The long established partnership between KWH Pipe (UK) Ltd, the Scottish Water framework supplier for large diameter Polyethylene pipework systems and Asset International, the UK licensee for the manufacture of Weholite products, has led to the successful installation of what is the largest ever Weholite storage tank supplied and installed anywhere in the world", said George Merry, managing director of KWH Pipe UK Ltd.

The tank is capable of holding 10 million litres of water, and features sixteen legs of 2.6 diameter pipes, comprising approximately 2km of pipework in total.

A tank of this scale is large enough to contain storm water flow in the event of a large amount of rain fall, allowing Scottish Water to meet stringent European Union directives. The smooth invert provided by the Weholite system was crucial to the project.

The project is being delivered by MBV, a Morrison Black & Veatch joint venture. MBV designed the system so that the retained storm water is directed into a new pipe and channelled to the Meadowhead Treatment Works. From there it is managed in an environmentally friendly way to ensure that the bathing water quality standards in the Irvine Bay are met by Scottish Water.

Commenting on the choice of Weholite plastic tanks and pipes, Dominic Moynihan, project manager for MBV explained: "A number of things directed us to Weholite. Firstly, the fact that it gave us a smooth invert without the need for further treatment. Secondly, Weholite offered an installation service, which meant that the same engineers who had manufactured the pipes were the ones installing them on site. Their knowledge and expertise ensured the product gave us the performance designed to meet our specifications. It also meant that the whole installation process has been pretty much trouble free."

Speaking about the complete process, George Merry of KWH Pipe said: "The KWH Pipe and Asset partnership worked closely with MBV, from conceptual design through to installation, test and inspection. We provided a unique service, which saw the completed tank tested in accordance to CESWI guidelines, giving MBV the confidence of a 100% watertight tank."

Simon Thomas, managing director at Asset, added: "The Meadowhead project continues to showcase our effective urban water management solutions, which have been deployed in a number of UK and European towns and cities in recent years.

"As flooding in our urban environments continues to become more and more of a focus we will continue to develop our systems in order to meet any and all eventualities."

Weholite in the community

Asset packs a punch for Charity fundraiser

Asset put its dukes up for a good cause by supporting a charity white collar boxing event to help raise money for a local cause.

The event, held at Pill Millennium Centre on February 24, is was organised by owner and Commonwealth boxing medallist, Mo Nasir as a fundraiser for one year old, cystic fibrosis suffer, Amy Smith's appeal.

The appeal is to help one year old Amy Smith's parents pay for treatment and equipment that will help manage her symptoms and give her a better quality of life. Amy, from Duffryn, currently has to endure two sessions of physiotherapy a day and take a range of drugs to treat the condition.

Two of the men that stepped into the ring were from one of the evening's sponsors, plastic pipe manufacturer, Asset International Ltd. John Hutton, a 34-year-old father of two from Pillgwenlly, who last year undertook the half marathon for the same cause. John was joined by colleague Kraig Poyner, and both work with Amy's dad, Steve Smith at Asset.

Mo Nasir said: "The guys that took part had trained hard for this event for months prior and really rose to the challenge. Having a local cause at the back of their minds certainly pushed them even harder; the boxers were ready."

Simon Thomas, managing director of Asset, said: "We are proud to have staff like John and Kraig who are willing to put themselves out for a good cause and are really pleased to be supporting them at this local event.

"The whole company has really got behind Amy's appeal and has planned a host of fundraisers throughout the year. It is great to see the camaraderie amongst colleagues, and the commitment to the cause. The money raised is going to make a real difference to Amy's life and was a fantastic night."

The event saw fighters from a variety of professional backgrounds pit themselves against similar opponents in ten bouts.

Weholite realises pipe dream at summer games

Asset provided a large diameter Weholite pipe for a high profile mountain biking event during last summer's London games.

The mountain bike event, which was based in Essex, saw competitors cycling over rocky paths, tricky climbs and technical descents providing plenty of challenges for riders in the mountain bike competition.

The Weholite pipe, which measured 3.5m in diameter, is the largest plastic pipe on the market. It became an iconic part of the course as cyclists had to negotiate their way over and through the pipe to complete the course.

Simon Thomas, managing director at Asset comments: "Unfortunately there were no British medallists in the mountain biking last year but it was good to see home-grown manufacturing on show at an event televised to the world."

Asset goes for GOLD at the Royal Horticultural Society Tatton Park show

Last summer Asset International Ltd was thrilled to contribute a number of large diameter Weholite pipes for a garden design at The Royal Horticultural Society Tatton Park show.

Sheena Seeks was the designer behind the garden, which was called 'Untie the Wind'.

"The concept of the garden was based around music and the way sound becomes music", said Sheena, "the large pipe represented a wind instrument and the undulating grass banks sound waves. The smaller pipes represented different kind of sound waves.

"The materials used in the garden, bamboo, steel and plastic are all used in making wind instruments."

Untie the Wind won a gold medal and an award for best visionary garden.

Speaking about Asset's involvement with the event, managing director Simon Thomas commented: "Flower shows aren't normally the type of place our pipes usually end up, but we were extremely happy to help Sheena with her spectacular designs and delighted to play a small part in winning the awards."

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