TRENCHLESSWORKS

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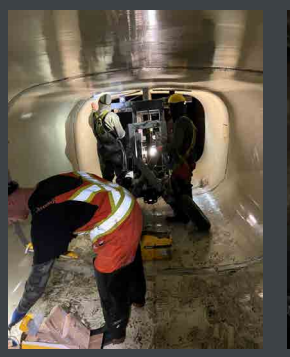
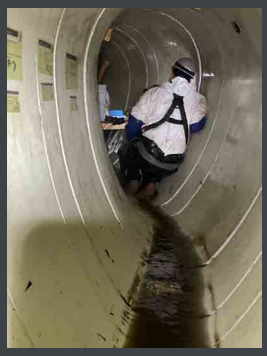
CHANNELINE
GRP Structural Lining Systems

PANELS SHOWN ABOVE ARE MANUFACTURED BY CHANNELINE

ANY SHAPE – ANY SIZE

Large diameter pipelines and culverts represent the backbone of any city's utility network for the collection and disposal of sewerage and effective drainage of stormwater. The need arises to consider the means by which the structural rehabilitation of these pipelines and ducts can be achieved whereby a new, 100-years plus life expectancy can be provided with a high degree of confidence. Channeline international has been providing bespoke Structural Glass Reinforced Plastic (GRP / FRP) lining systems since the early 1980's, during which time we have accumulated unrivaled engineering and manufacturing experience for both Circular and Non-circular buried infrastructure worldwide. **At Channeline, we are proud of our heritage and are committed to offering economic custom solutions to our existing and future customers in the Storm and Wastewater Sectors.**

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CHANNELINE
Beyond the Ordinary

Beyond the Ordinary

SPOTLIGHT

Matthew Izzard, Executive Director, North American Society for Trenchless Technology (NASTT)

This issue of Trenchless Works focuses on North America where, over the last two years, the adversity of world events have frequently affected lives globally. Through this time our global trenchless technology family has been supported by the ISTT enabling us to work together in new ways to provide a strong platform for the future.

Microsoft Co-Founder Paul Allen said: "As long as we work together, with both urgency and determination, there are no limits to what we can achieve." Famously starting out with two people working from a garage, by constantly challenging innovation Paul Allen and Bill Gates grew not only their leading company, but an entire industry.

Mankind innovates in adversity, and people are more likely to take calculated risks that lead to innovation if they work together. Over the last 50+ years trenchless technology has continually developed new equipment and techniques, enabling the 'impossible' to become practical delivered projects. This had been made possible through broadening ranges of applications, capabilities and generally improving the network and sustainability of underground infrastructure for everyone.

The NASTT 2022 No-Dig Show in April reflected this strength and desire to move forward, where nearly 2,000 attendees gathered in Minneapolis to celebrate the best in trenchless and share their knowledge and experience. Taking time on the exhibition show floor to see and hear the energy of everyone attending was testament to your determination and passion, as exhibitors, sponsors and the delegates who participated in the training courses, technical sessions, and awards.

Based on growing demand and interest our newest NASTT 'family member' - Mexico Regional Chapter (MEXTT) is hosting a Trenchless Technology International Seminar later this year with ISTT as the launch to the ISTT International No-Dig Show visiting Mexico City in October 2023. With annual events now in Canada, Mexico, and the United States we can better contribute to the education and awareness of 'No-Dig' throughout North America and the world. We look forward to sharing more information with you through new regular features in Trenchless Works.

One of our responsibilities to sustaining an environment for future generations is to continually improve the world we live in. Innovation is only effective if we all work together to make change effective. Investment in R&D, manufacturers, suppliers, engineers, contractors, and owners all play a key role in embracing the future as projects consistently set new benchmarks and the need and utilisation of trenchless technology continues to grow.

As we increasingly commit to being greener both above and below, to paraphrase Mr Allen: "If we have Innovation, determination and work together – there are no limits to what trenchless technology can achieve."

Matthew

NI WATER PUMPS £300,000 INTO SEWER IMPROVEMENTS IN PREHEN

NI Water is about to commence a £300,000 programme of sewer improvement work in Prehen, County Londonderry, Northern Ireland , UK to enhance the local sewerage infrastructure and reduce the risk of out of sewer flooding in the area.

The sewer improvements, which will be mainly undertaken using trenchless techniques to minimise disruption, recently got underway in Prehen Park and will be extended to various areas of Prehen over a period of approximately 8 weeks. Work at most locations should take no longer than 1 to 2 days to complete.

NI Water's Robert McLean, Senior Project Manager explained: "This essential work will involve the repair of existing sewers using underground trenchless techniques where possible. This innovative approach will significantly reduce the duration of the works and disruption to the public. Where this method of repair is not possible, due to the condition of the sewer, 'open-dig' repairs will be carried out. The programme of sewer repairs for the Prehen area will also involve some work on private lands. >

"This essential work will involve the repair of existing sewers using underground trenchless techniques where possible. This innovative approach will significantly reduce the duration of the works and disruption to the public."

NI Water through its project team, CivCo and AECOM, will liaise with any residents, businesses and landowners directly affected by these works. We appreciate that work of this nature can be disruptive and we will endeavour to keep disruption to a minimum. We would like to thank the public for their patience and cooperation as we complete this essential work. Local communities will benefit from these sewer improvements and reduced flood risk for many years to come."

NI Water manages a network of 15,600 km of sewers on a daily basis and it has invested billions in its water and wastewater infrastructure. However, no amount of investment will completely stop blocked pipes or inappropriate items polluting the environment. Items such as baby wipes and sanitary products are often the cause of out of sewer flooding which can easily be avoided by only flushing the 3Ps: pee, poo and toilet paper; everything else needs to go in the bin.

GOING FORWARD WITH INNOVATIONS FOR UTILITIES AND PROCESS AUTOMATION AT IFAT 2022

Between 30 May and 3 June 2022, the Swiss flow solutions provider, GF Piping Systems, presented a wide range of products and services at the world's leading trade fair for water, sewage, waste and raw materials management, including the Ball Valve 543 Pro, a new Y-Tapping Saddle, as well as innovative VR training and ultrasonic non-destructive testing. GF Piping Systems' presence also featured live discussions about the water supply of the future and sustainable energy sources.

The Y-Tapping Saddle for the ELGEF Plus piping system was one of the products launched at IFAT 2022.

Source:
GF Piping Systems

As a company specialised in plastic piping solutions, GF Piping Systems approached IFAT 2022 with the goal of presenting products that make piping systems more efficient, sustainable, and digital. Under the motto 'Connections for Life', one of the focus areas was utilities. Here, the company introduced new products such as the Y-Tapping Saddle for the ELGEF Plus system, a range of pressurised piping systems for industrial applications. The Y-Tapping saddle was designed to improve flow characteristics while simplifying the installation process with a tool-free assembly and a patented electrofusion heating element.

The company also introduced the new IR PVC-U piping system which is joined by a unique infrared welding technique, offering a secure and adhesive-free connection. In the context of process automation, visitors got to see the new Ball Valve 543 Pro which can be operated fully automatically with an electrical actuator. This makes it ideal for automating the chemical process industry, desalination and water treatment. In addition, GF Piping Systems conducted live demonstrations of welding techniques as well as ultrasonic non-destructive testing, a way to easily and efficiently evaluate pipe connections. >

GF Piping Systems demonstrated virtual reality as an innovative approach to teaching installation techniques.

Source: GF Piping Systems

"At IFAT, we wanted to show how modern piping solutions with cutting-edge materials, new technologies and digital functionality can have a positive impact across a wide range of industries."

However, the company's booth at IFAT 2022 also allowed visitors to get hands on with a variety of products. They could try out the new smartphone application CONNECT Conrivo which enables the tracking of components throughout a building project. A highlight to the public was the company's virtual reality (VR) training which let visitors immerse themselves in the training world of GF Piping Systems. The new method was created in an effort to quickly familiarise customers with the company's products and efficiently teach them the correct installation techniques. Finally, GF Piping Systems used IFAT 2022 as a platform for discussions and talks about sustainability, new energy sources, and the water supply of the future. As part of its corporate metaverse 'The Age of Water', visitors at the trade fair and online could participate live or on demand.

Looking back at IFAT 2022, Jens Frisenborg, Head of BU Industry/ Utility at GF Piping Systems, is pleased with the event saying: "At IFAT, we wanted to show how modern piping solutions with cutting-edge materials, new technologies and digital functionality can have a positive impact across a wide range of industries. With our new products, various hands-on experiences, and important discussions, I believe that we demonstrated our commitment to facing current challenges and working towards a more sustainable and connected future. At GF Piping Systems we create connections for life."

STANDARDS AUSTRALIA RELEASES FLUSHABLE PRODUCTS STANDARD

"It is exciting to see the release of this Australian and New Zealand Standard (DR AS/NZS 5328:2022) which has been many years in the making. One of the first of its kind internationally, it is the result of ground-breaking collaboration between manufacturers, water utilities, peak bodies and consumer groups." said Adam Lovell, Executive Director WSAA (Water Services Association of Australia). "We know others internationally have been watching the development of this Standard. There is already interest in adopting the Standard, with Israel advising it intends to adopt the Standard with no changes."

"While the Standard is voluntary, it provides manufacturers with clear pass/fail criteria for products suitable for toilet flushing. Importantly it includes requirements for clearer labelling so customers know for certain whether a product is safe for flushing." said Lovell. "'The message from the water industry has always been, only flush the 3P's. Now we can add 'check for the flushable symbol'. If there is no flushable symbol on the packet then do not flush it, bin it! Wipes and other items that should not be flushed are an issue for water utilities around the globe, disrupting customer services, creating extra costs for utilities and customers, and impacting the environment through overflows. In Australia and New Zealand it costs water utilities tens of millions of dollars each year." he said.

WSAA and the urban water industry in Australia and New Zealand have been concerned about the contribution of wet wipes products to pipe blockages for some time. The issue became even more serious during the COVID-19 pandemic, with its members reporting increases in blockages with people flushing materials never intended to go down the toilet like paper towel.

Manufacturers are expected to start using the flushable symbol in the coming months for products that pass the testing criteria, including six tests and an attestation that there is no plastic in the product. WSAA and its members will continue to monitor the impact of items that should >

Example of flushable and do not flush symbols.

Figure 4.1 from AS/NZS 5328:2022.
© Standards Australia Limited/Standards New Zealand 2022.

"The standard defines criteria for what material can be flushed down the toilet and, therefore, what products can be classified 'flushable'."

not be flushed on wastewater systems and engage with customers and stakeholders to increase awareness.

WSAA is the peak body representing the urban water industry in Australia. Its members provide water and wastewater services to over 24 million customers in Australia and New Zealand, including many of Australia's largest industrial and commercial enterprises.

Standards Australia released the new Standard following nine weeks of public consultation and consideration of comments received. The standard defines criteria for what material can be flushed down the toilet and, therefore, what products can be classified 'flushable.' To assist manufacturers in developing these products, the standard provides test methods for determining 'flushability.' In order to be 'flushable', the standards must have a declaration that it has passed six stringent tests. It also specifies disposable labelling requirements so that if a product is flushable, it will be clearly indicated on the packaging, providing confidence for the end consumer.

AS/NZS 5328 was developed by technical committee WS-041, including experts from consumer interest groups, water utilities, local government organisations, suppliers, manufacturers, and associations, including The Water Services Association of Australia (WSAA).

The Flushable Products Standard can be purchased in the Standards Australia Store.

(https://store.standards.org.au/product/as-nzs-5328-2022)

MCELROY'S NEW DIRECTOR OF DIGITAL STRATEGY

Chris Zenthoefer, Director of Digital Strategy, McElroy.

McElroy, one of the world's leading designers and manufacturers of thermoplastic fusion equipment, recently announced the arrival of Chris Zenthoefer as the company's new Director of Digital Strategy.

"As the world shifts more and more to a technology-driven model, we realised the need for a department to coordinate our digital strategies." said President and CEO Chip McElroy. "We are thrilled to have Chris join the McElroy team to lead this new facet of the company."

In his capacity as Director of Digital Strategy, Zenthoefer will assist in crafting McElroy's technological approach to its equipment, while working alongside other members of McElroy's leadership team to ensure that the company remains at the forefront of fusion technology. He looks forward to championing that effort.

A Tulsa native, Zenthoefer graduated from the University of Tulsa with a Bachelor of Science in Business Administration with a Marketing focus. He has always had an eye for technology. After completing his degree, he started a company that built websites. Through that position, he realised he especially appreciated the opportunity to work directly with clients and guide them through the digitisation process.

He went on to found ICEdot, a startup that designed technological products for outdoor enthusiasts. The company was eventually acquired by California-based Specialized Bicycles, with Zenthoefer serving as Director of Specialized Digital. He remained at Specialized Bicycles until his arrival at McElroy.

In 2013, Zenthoefer was the recipient of the Fast Track Alumnus Award from the University of Tulsa Collins College of Business. The ICEdot product was recognised with numerous industry awards, including Product of the Year from Outside, VeloNews, Men's Journal, and Wired Magazine. Zenthoefer is co-founder of Saint Francis Tulsa Tough, an annual three-day bicycling festival in Tulsa. Currently, he serves as chair-elect of the organisation.

"I am very excited about what we have already done at McElroy, and how we can extend our work into increasing jobsite productivity for our customers." Zenthoefer said.

www.mcelroy.com

REMEMBERING SHINKICHI OOKA (1935-2022) - A JAPANESE TRENCHLESS PIONEER

Ooka san, photo taken from one of our Inpipe board meetings in Japan, at his weekend residence, May 1998

It is with great sadness that I was received the news recently that my dear friend and great business partner Mr Shinkichi Ooka had passed away on 29 April, at the n age of 86.

Ooka san was the founder of his company Toa Grout Kogyo, in 1958, when he was just 22 years old, and have ever since then been a key person in our industry.

The first time I met Ooka san was at the No-Dig Show in Hamburg 1988. He showed great interest in the trenchless industry and more specifically in the technology Inpipe AB presented - UV cured CIPP, and its potential for the Japanese market.

Mr Ooka and Borje Persson at No-Dig Copenhagen 1994

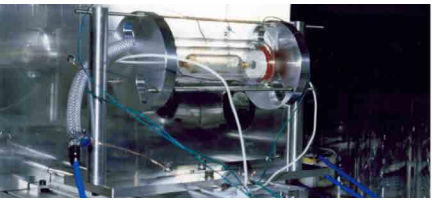
At that time Mr Ooka's international business experience had been with Swiss technologies, for example Flexible ring net barriers for debris, a slope protection technology which he had introduced into Japan some years earlier.

Inpipe, founded back in 1985, was based on the ideas and business platform created by the Swedish inventor Mr Volmar Jonasson and his company VJ-System AB with patents dating back to 1977. After years of development and investments and the Scandinavian economic crash in the late 80s, Inpipe went into liquidation in February 1990.

Ooka san had already, before Inpipe went into bankruptcy, decided that UV cured CIPP technology was the future and he would be the one introduce it into Japan. Over the following months, and together with the founder of Inpipe AB, Mr Karl-Göran Burlin, a group of investors was put together and in September of the same year the company, Inpipe Sweden AB was established, with 70% Swedish ownership and 30% owned by the Japanese group, Ooka san was a strong driving force in this new entity.

The restart of Inpipe was challenging, and with the recent financial crises in Sweden still fresh in memory the demands from the new owners to see fast results was strong. At the time long-term planning was 2 years. With great respect and thanks to Ooka san, if he and his Japanese partners had not been involved, I believe that Inpipe would not have grown to be the largest UV liner producer in the world in the early 1990's. For Ooka san short term planning was 2 years, mid-term 5 years and long-term planning was 10 years. This view on business gave us the very necessary possibility to finish important development work started earlier, to become a leading system supplier for trenchless pipe rehabilitation using UV cured In Place technology.

I became a shareholder in Inpipe 1992 and had the opportunity to work together



Light trolly development, lamp should be touchable maximum 50 degree even when running. Japanese version of Inpipe Light train based on 400w Gallium lamps with camera in the front, 1997

Mr Ooka and Borje Persson at No-Dig Copenhagen 1994

Mr and Mrs Ooka with son Taro.

with Ooka san and the rest of the shareholders as a board member until the company was sold in March 1999. These seven years were a very good learning period, surrounded with professional people from the industry. Ooka san was a person of honour and integrity and his spirit and enthusiasm impacted everyone who had the good fortune to work with him.

Ooka san introduced UV curing technology into Japan in 1991. I had the opportunity to work with him and his team, for many years, to develop lining material as well installation technology. We can still see technology from those days still in operation today. What was done at that time was pure pioneering work.

Mr Ooka and his technical team worked closely with Tokyo Metropolitan Government (TMG), It was very soon discovered that not only the main drainage pipe system was needed to rehabilitate and protect from earthquakes, but also laterals needed to be refurbished. So in 1995-96 development work started for the lateral system LIP (Lateral InPipe), and quite soon both flexible liners which could handle bends as well adapted equipment were developed.

When Mr Ooka's secretary contacted me early one morning in the spring of 2004 and asked if I could help him to transfer production technology into Japan, it took only some few weeks before we had an agreement in place and a team of Japanese engineers were at the BKP Berolina factory to update drawings etc. In July 2006 the Japanese factory for the Berolina-Liner was officially opened in Toyohashi.

I first met Ooka san's wife and his son Taro for the first time in 1992 at the family home in Tokyo. At that time Taro was a very well-behaved young boy. Over the years with education in Australia and work experience abroad Taro has become a well-respected Director within Toa Grout and I am convinced that he will take Toa Grout and associated companies to the next level.

Mr Ooka, with his strong belief and dedication to the industry, has brought UV Cured technology into Japan through his organisation LCR (Light Curing Association) to be the leading CIPP in the country and beyond. He was also very keen that all development work made should meet standards and be of best possible quality. He therefore became the member of German IKT so material and installation technology could be tested and proven.

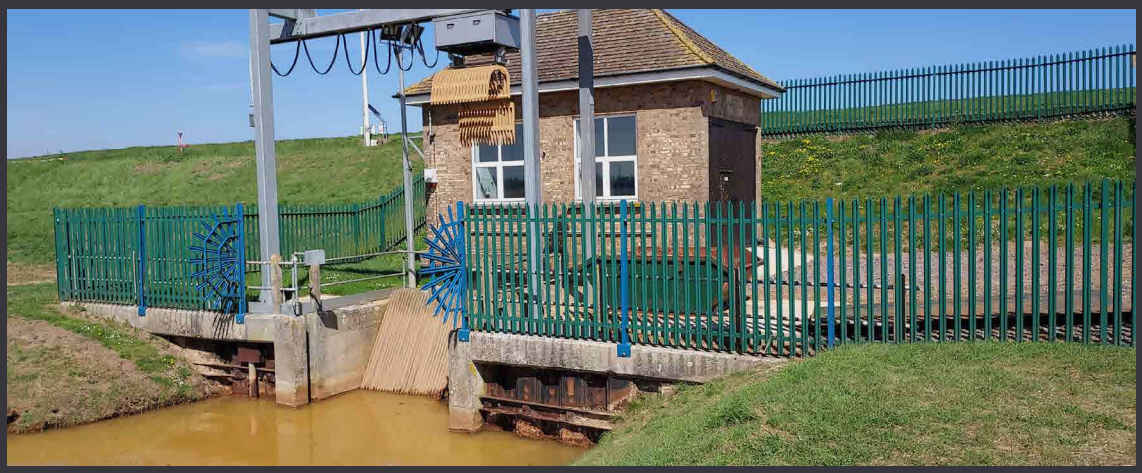
He attended many of the No-Dig events in Europe and elsewhere, until very recently, as well frequent business meetings held across Europe.

(Dinner in Prague May 2013 at one of the BKP Partner meeting. From left: Mrs Ooka, M. Ooka, M. Kaneuji, Mrs Persson and Mr Persson)

In sharing my memories here of my dear friend Ooka san it has given me an opportunity to recall so many happy occasions I was fortunate enough to share with him, his family and many of his colleagues, both in our business collaborations but also in moments of relaxation. It has also given me the opportunity to reflect on the great experience I gained from working with him, early on in my own career in this industry, and how much of his influence and expertise I have carried forward right up until the present day. It was an honour to be able call Mr Ooka a friend and a privilege to count him amongst my most influential colleagues. He will be greatly missed by me, and by many more amongst the Trenchless community. Of this I am certain.

Borje Persson, Export Manager of BKP Berolina Polyester and Managing Director of JBP Composites S.L.

BARHALE WINS CRITICAL LINCOLNSHIRE DRAINAGE WORK



Dawsmere Pumping Station.

South Holland Internal Drainage Board (IDB) has awarded Barhale a contract to install, reinforce and renovate vital drainage works in Lincolnshire.

The infrastructure and civil engineering specialist will renovate the inlet, outfall and surge chamber at Dawsmere Pumping Station, a crucial part of the network of flood defences in and around Holbeach.

Dawsmere Pumping Station removes to the sea water collected by the network of local drains and is essential for the protection of the surrounding land and villages which typically lie one metre below high sea level.

An unusual additional operational consideration is that, because the pumping station is located next to RAF Holbeach, the site must undergo 'sweep and watch' protocols for unexploded ordnance before and during excavation work.

Keven Stobbs, general manager at Barhale, described the pumping station at Dawsmere as in the front line of defence for the land behind the seawall.

"South Lincolnshire, and specifically the South Holland area, is among some of the lowest-lying inhabited land in the UK." he said. "The system of drainage has been successfully developed and managed over centuries but we are more regularly facing extreme weather conditions so the process of maintenance and upgrade is hugely important. When carrying out work, we do not like to take any component out of the system for too long so have been introducing innovative approaches to accelerate delivery. At Dawsmere, we will use a dam formed from one tonne bagged aggregate which can be deployed and removed very quickly.

Barhale regional director James Haddon sees the company's selection for the South Holland IDB contract as a testament to the company's expertise and experience across the water sector saying: "South Holland IDB is engaged in a long-term project to enhance the resilience of this important agricultural area and we are delighted to have been selected to work with them to deliver their programme."

STEVE VICK WINS COMPANY OF THE YEAR AT THE IGEM & EUA AWARDS

Steve Vick's Award winning team at home and at the Award Presentation.

Steve Vick International (SVI) is pleased to announce that it won the coveted award of Company of the Year 2022 at the Gas Industry Awards Lunch, organised by IGEM and the EUA.

There was stiff competition for this prestigious title with both SGN and United Living Infrastructure Services also reaching the final however, the judges decided to crown SVI the winners. The judges commented that they 'recognised SVI not only for a strong entry but also for their long-standing commitment to the industry, as they celebrate their 40th anniversary'.

This is the second time SVI have been lucky enough to win Company of the Year, having won back in 2015.

Crock Harrison, Managing Director at SVI commented: "We are honoured to have won Company of the Year 2022. Our team works extremely hard to deliver new innovations to the industry and to offer the very highest levels of customer service and it's hugely motivating to the team that their work has been recognised."

Steve Vick, Chairman at Steve Vick International commented: "40 years ago, when I started SVI, in a barn at home, I could never have dreamt of winning Company of the Year at the Gas Industry Awards, not once, but twice. I am hugely proud of the team for all their hard work and dedication, for them, this win is hugely well deserved."

The company celebrated with a barbecue for all staff, cooked and organised by the company directors. Each member of staff was also gifted an additional half day holiday, with Crock Harrison, Managing Director commenting: "If the Queen can give everyone an extra day's holiday for her Platinum Jubilee we can give an additional half day for winning Company of the Year!"

The award ceremony took place on the 11 May at the Hilton on Park Lane. The Welcome Speech was delivered by Dermot Nolan of Fingleton and former OFGEM CEO who spoke about the future of Gas.

www.stevevick.com

BELFAST ROADSHOW KICKS OFF SUMMER OF TRENCHLESS EVENTS

The fabulous city of Belfast recently hosted the latest NO-DIG ROAD SHOW organised by Westrade in association with the UKSTT and supported by Irish Water and Northern Ireland Water.

The perfectly situated Crowne Plaza hotel proved to be the ideal venue hosting almost 200 delegates and exhibitors who between them represented both the domestic and international trenchless markets. The high-quality delegate list boasted representatives from a wide range of sectors including water, sewerage, telecoms, electricity, oil and gas, , civil engineering, and research all of whom enjoyed a diverse conference programme organised and chaired by Environmental Techniques Director and UKSTT Council Member Shauna Herron. The day got off to a great start with the event's Keynote speaker, Dr Dec Downey, Principal Consultant at Trenchless Opportunities Ltd giving a fascinating insight into 'Innovation in Trenchless Technology CIPP in the last 10 years'. This was followed by a host of well-respected figures representing many of the region's biggest players and trenchless projects, such as Irish water and Northern Ireland water.

Commenting on the success of the roadshow Westrade's Managing Director, Paul Harwood said: "It was great to see such a diverse cross section of the trenchless community showcasing the latest innovation in technologies and techniques from around the world. I would like to extend a special thank you to our event partners Northern Ireland Water and Irish Water, whose commitment and passion for trenchless technology is well recognised. I would also like to thank our event sponsors PE100+, Picote and Sanivar who's support is, as always, greatly appreciated. Last but by no means least a huge word of thanks to Shauna Herron for all her efforts in putting together such an insightful and varied conference programme."

The Belfast roadshow kicked off what is an exciting summer for trenchless events with the return of the world-famous No-Dig Live exhibition at East of England Arena, Peterborough between the 13th and 15th September. This flagship event will once again feature the UKSTT Gala Dinner and Awards ceremony and further details can be found at www.nodiglive.co.uk.

INTERNATIONAL NO-DIG 2022 HELSINKI

THE 38th INTERNATIONAL NO-DIG

Conference and Exhibition
3-5 October 2022

Messukeskus Helsinki Expo and Convention Centre, Finland




International No-Dig Helsinki is the major annual international gathering for trenchless technologists to meet and discuss the latest industry developments.

- Reach new markets at this major event targeting influential audiences to be drawn from the European markets, as well as attendees from further afield
- An opportunity to display and demonstrate products to a highly targeted audience
- Ensure your brand has a profile in the presence of the industry's premier decision makers
- Take a leadership position and play a major role within the Trenchless/No-Dig sector
- Be seen at the region's only industry specific exhibition and conference with a proven track record that truly demonstrates Trenchless/No-Dig technology and its capabilities
- Be seen alongside influential supporters representing Europe

To be seen amongst the worlds leading providers and show your innovations, book a stand at International No-Dig Helsinki.

Contact Paul Harwood at pharwood@westrade.co.uk or +44 (0) 1923 723990

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CONSIDERING ALL FACTORS FOR PIPELINE REHABILITATION

By Steve Brogden MSc. PhD, Managing Director, Die Draw Ltd

DieDraw

Pipeline rehabilitation is a complex technical process that requires specialised knowledge, skills, and experience. When considering a pipeline rehabilitation project, it is critical to consider all the factors that can influence the cost, the timescales, and the longevity of the repair. When these considerations are factored in correctly, the low-cost solutions almost inevitably end up costing significantly more over the lifetime of the pipeline.

The relentless pursuit of cost reduction and budget cuts has led to the emergence of a myriad of solutions being offered, some of which can put projects at risk during installation and frequently lead to very short lifetimes. This repeatedly tarnishes the reputation of all rehabilitation technologies, hindering progress. The cheapest solution is often not the most reliable.

A reliable and robust solution

The safest and most reliable method of rehabilitating a pipeline is frequently the installation of high and medium density polyethylene liners. Liners ranging from loose-fitting fully structural slipliners to tight fitting semi-structural Die Draw liners (historically Swagelining or Die Drawing), and everything in between can be installed. These proven PE100 and PE80 materials deliver the reliable, fully qualified, and extensively tested materials that already dominate low pressure water and gas pipelines throughout the UK and Europe. >

"The best way to ensure a project is completed within the fastest time and for the lowest cost possible is to ensure it is implemented and completed correctly in the first place."

A lining operation underway.

When correctly engineered these solutions offer a highly controllable installation process that only uses the natural properties of the materials themselves without any need for difficult to control post curing, spraying or post-pressurisation to establish the finished product. Polyethylene liners, when implemented correctly, offer a robust, reliable, environmentally friendly, and cost-effective method of rehabilitating pipelines with greater than 100 years design and life expectancy.

Reduce risk and maximise return

So how do you maximise the return, lower the risk and provide the fastest resolution for your pipeline rehabilitation project? The answer is surprisingly straightforward: Use the correct materials with the right people with the right expertise and experience. Never deviate from the project specification, equipment, material, processes, or tolerances.

At first glance, this answer may appear over simplistic and nothing more than common sense, however the reality is that failure to follow this simple guideline has repeatedly caused significant problems across the industry.

When a complex project experiences a failure, the engineering solution required to rectify the problem is often more challenging than the original problem.

The best way to ensure a project is completed within the fastest time and for the lowest cost possible is to ensure it is implemented and completed correctly in the first place.

Why experience matters

We have examined many instances of pipeline rehabilitation project failure over the last 30 years. In some cases, we have been brought in to engineer an appropriate solution after a project has already failed within a few years or less of installation. What we have seen, with alarming regularity, is that in almost every case, the root cause of the project failure has been non-adherence to the project specifications. If the process is difficult to control in the first place it invariably leads to problems.

We have seen difficult to control processes, often using thermoset rather than thermoplastic materials, go on to cause catastrophic project failures requiring complex, lengthy and expensive resolutions. A key advantage of polyethylene is that it is a thermoplastic, produced in a controlled factory environment rather than a thermoset which is usually cured on-site with all the additional variables that environment entails. As a polymer engineer, I view thermosets as yesterdays' >

The towing head that leads the liner pipe into the host pipe during the lining operation.

materials and thermoplastics as the future. Thermoplastics can be recycled whereas thermosets cannot.

My intention is simply to highlight that when complex engineering solutions are completed by qualified individuals with the right experience, there is a much higher probability the project will be carried out successfully. This is true of whatever type of liner material is selected.

If a project fails because a defined process has not been followed, it is not the fault of the process or the technology. It is a failure of an industry that is willing to permit deviations or accept judgement calls from people who are not qualified to make the alterations to the process.

The Variables

Modern trenchless technology requires fully designed, engineered and checked solutions for the installation phase, it is no longer acceptable to just turn up with the equipment and attempt to pull a liner in. Unfortunately, this practice is still occurring and in the event of a failure, the resolution will cost several times the original project budget.

When a lining solution is correctly engineered, all variables will have been meticulously examined, understood and where necessary, mitigated against. The calculations and planning take months of work by qualified engineers. The system is considered as a whole and when unknowns are introduced, they can have cumulative, knock-on effects that increase the chance of failure. >

Thermoplastic lining operations.

The Considerations

There are many different thermoplastic lining techniques available. The success of the project will be largely dependent on the ability of that specific technique to meet the client requirements.

There are 2 broad classifications of thermoplastic lining solutions:

• loose fit

• tight fit.

A loose fit solution, often referred to as sliplining, is more common across the industry and is widely recognised as the simplest form of thermoplastic PE lining system due to the ease of installation.

Sliplining is an excellent solution as long as it meets the clients' requirements. More often than not, however, sliplining will be proposed because it is relatively easy as opposed to correct.

Sliplining remains a good solution where flow capacity is not critical for a pipeline owner. This is often the case over shorter distances but for longer projects, consideration must be given to the reduction of flow capacity over the entire length of the pipeline.

In the circumstances described above, where flow capacity is a critical consideration, a tight-fit lining solution will offer a superior engineering solution. The initial cost may be a little higher and the installation a little more complex but this is mitigated against by utilising qualified engineers with appropriate experience. The whole life cost of the project will likely be significantly lower as the solution will be more likely to meet the client requirements, while using less material.

It is also worth noting that the Die Draw technique can be used for loose fit options too, with a fully structural full pressure bearing liner able to deliver greater flow capacity than a slipliner.

A holistic design approach with experienced, qualified engineers that considers all variables and requirements of the entire project will inevitably deliver a superior solution, provide quantifiable savings, maximise flow rate, meet all engineering >

Steve Brogden MSc. PhD, Managing Director, Die Draw Ltd

Dr Steve Brogden is a Polymer Engineer with over 30 years of experience in materials technology, having specialised in plastic pipes for 25 years.

Steve's PhD on the fatigue loading of PVC and PE went on to form the basis of a UK Water Industry IGN 4-37-02 Design against surge and fatigue conditions for thermoplastic pipes, which led to the wider use of PE materials in pipeline applications globally. Other projects for the UK Water Industry during the 1990s involved engineering of polymer lining systems, development of pipe pressure test commissioning procedures, polymer fitting improvements and welding methods.

Building on his technical knowledge, Steve has worked with commercial success throughout the supply chain on Projects involving Polymer Material Producers, Pipe Manufacturers, Utility Gas and Water Companies, Pipeline Installers (Contractors, both onshore and offshore) Oil and Gas Companies, Test Houses and Certification Bodies. A thorough understanding of polymer viscoelastic behaviour and material operating limits enables Steve to bring a practical approach to solving seemingly complex technical issues during installation of polymer liners.

Steve has contributed to Pipeline Projects all over the world, throughout Europe and especially Scandinavia, the Middle East, India, Japan, North America and Africa. Over the last 10 years, Steve has applied the principles of polymer viscoelasticity to overcome the technical hurdles required to get the process of die drawing under control. This has enabled Projects to be undertaken reliably and consistently at very low risk, using this versatile process. Steve has designed hundreds of successfully installed and operating tight-fitting liners.

tolerances and maximise the pipe life. Specialist winching design requirements and associated temporary works is critical for all these solutions whether sliplining or die drawing. The pipeline rehabilitation consultancy must have sufficient knowledge of these requirements and be able to propose a suitable solution.

Summary

If you want to ensure the success of your pipeline rehabilitation project, make sure you look at the total, lifetime cost of the proposed engineering solution. Take everything into account. Use qualified individuals with relevant experience who understand the situation, the environment, the calculations. Explore historical projects in detail and ensure there is a clear understanding of what needs to be achieved. Ensure all influencing factors are identified and integrated into the solution, especially the ones that are less obvious. Relevant experience is critical to the success of your project.

Above all, choose an industry proven technique with a long history of successful installations. The installation of high and medium density polyethylene liners by qualified engineers will go a long way to guaranteeing the success of the project.

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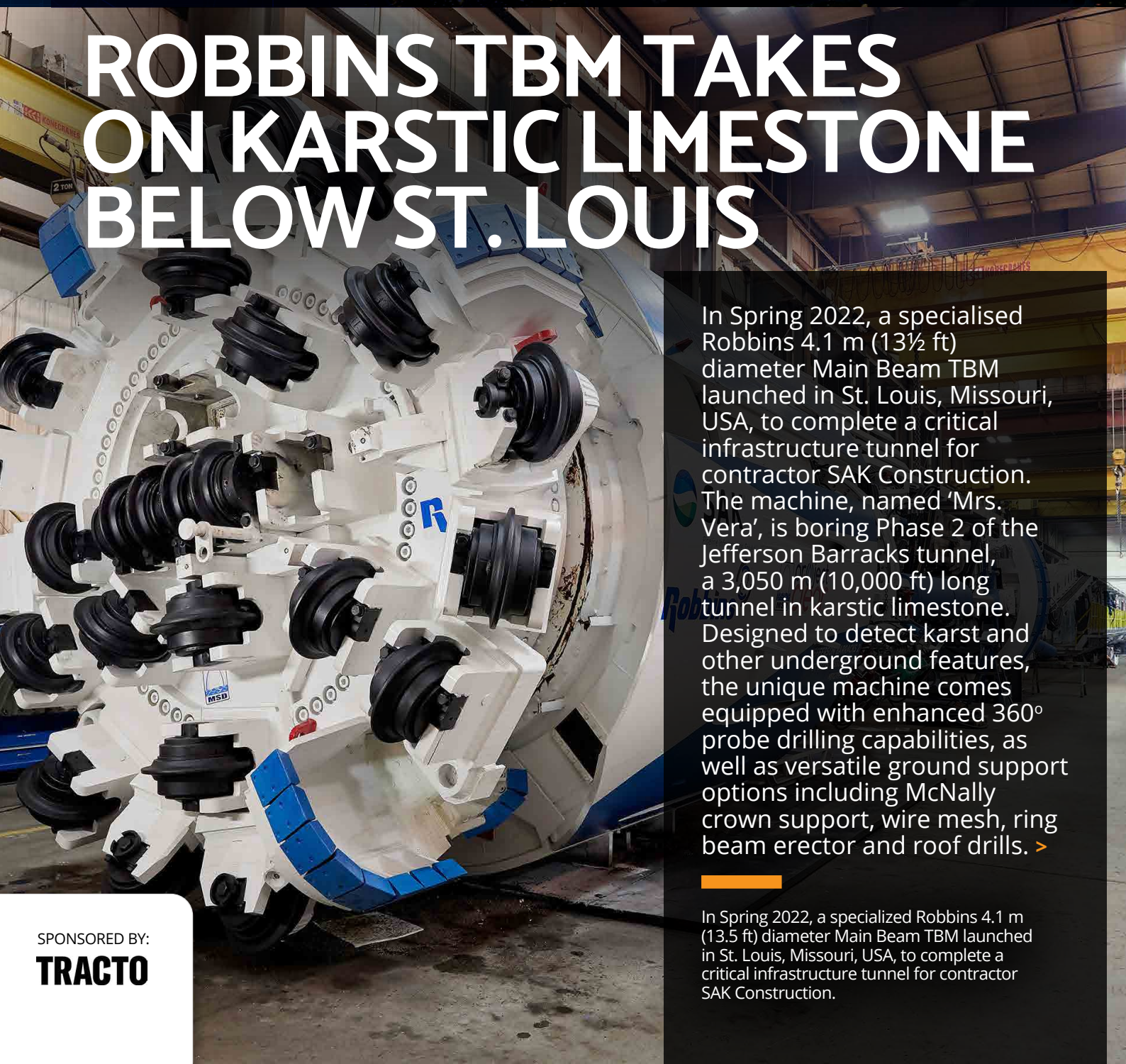
FOCUS

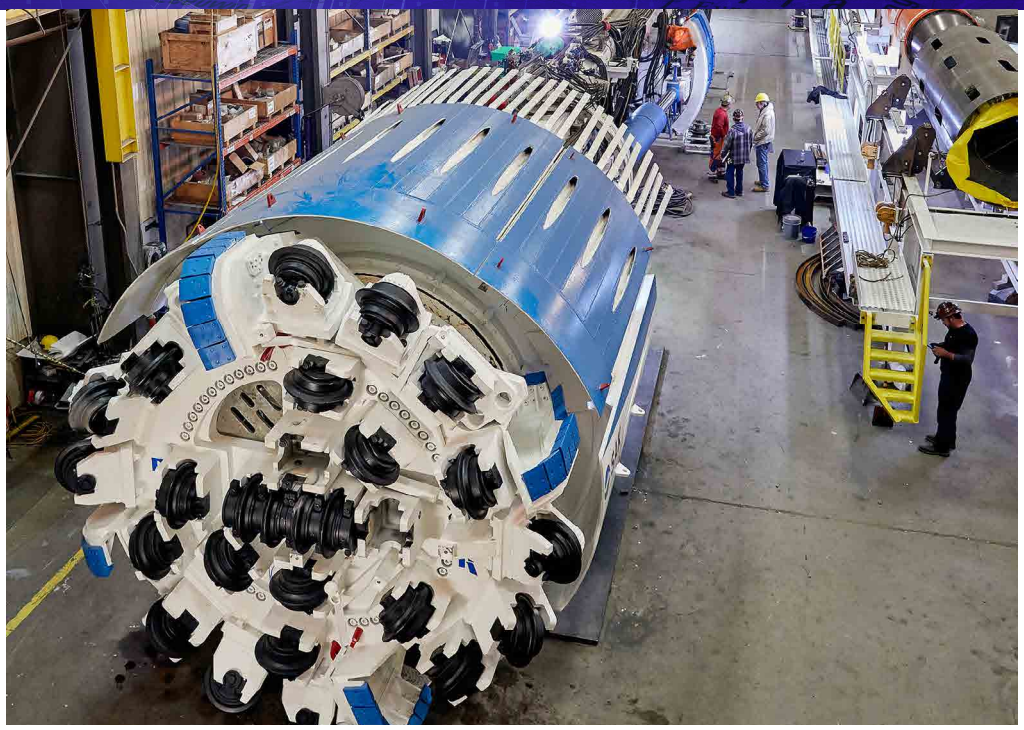
NORTH AMERICA

ROBBINS TBM TAKES ON KARSTIC LIMESTONE BELOW ST. LOUIS



In Spring 2022, a specialised Robbins 4.1 m (13½ ft) diameter Main Beam TBM launched in St. Louis, Missouri, USA, to complete a critical infrastructure tunnel for contractor SAK Construction. The machine, named 'Mrs. Vera', is boring Phase 2 of the Jefferson Barracks tunnel, a 3,050 m (10,000 ft) long tunnel in karstic limestone. Designed to detect karst and other underground features, the unique machine comes equipped with enhanced 360° probe drilling capabilities, as well as versatile ground support options including McNally crown support, wire mesh, ring beam erector and roof drills. >

In Spring 2022, a specialized Robbins 4.1 m (13.5 ft) diameter Main Beam TBM launched in St. Louis, Missouri, USA, to complete a critical infrastructure tunnel for contractor SAK Construction.



The machine, named 'Mrs. Vera', is boring Phase 2 of the Jefferson Barracks tunnel, a 3,050 m (10,000 ft) long tunnel in karstic limestone.

"The overall design of the machine is a good fit for our project, not only for the mining aspect but also for the capability to run two probe drills in multiple locations around the TBM" said Brotherman Bragg, Project Superintendent for SAK Construction. "The challenges I anticipate during tunnelling are mostly related to ground conditions. The area that we are tunnelling in has a potential for karst features. The probe drills are our lifeline and with the two probe drills on the machine, I believe that we will find out what is in front of us before we get there, giving us the ability to take care of potential problems."

During Phase 1 of Jefferson Barracks, a rebuilt 3.35 m (11.0 ft) diameter Robbins Main Beam TBM hit challenging conditions about 2,400 m (7,900 ft) into tunnelling. The machine encountered a large vertical feature along with flowing and unstable ground that required the TBM to remain in place. While various options including ground freezing were considered, they were ultimately deemed infeasible.

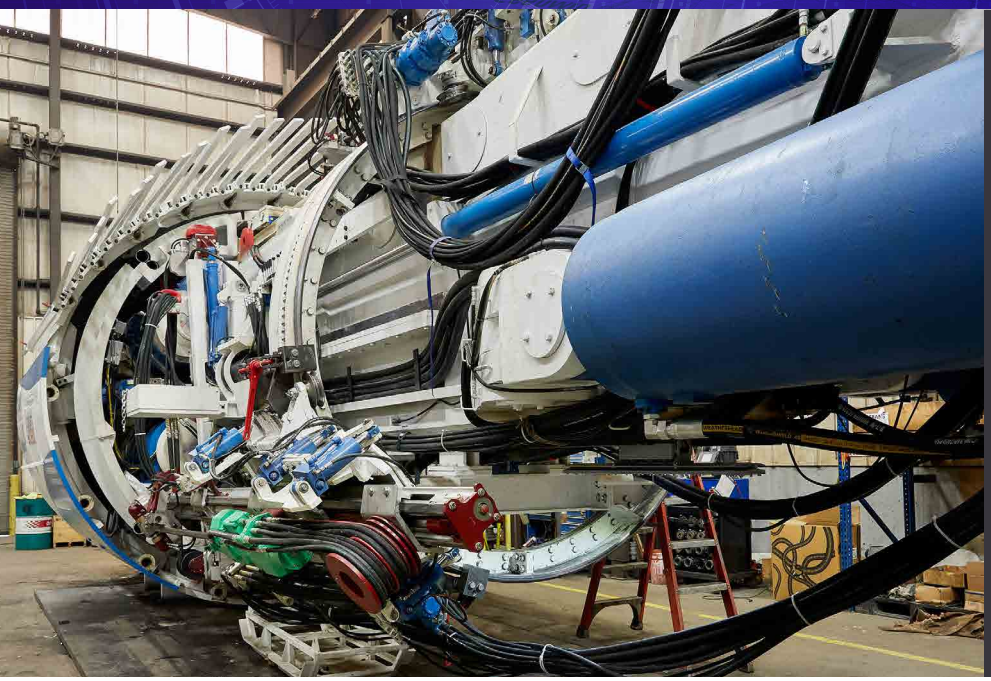
A 62 m (205 ft) deep recovery shaft and 60 m (200 ft) long adit were built to stabilise the area and remove the machine in what would be an intensive and ultimately successful undertaking. After recovery of the machine, SAK Construction turned to Robbins for a solution to bore the remaining tunnel in what would become Phase 2 of the project.

SAK and Robbins agreed to do extensive in-shop testing of the new, larger TBM to ensure there would be no unnecessary delays on site. The TBM was ultimately delivered a couple months late due to both COVID-related matters and the additional in-shop testing. SAK operational personnel and Robbins personnel were heavily involved in final assembly and testing procedures.

After arriving in St. Louis, the TBM was swiftly assembled and launched from the recovery shaft.

"The Robbins Field Service techs have been excellent in their support, helping us assemble the machine, and troubleshoot the machine. Our challenges during the assembly and launch from the shaft were minimal, this is the fastest and most efficient assembly we have ever had on a machine. We assembled the TBM in four weeks, which was a huge hurdle." said Bragg.

"The overall design [of the TBM] is very functional and thus far in the early stages it seems to be mining very well." continued Bragg. "So far, I am very pleased with the machine and with the technicians." Early indications were good, with the machine advancing 21 m (70 ft) in its first two shifts after launch. >



"The overall design [of the TBM] is very functional and thus far in the early stages it seems to be mining very well."

A bursting head about to start a run with the new pipe to be installed attached to the rear.

The Jefferson Barracks project is a key component of MSD Project Clear, a massive US$6 billion programme undertaken by the Metropolitan St. Louis Water District to target water quality and wastewater concerns in the city and surrounding areas. The 5,400 m (17,800 ft) long, 2 m (7 ft) internal diameter Jefferson Barracks tunnel runs parallel to the Mississippi River and extends to the Lemay Wastewater Treatment Plant located at the confluence of the River des Peres and the Mississippi. The tunnel is slated for completion in Autumn 2023.

AKKERMAN – A US-BASED COMPANY WITH AN INTERNATIONAL REPUTATION

In 2021, The Rimon Group, a private water infrastructure contractor in Bat Yam, Israel, purchased equipment from Akkerman to help rehabilitate a sanitary sewer. The sale was facilitated through a representative Akkerman has in the Bat Yam region to help make connections such as these. >

Sliplining works on the Bat Yam site in Israel using Akkerman equipment.

Wear and tear on the sanitary pipe can cause issues that need to be resolved through rehabilitation. When a host pipe is made of concrete, it usually flows about half-full. Septic gases are hard on the concrete, and if the pipe is not rehabilitated, it will decay. If the decay gets severe enough, the top of the tunnel can collapse and stop the flow, causing issues in household plumbing (since the septic flow has nowhere to go) and can also allow groundwater to leak in, which can negatively affect how the sanitary sewer is treated.

The Akkerman sliplining system works by sliding a slightly smaller fibreglass pipe into an existing host pipe to provide a reinforced and efficient conduit. The fibreglass pipe then becomes the new sanitary sewer pipe. The approximate lifespan of a concrete pipe is 20 years, while the fibreglass reinforced pipe (FRP) has an approximate lifespan of 100 years or more. An advantage to the Akkerman sliplining equipment is that it can be installed while the sewer system is actively flowing. This reduces the need for costly bypass pumping while the sewer line is rehabilitated.

In March 2022, members of the Akkerman team travelled to Bat Yam, Israel to provide training on Rimon's initial 140 m long installation. The modular design of the Akkerman SLS-100 sliplining system was set-up to accommodate the 2.8 m long, 1,800 mm diameter FRP pipes while minimising surface disruption around the project site. Once onsite, the Akkerman team familiarised themselves with the crew and provided operational and safety training via translators, Google Translate, and demonstrations.

Sliplining operations were restricted to four hours each night due to severe fluctuations in the sewer flow in the region. Initially estimating the first installation would take three full shifts, the crew was able maximise productivity and install the 1,800 mm diameter FRP in just two shifts. Due to the simplicity of the Akkerman SLS-100 sliplining system, the crew averaged around 6 minutes to set and install each 2.8 m long section of pipe. Once complete with this installation, the experienced crew was able to set-up and successfully utilise the system on several other scheduled projects.

This was the second project in Israel that Akkerman had been involved in, and the first of this particular type of project. Akkerman is looking forward to the potential for future pipe rehabilitation work in this region.

FASTER NETWORKING SPEEDS IN HIGH DEMAND ACROSS WESTERN CANADA

The need for fast internet connectivity is a common concern for everyone these days. Spending the last year social distancing and working remotely is putting a strain on existing infrastructure and leading to more and more fibre work around Canada.

For horizontal directional drill (HDD) contractors specialising in fibre and shallow utility work, the COVID-19 pandemic has added demand and pressure to put as much product in the ground as possible before the end of this year's working season. Two companies working hard to expand high-speed connections across Western Canada are High Speed Crow and Platinum Hydrovac & HDD. For the last several years, both companies have dedicated their resources to help ensure everyone has access to high-speed internet.

Providing rural fibre access

The team at High Speed Crow, based in Lockport, Manitoba, Canada is a trusted name in providing high-quality fibre and wireless internet services for much of rural Manitoba. Company founder, Bryan King, said it has been his mission to deliver the same levels of internet access to his rural neighbours as people living in the city. "From businesses in smaller communities competing with large companies to giving our young people access to the same educational tools that city kids have, high-speed internet access is not a luxury, it is a necessity no matter where a person lives." he explained. "Our job at High Speed Crow is to deliver access to over 18,130 square kilometres (7,000 square miles) of rural Manitoba using fibre and wireless broadband." >

Utilising Vacuum excavation onsite in Canada as part of Platinum Hydrovac & HDD's operations.

"The High Speed Crow fibre equipment fleet includes a Vermeer RTX1250 ride-on tractor; Vermeer LM42 and SPX25 vibratory ploughs; a Vermeer V500 vacuum excavator; and Vermeer D24x40 S3, D20x22 S3 and D9x13 S3 HDDs."

In High Speed Crow's early years, the company only delivered wireless service. However, in 2015, King decided to expand the company's services as the demand for higher internet bandwidths grew, and wireless service would no longer be enough in more densely populated areas. After exploring his options for installing fibre in the area, King concluded it was in his customers' best interests to perform the work themselves.

The High Speed Crow fibre equipment fleet includes a Vermeer RTX1250 ride-on tractor; Vermeer LM42 and SPX25 vibratory ploughs; a Vermeer V500 vacuum excavator; and Vermeer D24x40 S3, D20x22 S3 and D9x13 S3 HDDs. The big vibratory plough is used to install the system's backbone, the small plough is used for short drop and the HDDs are used in more sensitive ground conditions, connecting businesses and homes. The vacuum excavator is also an essential part of the process to avoid existing buried infrastructure and support the drilling crew.

The bulk of fibre installation work for High Speed Crow happens during the summer months, which means crews need to be ready to roll each spring when the weather gets nice. On average, crews install 46,720 to 54,864 meters (150,000 to 180,000 ft) of fibre each year, one town at a time. The amount of work done varies because the soil conditions in the area can be a bit unpredictable. Most of the time, crews work in softer soils, but every now and again, there are some patches of hard rock.

The team at High Speed Crow moves forward every working season, trying to outdo what they accomplished the year before. King does not believe they will ever be done with expanding their fibre network in the metro Winnipeg region. "As demand for high-speed internet grows, so will our responsibilities to our customers." he said. >

A Vermeer drilling rig installing a fibre crossing beneath a river as part of High Speed Crows operations.

"We have been here delivering on our promise during today's uncertainties, and we will be there for them when life gets back to normal."

Working efficiently in the city

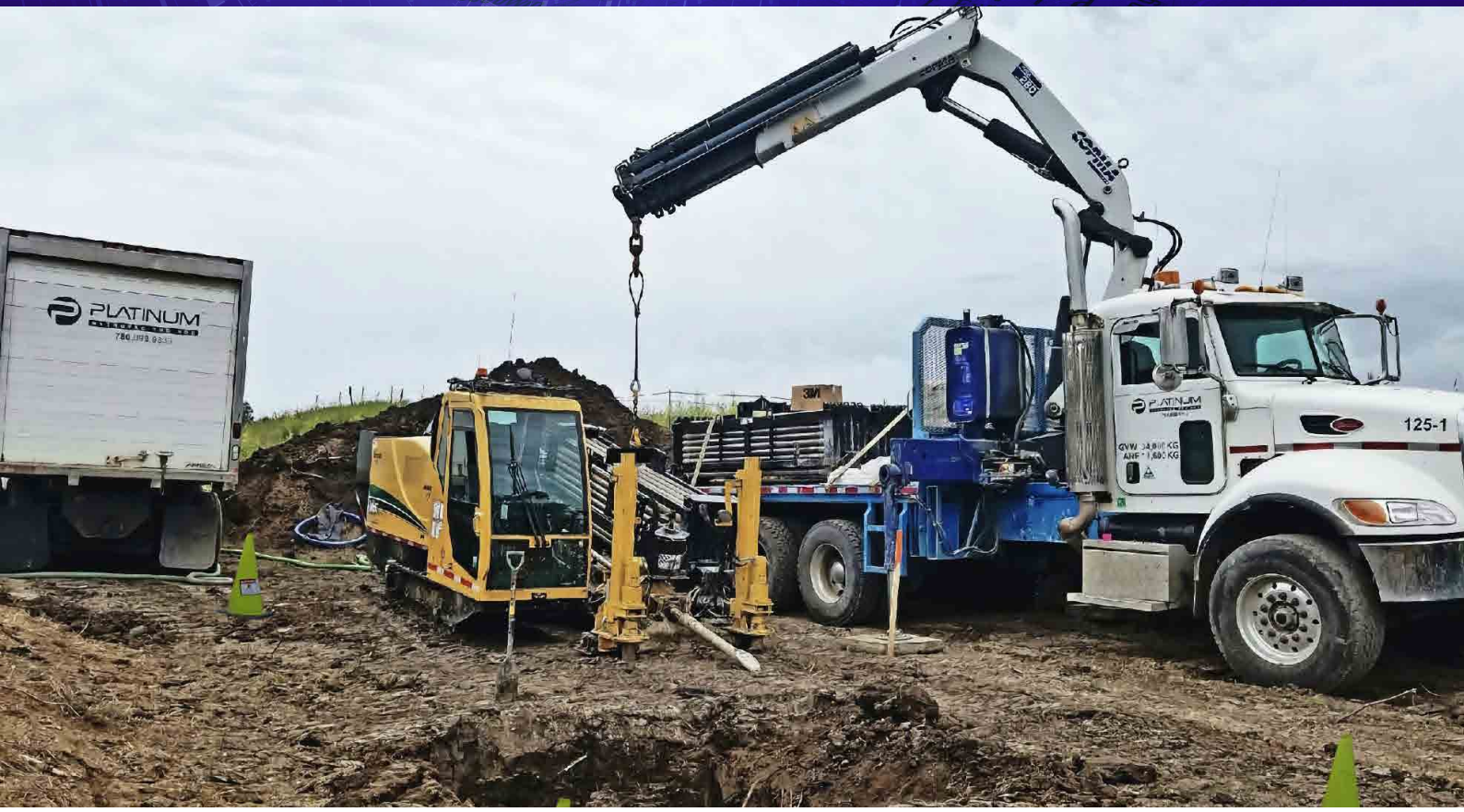
Platinum Hydrovac & HDD pushes its team hard every summer installing fibreoptic conduit across western Canada. According to Lorne Aasen, the directional drilling manager for the Nisku, Alberta-based company, supporting their shallow utility contractor's installation demands seem to grow every year. The company's most concentrated area of projects is in Edmonton, Alberta, with more than 20 crews that have been stationed around the city.

To get the most from its people, Platinum makes sure each crew has the right equipment to do the work as efficiently as possible. Aasen said that choosing a limited number of machine models and manufacturing brands so operators can change from one machine to another without having to adjust to different controls is an integral part of that. "We only operate Vermeer HDDs" he said. "This decision makes it easier to move people around as we need to. It also simplifies maintenance and helps reduce the volume of parts and consumables we need to stock."

Platinum's HDD fleet ranges in size from the Vermeer D6x6 to the D40x55 S3 HDD. For short drops, the crews primarily use D6x6 and D10x15 S3 HDDs because of their compact size and lightweight footprint. Aasen explained that these machines help minimise restoration, and that means crews can get more done during the limited working window every summer.

For mainline work throughout Edmonton, Platinum primarily uses Vermeer D20x22 S3 HDDs. Made up of soft clays, the ground conditions in the area are ideal, and these units have proven to be efficient at installing the hundreds of thousands of meters (ft) of conduit crews need to accomplish each year. The company's larger drills are primarily used to do natural gas work but are available on fibre jobs when ground conditions are a challenge.

"In Edmonton, we typically have around 15 crews dedicated to mainline work and another six to install conduit for doing home drops." Aasen explained. "The mainline >



Platinum Hydrovac & HDD setting up for a drilling run.

crews are usually installing triple 76 mm and 102 mm (3 in and 4 in) diameter conduit bundles. They shoot the pilot bore, ream the hole to a 305 mm or 406 mm (12 in or 16 in) diameter and then pull back. It is all pretty straight forward, and we have been doing it for so many years in the area, we have gotten pretty efficient at it."

Even though the area's environment has become quite familiar to the Platinum team, each crew follows a meticulous process to help reduce the risk of utility strikes. The standardised operating process works so well that Platinum's crews safely installed 107,000 meters (35,109.9 ft) without a contact.

Accomplishing it all

Whether working in rural areas or a busy metro, both contractors agreed that planning, trained crews and a dependable equipment dealer are crucial for maximising their productivity every working season. Both organisations work closely with the team at Vermeer Canada and say their efforts are important to staying on schedule. King said his team has had a wonderful working experience with Vermeer Canada over the years, and for Aasen, the dealership is responsible for the company's commitment to proactive preventative maintenance.

Platinum uses Vermeer telematics with each drill in its fleet. Aasen said he monitors the hours and service needs of every single drill from his computer. But more importantly, Vermeer Canada is getting that information too. So, when it is time for service to be performed or there is an issue with a drill, the service team at Vermeer Canada can schedule preventative maintenance or deploy a service technician to get a machine back up and running.

It is going to be another busy summer for HDD crews, and that is just the way King and Aasen like it.

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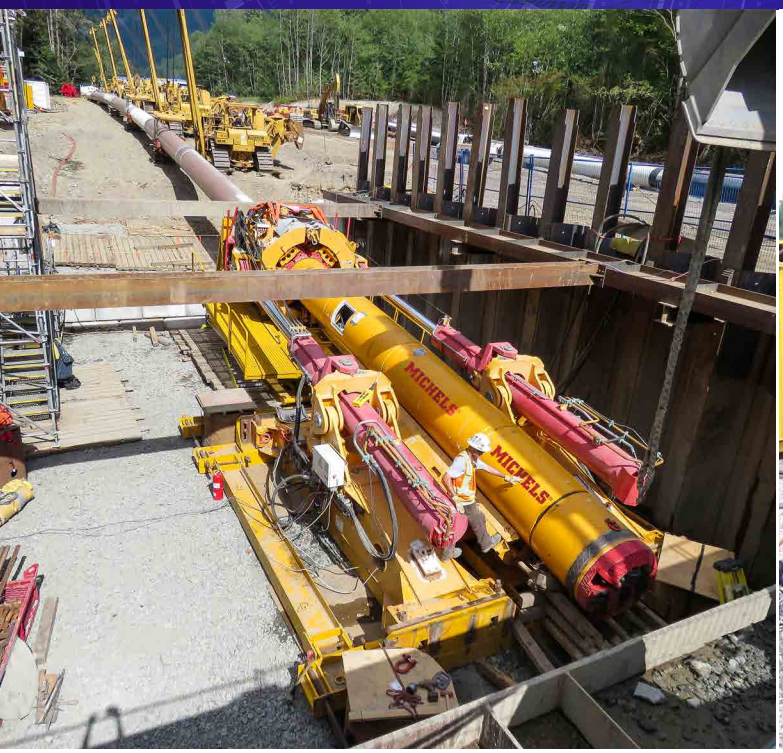
DIRECT STEERABLE PIPE THRUSTING IN MUNICIPAL MARKETS – WHAT WE NEED TO UNDERSTAND

Direct Steerable Pipe Thrusting (DSPT) is relatively new in North America, with approximately 165 completed installations worldwide since the first installation in 2007 (Herrenknecht). >



The microtunnelling machine (left) set up at the start of a DSPT operation with (right) the head of the microtunneller showing periphery bits used to create an overcut. Source: STC project files.

DSPT refers to a pipeline installation technique where a Microtunnelling machine is propelled by steel pipe strings by the use of a thruster to achieve curvilinear alignments, long drive lengths, avoid the use of deep shafts, and minimise the potential of hydrofracture, which is typically the driving design factor behind HDD designs. The method was marketed by Herrenknecht Corporation which introduced Direct Pipe® to the trenchless industry. Of the 165 installations completed to date, 58 have been completed in Canada, the United States and Mexico combined. The use of DSPT is now being considered on many municipal projects as an alternative to horizontal directional drilling (HDD) and microtunnelling.

The vast majority of projects in North America have been for the energy industry with only 4 of the 58 projects (just under 7%) constructed for municipalities. As such, data from the installation is often not shared or easy to obtain. As such, information on project challenges, solutions, and the advancement of the technology are not widely published due to the confidentially that is required by Energy Companies.

In addition, many contractors will not share the details of specific projects and challenges, as they try to maintain competitive advantage. As this method transitions into the municipal market, there is little understanding and some confusion in the industry regarding the capabilities of DSPT, what parameters influence the success of the method, and why one would specify DSPT over the use of either HDD or Microtunnelling. Understanding the differences between the three methods (HDD versus Microtunnelling versus DSPT) and the appropriate application for each is critical to ensure that the method is used appropriately and successfully on projects. There are a number of important technical topics that require further research and evaluation to develop a full understanding of the DSPT method such as:

- Inadvertent Returns and the reduction of hydrofracture potential. Inadvertent returns are well understood in the HDD industry, and the engineering guidelines available to assess the potential for inadvertent returns has been studied and used for over 20 years. However, the potential for inadvertent returns is not well understood with DSPT. The mechanisms that govern inadvertent return potential on HDD projects are very different than those that exist in DSPT applications. Understanding why inadvertent returns occur in HDD and do not occur in DSPT is a topic that must be understood to allow appropriate specification of the method. >

Lowering a microtunnelling machine into a deep pit for a river crossing; Right: A shallow launch portal for a DSPT application. Source: STC Project Files.

- Understanding properties for drilling mud (HDD), slurry (microtunnelling), and lubrication (both microtunnelling and DSPT), and how they impact each of these technologies differently.
- Development of thrust loads and how to estimate thrust loading for a DSPT installation. It is important to understand the frictional loading that develops during DSPT and how it is different than the pull loads that develop during HDD installation. it is equally important is to evaluate how jacking loads are developed on microtunnels and what differs between a standard microtunnelling jacking force evaluation and one for DSPT.

In the upcoming Summer edition of the NASTT magazine, Trenchless North America, Morty's Technical Academy will address the DSPT method and the current state of practice in North America. It will also address key features that should be evaluated when determining whether a project is well suited to DSPT, as opposed to HDD or microtunnelling. Inadvertent returns and thrust loading will also be addressed in detail as well as drilling fluid and lubrication properties.

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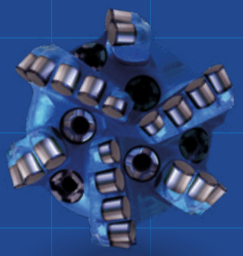

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MINIMISING GOLF COURSE DISRUPTION

Static pipe bursting continues to be a popular trenchless choice throughout the United States and Canada. The method has become a mainstay for trenchless contractors and municipalities alike. The method's versatility when it comes to utilising a variety of product pipes along with its ability to upsize existing lines has made it a preferred trenchless method. On a recent project in South Carolina, USA, static pipe bursting proved to be the right choice in a difficult setting. >

For the golf course project in South Carolina, Roper Brothers used a 2500G static pipe bursting system from TT Technologies.

Tight working conditions, along with the golf course irrigation pond making staging equipment a top priority.

The project consisted of replacing 1,700 ft (518 m) of 24 in (610 mm) diameter reinforced concrete gravity sewer main at the Smithfield Country Club golf course, Easley, South Carolina. The main had capacity and ground water infiltration issues. Utility contractor Roper Brothers, Fountain Inn, of South Carolina was awarded the project to replace the existing main. While the project was initially bid as open cut, the contractor reached out to trenchless equipment manufacturer TT Technologies, of Aurora, Illinois, USA (a wholly-owned subsidiary of Tracto-Technik, of Lennestadt, Germany) to check the feasibility of pipe bursting the 24 in diameter Reinforced Concrete Pipe (RCP) to 30 in (760 mm) diameter High Density Polyethylene pipe (HDPE).

TT Technologies Pipe Bursting Specialist Brian Hunter said: "With limited access and extremely wet conditions due to the main's proximity to a golf course irrigation pond dam, open cut was not a very attractive solution. So, we worked with Roper Brothers on the possibility of an upsize from 24 in pipe to 30 in pipe through static pipe bursting. We had several discussions about the length of the pulls, pipe material, and ground conditions. We determined that a large static pipe bursting machine would have the power to upsize the existing pipe. The project owner Easley Combined Utilities (ECU) of Easley, South Carolina, had finally reached a point where they could no longer hold off on upsizing this line. But, they had experience with successful, smaller diameter pipe bursting projects in the past and agreed to the change in specification."

After considering the potential length of the pipe bursting runs, the pipe materials involved, ground conditions, etc., it was established that a Grundoburst 2500G static pipe bursting system from TT Technologies would have the power to cut and expand the RCP and to pull in the 30 in diameter HDPE.

Bursting Above the Cut

The static pipe bursting method has seen continual growth and acceptance in the North America market over the last several decades. Hunter attributes that growth to several key capabilities that it has, along with another pipe bursting methods. He said: "Pneumatic pipe bursting really paved the way for pipe bursting in the US and Canada. High production tools for replacing miles and miles of infrastructure were key. When static pipe bursting was introduced, it changed things. Here was a method that was extremely capable in terms of the pipe it could be used on. Pneumatic was limited to >

The 1,700 ft (518 m) project was divided into three runs and included manhole replacement and tie-ins.

fracturable pipe, but static is not. Cutting heads and blades allowed it to be used on difficult host materials like ductile iron and even steel in certain cases. In addition to that, static pipe bursting opened the door to using a large variety of new product pipe as well. Contractors were now able to meet pipe specifications that included pipes beyond just fusible. They could utilise sectional or segmented pipe, both restrained and non-restrained joint pipe. For this project however, HDPE was specified and was a good choice considering the conditions."

Upsizing the original pipe diameter was a major consideration for the project. Some extremely large upsizes in the 120 to125% range or 4 to 5 nominal sizes have been successfully completed through bursting. The 25 to 50% upsize is much more common, but is still challenging. This project fell in the 2 to 3 nominal size range.

Hunter said: "Each job has unique characteristics and situations that have to be taken into consideration before a burst is attempted. This particular project falls in the 25% to 50% upsize. However, the jobsite conditions and the potential difficulty with bursting the existing reinforced concrete pipe, made this project more difficult than a project with optimum conditions. The existing pipe diameter was significant to start and the pipe materials of concrete with wire reinforcement posed a challenge."

Water and Other Hazards

The gravity sewer was in a very wet area adjacent to the golf course irrigation pond with a large section actually running through the pond dam area. The tight working conditions, along with the pond made staging equipment a top priority. The contractor also faced access issues that made delivering and staging equipment even more difficult. Access was limited to one road in and out, approximately 30 ft (9 m) in width, that the golf course used for maintenance access. Equipment and material deliveries >

The bursting head configuration and pipe string is moved into position for a section of pipe bursting.

had to be strategically planned in order to make sure no vehicle or machinery blocked the way or inhibited travel.

Hunter said: "Staging and pre-planning were crucial to the success of the project. It was important to have all necessary equipment and material placed in position prior to excavating the pits, since there was no other way to get to the other side once the pits were excavated. Golf course maintenance operations were halted for a time during the project."

Additionally, the pond level was lowered approximately 3½ ft (1 m) in elevation to help minimise ground water infiltration. Noise level was also a concern, along with interference and disturbance of golfers and area residents. Noise reduction was accomplished by implementing by-pass pumps with noise reduction capabilities. Selecting the static pipe bursting method over pneumatic further reduced level of noise.

Long Par Three

The 1,700 ft (518 m) project was divided into three different pipe bursting pulls of 535 ft (163 m), 537 ft (164 m) and 287 ft (87.5 m), along with a few small areas of open cut. Once the crew established launch and exit pits, the HDPE product pipe was fused and staged ahead of time.

After the existing pipe was rodded with the bursting rods the specially designed busting head, splitter and expanding was connected, along with the pipe string. The bursting head configuration and pipe string were then moved into position for the first bursting run. The process was repeated for each pull. Bursting runs were started and completed in the same day. During the course of the project, the static bursting machine never used more than 60% of its potential pulling power. The project lasted for a period of three weeks and further included tie-ins, manhole replacement, and power line realignment.

The 19th Hole

Roper Brothers was able to overcome the difficult working conditions at the golf course including lowering the pond level to minimise ground water, tight access, noise level of equipment in a country club and residential environment, bursting RCP with wire reinforcement and upsizing the original line.

Hunter said: "Pipe bursting as an alternative to open cut for this project really made a big difference in terms of the time it took replace the old pipe, the amount of disturbance to the golf course and neighbourhood, and cost to the owner. Roper Brothers has a vast amount of experience dealing with tricky and niche type projects and were able to bring that experience to the project and provide an extremely effective solution."

THE POWER TO DRILL THE DISTANCE

The family of Ditch Witch HDDs owned by Jerry's Trenching Service.

On its own, a horizontal directional drill (HDD) shot spanning more than 1,500 ft (457 m – the length of the average Par 5 golf hole), while long, can be relatively straightforward. That is until volcanic and clay ground conditions are added in, a tight deadline is required and on an environmentally protected jobsite.

This was the mission Jerry's Trenching Service was tasked with in Clear Lake, California, USA. The underground construction company, with a history dating back to 1964, was called to the site to move an existing AT&T intercontinental fibre line in order for a bridge expansion to take place.

"When my father founded Jerry's Trenching, he focused on efficient and creative solutions to problems." said Jerry Berlin Jr, CEO of Jerry's Trenching Service. "When I think about jobs that test those values, the Clear Lake job is the right at the top of the list. We encountered a variety of issues and we needed to trust our technology and our crew."

A Long List of Challenges Requires the Right Equipment

When the crew, led by Jose J. Sandoval, arrived on-site in Clear Lake, they quickly realised the challenges they were facing for the job.

To start, they would be drilling under an environmental reserve, eliminating the possibility of excavation or potholing to provide visibility or relief. The good news was that there were not any existing lines in the area outside of the original line that the crew was splicing over to, and they were allowed to trench in the last 15 ft (4.5 m) of the job to make sure the tedious splicing process was safe. That said, the reserve also happened to be full of poison oak, forcing the crew to wear personal protective equipment from head-to-toe to protect themselves.

The ground conditions added further difficulty. While HDD jobs of this length are commonly through dirt (soil), this job was through hard volcanic rock, with scattered pockets of clay along the route. The rock would test the horsepower limitations of any machine, but the clay pockets complicated matters further. >

The family of Ditch Witch HDDs owned by Jerry's Trenching Service.

Each time the crew found clay, they needed to completely pull out of their established hole, clean the hole and then mix new drilling mud to drill through the new conditions. Then they would need to retool and repeat for the hard rock once they returned to those ground conditions.

Lastly, the clock was ticking. The team had an extremely tight deadline they needed to meet in order to accommodate scheduled downtime for the existing intercontinental fibre line, which was responsible for transferring vital information to companies throughout the United States. The downtime had been planned months earlier and missing the mark would be extremely costly financially and operationally to the businesses that depended on that fibre line.

"The jobsite was a challenge." Berlin said. "We knew it was a long drill shot going in, but as we got to work and found out about the other factors, we knew it would be difficult. Once we fully realised the challenges of the conditions, we got on the phone with Ditch Witch."

Counting Down to an All-Terrain Solution

Jerry's Trenching Service turned to the Ditch Witch AT40 Directional Drill for the project. Designed for increased control and productivity when drilling in hard rock conditions, All Terrain technology would limit the impact of the ground conditions on the job.

"We have always used AT30s, but we really wanted the AT40 for this job because the larger 15 ft (4.5 m) bore rods would help us on the longer shots." Berlin said. "Also, the AT40 has an inner pipe that we could get air through, so we could run an air hammer with it. We knew the AT40 would help us out. It got to the point where we were counting days and shipping hours until the AT40 would arrive." >

The Ditch AT40 All Terrain HDD on site.

The arrival of the AT40 and its All-Terrain technology opened up the opportunity to use much less drilling fluid than is needed with typical mud motors. The compact size of the AT40 also minimised the overall footprint of the job, an important benefit due to the environmentally sensitive nature of the jobsite.

With the use of All Terrain technology and the crew's expertise, they hit their mark in just over three weeks. The 1,540 ft (470 m) bore was a new record for Jerry's Trenching Service, beating out the previous mark by over 300 ft (91 m), a mark that had been set two decades ago in dirt, not volcanic rock.

Jerry's Trenching Service Hits the Road

The knowledge and experience that comes with using All Terrain technology on complicated rock drilling jobs is now an asset for Jerry's Trenching Service. Furthermore, since many cities do not have an abundance of rock jobsites, Jerry's team decided to take their skills on the road by forming a travelling rock drilling team to support jobs across the region.

"We have always had All Terrain technology on site for when we were faced with rock, but now we have seen how it can help on difficult, unpredictable rock drilling jobs." Berlin said. "We also now have an experienced, energetic crew that wants to travel. Now we can find and conquer any rock drilling job."

www.ditchwitch.com

FLEXBOR ACQUIRES NEW INTERNATIONAL PATENT

A Barbco FlexBor cutting assembly recently patented in Mexico.

Barbco, Inc. of East Canton, Ohio, USA was recently granted Patent No. 387289 in Mexico for the Cutting Assembly for a Boring Device. This is a proud moment in this manufacturer's storied 32-year history of driving the trenchless technology, horizontal boring, and underground manufacturing industries forward with world class capital equipment and cutting-edge technology. The FlexBor is an extremely cost-effective, environmentally safe trenchless method and tooling. The FlexBor is designed to virtually eliminate 'frac-outs' and 'inadvertent returns' that are often associated with horizontal directional drilling and the use of bentonite as a slip agent lubricant.

The Patent Abstract reads: "An apparatus and method for drilling an underground bore-hole where pressurised air may be used to discharge cuttings produced by a cutting assembly. The cutting assembly includes a shaft having a first and second ends and a bore extending between the ends. First and second cutting heads are provided on the shaft a distance apart. The second cutting head is rearward of the first cutting head and is of a greater diameter. Each cutting head defines an air passage there-through that is in fluid communication with the shaft's bore. A housing extends rearwardly from the second cutting head and connects to a length of casing. An annular flange, concentric with the housing, seals the borehole as the cutting assembly rotates and moves forward through the ground. Cuttings generated by the assembly are moved therethrough and discharged from the casing by pressurised air provided to the assembly through the shaft's bore."

The FlexBor set up to start a bore.

NASTT WELCOMES FIRST REGIONAL CHAPTER IN MEXICO

Introductory Trenchlesss Seminar and Networking Reception Coming November 30 and the International No-Dig Show Coming in 2023 to Mexico City!

August 3, 2021, was a significant day for North American Society for Trenchless Technology (NASTT) as the 12th and latest Regional Chapter was formed, covering the 32 states of Mexico. Matthew Izzard, NASTT Executive Director and Alan Goodman, Chair of the Board of Directors, met with founding members Sergio Alvarado (Underground Construction Equipment Mexico), Chapter President; Adrian Cordero (Tubepol), Chapter VicePresident; Itzel Mora (Tubemas), Secretary; and Caesar Alvarado (Hammerhead), Executive Officer for the inaugural meeting of the NASTT Mexico Regional Chapter – MEXTT. The addition of this Chapter offers complete coverage of the North American continent for NASTT with Mexico joining the three Canadian and eight United States Chapters in the Society. >

Welcoming the NASTT Mexico Chapter the NASTT family.

The NASTT Board, under Immediate Past Chair, Craig Vandaelle, formed an initiative group to create the Mexico Chapter, with Board Members Tiffanie Mendez and Alan Ambler central to its development and working with Itzel Mora to engage volunteers in the creation of the new chapter. This culminated in the inaugural meeting and formation of the Regional Chapter Board to provide local engagement to the members in developing trenchless technology knowledge and education.

MEXTT President, Sergio Alvarado commented: "I am very grateful for the opportunity to be one of the founding members and to be elected president of MEXTT, as well as recognising my colleagues Itzel Mora, Adrian Cordero, Eduardo Ortegon and Cesar Alvarado who are part of this executive board. We are very excited about the future growth of our association, and we will be preparing our work plan in the short, medium and long term to publicise the benefits that we can bring to our members through the different existing trenchless technologies for the benefit of the projects of infrastructure generated in Mexico."

NASTT Chair, Alan Goodman added: "NASTT has been blessed to work with five incredible people that are passionate about bringing trenchless technology to every corner of Mexico. On the historic day of 3 August, 2021, the Mexico Chapter was formed and inaugurated into NASTT. Whether it be new installation or rehabilitation the Mexico Chapter wants to educate all sectors (municipalities, state agencies, utilities, contractors, and engineering firms) in all industries including water, sewer, gas, power, fibre and telecommunications. Watch this Mexico Chapter grow, and we cannot wait to learn more about the future conferences and Good Practices Courses offered in Spanish."

Development plans include the delivery of NASTT's Introduction to Trenchless Technology Good Practices Courses, translated to Spanish with the assistance of grant funding from International Society for Trenchless Technology (ISTT). Work is also starting on a website and a new membership magazine entitled NASTT Mexico!.

The ISTT International No-Dig Show will be held in Mexico City in 2023 and as part of the efforts to promote the event and introduce more municipalities, utilities, engineers and construction organisations to the methods of trenchless technology, an Introduction to Trenchless Technology one-day seminar and an evening networking reception are in the works for November 30, 2022. Mark your calendars for this event where you can hear from experts in the industry offering an overview of techniques and equipment utilised in the industry and meet with colleagues to share ideas. Stay tuned for more details on this exciting in-person event in Mexico!

APRIL 30-MAY 4 | PORTLAND, OR

NO-DIG SHOW 2023

GREEN ABOVE. GREEN BELOW.

Save the Date

NASTT 2023 NO-DIG SHOW | APRIL 30-MAY 4 | PORTLAND, OR

Educational & Networking Opportunities Await

The No-Dig Show is the trenchless industry's flagship educational and networking event. Each year No-Dig attendees are privileged to the best industry-related content and access to the leading companies and individuals in trenchless technology.

- **Technical papers & presentations**
- **Large exhibition hall**
- **Specialized trenchless training courses**
- **Engaging networking programs & events**
- **Prestigious industry related awards**

Visit **nodigshow.com** to learn more

NETWORKING EVENTS | EXHIBIT HALL | TECHNICAL SESSIONS

The No-Dig Show is owned by the North American Society for Trenchless Technology (NASTT), a not-for-profit educational and technical society established in 1990 to promote trenchless technology for the public benefit. For more information about NASTT, visit our website at nastt.org.

DO YOU KNOW THE WAY TO SANTA FE?

Westrade Group and North American Society for Trenchless Technology (NASTT) are excited to announce the launch of the Trenchless Technology International Seminar in Santa Fe, Mexico on the 30 November 2022.

A rapidly increasing number of trenchless projects are completed across Mexico every day with the government recently announcing ambitious infrastructure development plan which is expected to result in around USD 44 billion of spending. This showcase event, supported by the International Society for Trenchless Technology (ISTT), will provide the local and international audience with updates on the latest developments in local markets as well as the rapid advances in trenchless techniques, underground infrastructure and pipeline technologies.

The comprehensive and interactive programme includes a two-track seminar programme covering New Build Construction and Rehabilitation. This will be supported by an unmissable conference programme combining technical updates and case studies designed to share best practice from around the world.

Commenting on the launch of the seminar Westrade's Managing Director, Paul Harwood, said: "We're excited to have the opportunity to make Mexico and Santa Fe the trenchless capital of the world for a day this October. In addition to its own rapidly growing market, Mexico is the gateway from the north to the south of the continent and as a result will pull a highly diverse and engaged audience from across the Americas. Delegates can expect to hear from global pioneers of trenchless technology sharing their experiences of new build construction and rehabilitation projects."

The Trenchless Technology International Seminar proceeds the ISTT's highly anticipated 39th International No-Dig Conference and Exhibition which takes place at the Expo in Santa Fe between the 17 and 19 October 2023.

A diverse and exciting portfolio of exhibition and sponsorship packages are now available through the Westrade team. For more information, please contact pharwood@westrade.co.uk.

BACK IN THE SWING OF THINGS AT THE NASTT 2022 NO-DIG SHOW!

NASTT University Student Chapter Members attend the No-Dig Show and volunteer throughout the event while also having the opportunity to attend technical sessions, walk the exhibit hall and network and engage with attendees and future employers!

The Trenchless Industry Shows No Signs of Slowing Down

The world's largest trenchless technology conference headed to Minneapolis, Minnesota, USA this past April looking to continue the momentum built during the 2021 conference return after the 2020 shutdown. The NASTT 2022 No-Dig Show was a triumphant return to business-as-nearly usual, demonstrating the resilience, resourcefulness and innovative nature of the trenchless industry, and the people who pursue it with a passion.

As a premier educational opportunity for forward-looking underground infrastructure professionals, the NASTT No-Dig Show can be counted on to provide countless environmentally-friendly trenchless solutions and cost-saving opportunities that municipalities and utilities can utilise within their communities. With six tracks of peer-reviewed, non-commercial presentations, nearly 200 informative trade exhibits and multiple networking opportunities, the NASTT 2022 No-Dig Show again fulfilled its promise as one of the must-attend underground construction conferences for anyone involved in this industry.

The NASTT No-Dig Show demonstrated that trenchless technology offers both innovative rehabilitation and technically advanced replacement options for communities and utilities looking for cost effective, non-disruptive and greener infrastructure solutions.

As preparations begin for the 2023 No-Dig Show in Portland, Oregon between 30 April and 4 May, NASTT looks forward to continuing steady growth in use of trenchless technology and being in place as the go-to resource for knowledge, networking, education, and training in trenchless technology all across North America.

REPAIRING SEA-ERODED DRAINAGE PIPELINES ON A GAS RIG

The Gas rig in the southern North Sea.

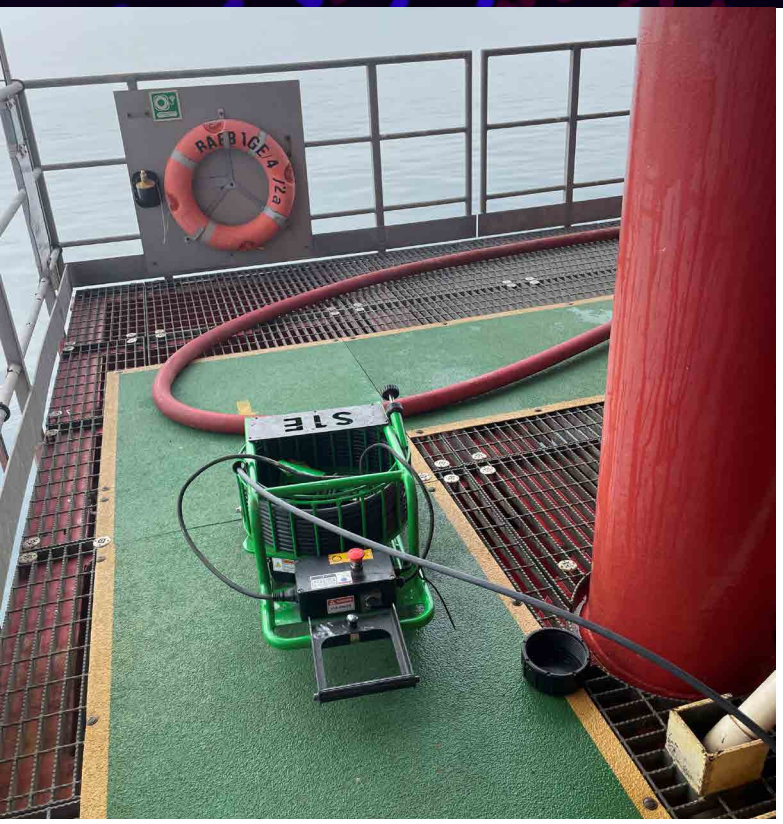
OnSite, a South Staffordshire Plc business, was recently tasked with repairing the drainage system on an unmanned offshore gas rig in the Southern North Sea some 80 km east of Easington, which lies on the coast some 30 km southeast of Kingston-upon-Hull, UK.

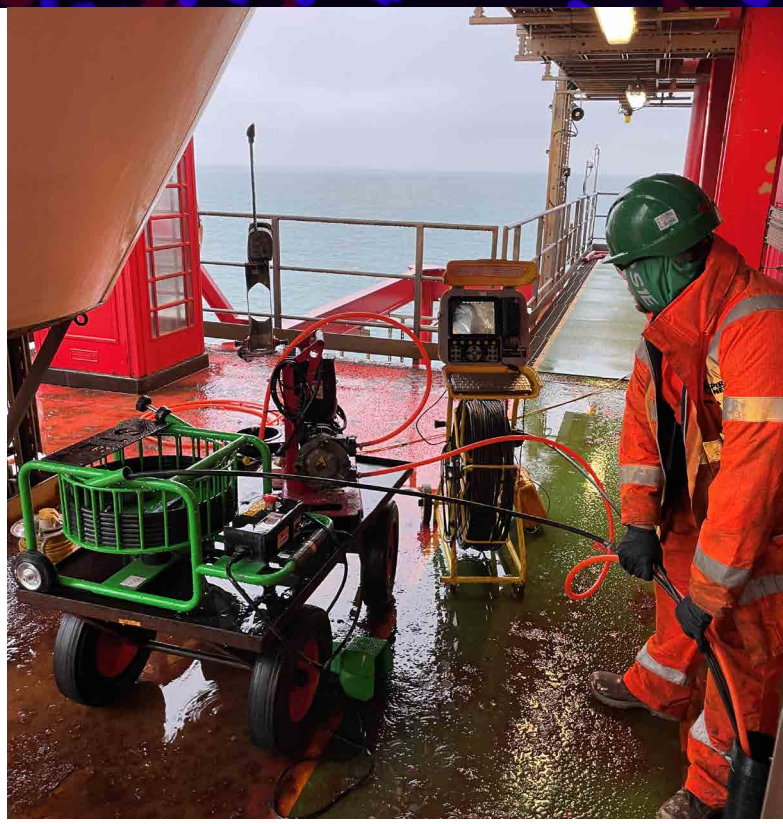
The drainage system on the rig comprises sections of carbon steel piping that required repair after suffering internal corrosion due to being in service for 12 years. The pipes had been initially installed with a non-corrosion resistant alloy with an original design life being only 2 years.

Internal corrosion and large loose scale deposits had caused frequent snagging and blockages. A full clean and removal along the length of carbon piping with replacement was required. Due to the location and nature of the system, the Picote Brush Coating™ system was deemed to be the ideal solution for both appropriate repair and to future proof the drainage system as it required less equipment and no lateral cutting of the pipework.

GETTING ON BOARD!

Whatever the job requirements, OnSite always ensures its teams are trained in all safety aspects to the highest standards. Before even stepping foot on the gas rig, the rehabilitation crew undertook the appropriate safety training. >





Left: Setting up cleaning equipment for the preliminary pipeline works.

Right: A Picote Brush Coating operation underway.

The 5 days of survival training included:

- BOSIET, which involved the team being in a helicopter shell lowered into a swimming pool and exiting while fully submerged.
- DONUT, training in quick exit from the gas rig into a survival raft.
- MIST, survival at sea training.

Once the crew was fully trained in the survival aspects of the work, the rehabilitation equipment was packed and sent via boat to the rig, followed by the team a week later via helicopter from Norwich airport.

RESOLUTION

The project commenced with the crew cleaning the pipes to be rehabilitated using high-speed cleaning with a Picote Miller, rotary chain and brush tools, taking care to disconnect the pipework to a macerator on the line prior to descaling to prevent any possible damage of the waste handling system.

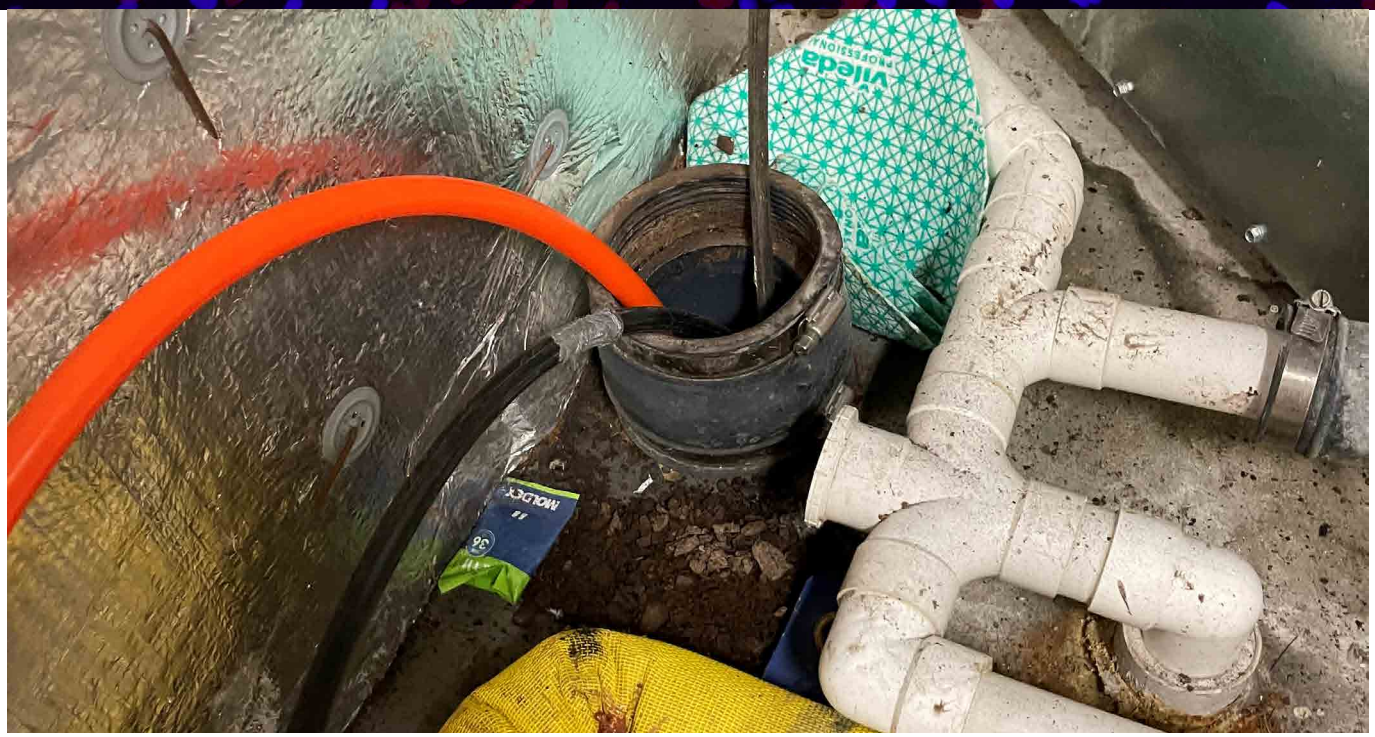
Outside connections comprised uPVC piping which required further care to clean as they were hard to reach transition and mastic joints, which had to remain intact.

The Picote Brush Coating™ system offered minimal disruption to the rig's operation, which also avoided costly full replacement of the pipes in question.

The equipment required by the OnSite crew comprised a Picote Mini Miller, a Picote Super Midi Miller, a Picote Maxi Coating Pump and DC1000E Picote epoxy resin. The coating of pipes had to be completed without the need to reopen lateral connections, over multiple lengths of DN100 pipe with multiple incoming connections, which were up to 10 m in length.

OnSite is a leading certified Picote Brush Coating™ business in the UK and on land or sea offers an expertise in the remedial use of this system.

The coating, once cured, provides a damp proof, corrosion resistant, wear resistant and non-corrosive lining, which is what made it the perfect solution for the sea water eroded pipelines on the rig. >



Access to the pipelines to be repaired was not always easy.

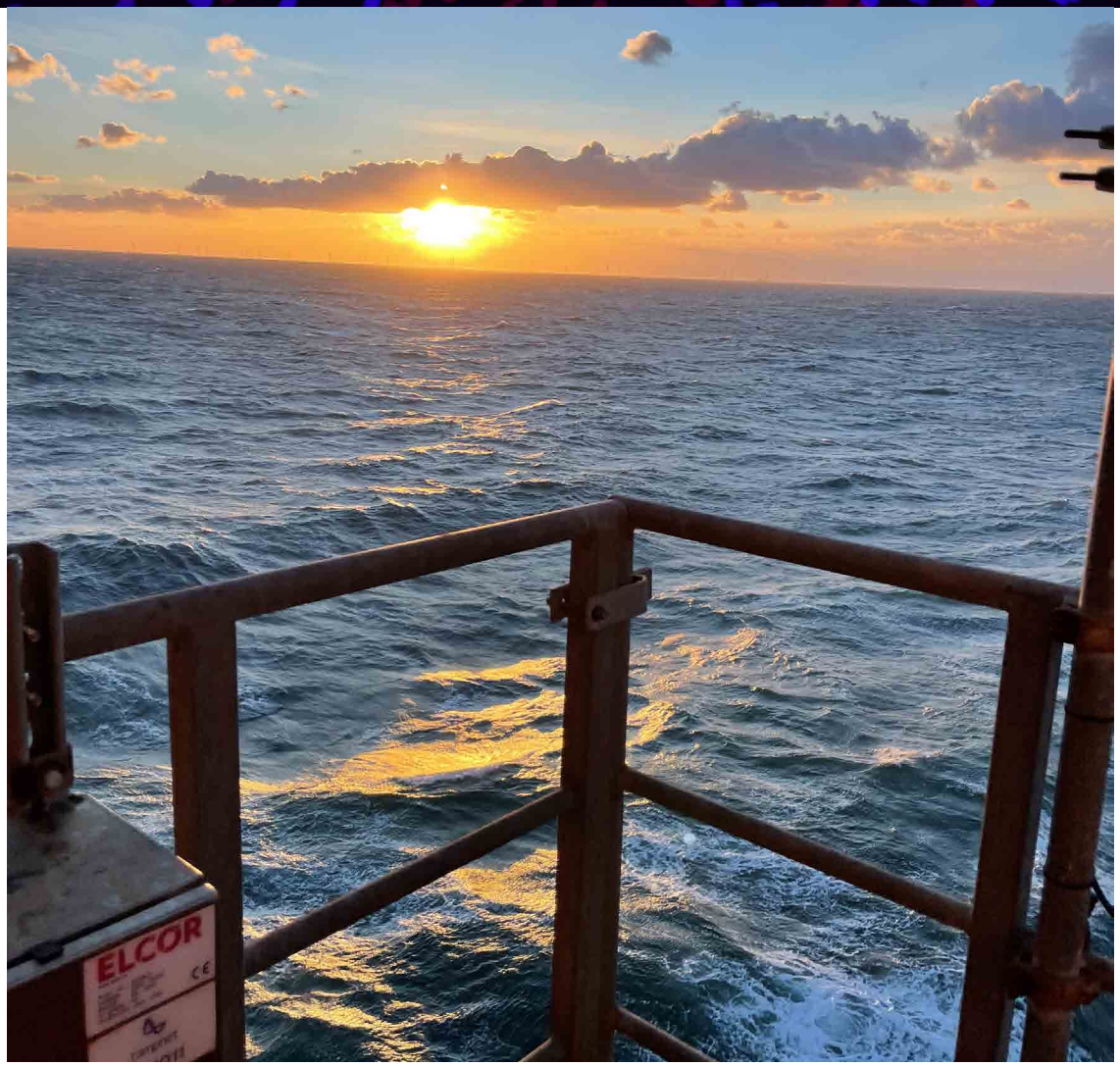
Brush Coating to provide the final lining product.

OnSite's team worked solidly for 8 days aboard the rig to complete the job. The feedback from the client on completion of the work was excellent.

PICOTE BRUSH COATING™ SYSTEM

Picote Brush Coating™ System, for this project provided by UK-based Picote reseller S1E, utilises a Picote Milling machine, of a size suitable for the pipe under rehabilitation, and a Picote-designed resin injection unit to coat the inside of the deteriorated pipe with a dual-colour 100% solids epoxy two-part resin (DC1000E). The resin is supplied in pre-batched cartridges for ease of use. Brushes attached to the end of the Milling Machine cable spread the resin coating evenly and effectively over the inner pipe surface once it is injected into the host pipe. It is then allowed to cure under ambient conditions. Depending on the state of the host pipe and the degree of repair required, two or more layers of the resin coating can be applied to complete a full rehabilitation.

In terms of the rig rehabilitation work, the initial process for the operation used the Picote Mini Miller to completely clean the internal surface of the pipes requiring rehabilitation. The Picote Super Midi Miller, the Picote Maxi Coating Pump and the DC1000E Picote epoxy resin were then set up to mix and pump in the resin into the sections of pipe being repaired. The Brush system at the 'business end' of the Miller cable then picks up the resin in the pipe, spreads it around the inner surface of the pipe. The thickness of the coating applied is controlled by the amount of resin pumped in and the speed of the brush rotation and the rate at which the brush is drawn through the pipe. The operation is monitored by the operator using CCTV so that the coating can be applied evenly around the pipe circumference. If the coating is too thin, the machine can be reversed over the site, more resin pumped in and smoothed into place. If the coat is too thick the resin pump can be stopped and the resin that is already in place brushed over to achieve the correct thickness. In this instance, The average cure time for the Gas rig >



The North Sea on a calm day during the project.

operation was approximately 3 hours, a time which was assisted and reduced by the use of a 'Smart Heater'.

Commenting on the project for OnSite Neale Sims, project lead said: "We at OnSite are very proud of our team and immensely grateful to our client to have been given the opportunity to deliver our specialist lining services in a very demanding but highly interesting environment. We continue to develop and offer new innovations and smarter methods of delivering drainage maintenance services for our customers and see their problems as our challenge."

Terry Ingleby of S1E went on to say: "It was a pleasure to have the opportunity to be able support OnSite on another unique Brush Coating project, which was away from the day-to-day land drainage sector. Over the years, OnSite has taken on some fascinating projects for the Picote Coating System, investment in all the required equipment and having its team fully trained and certified in the process of this system really supports the company in taking on these projects."

For Picote, Dawn Greig said: "OnSite has once again demonstrated the versatility of the Picote Brush Coating™ System. Our Technical Team was delighted to work with them to plan for these ground-breaking works, and we are delighted by the outcome. Preparation is key to all rehabilitation projects, Picote high-speed cleaning was essential for success, as well as a fully-trained and knowledgeable team. We look forward to working with OnSite and S1E Ltd on future challenges."

AFTER THE STORM: WHAT THE FLOODS HAVE TAUGHT US

Storm water flooding seriously affected cities across Australia.

There is no such thing as a one-size-fits-all solution to the flooding crisis experienced yet again in Australia. But there is a common approach that can help mitigate risk and prepare for the future.

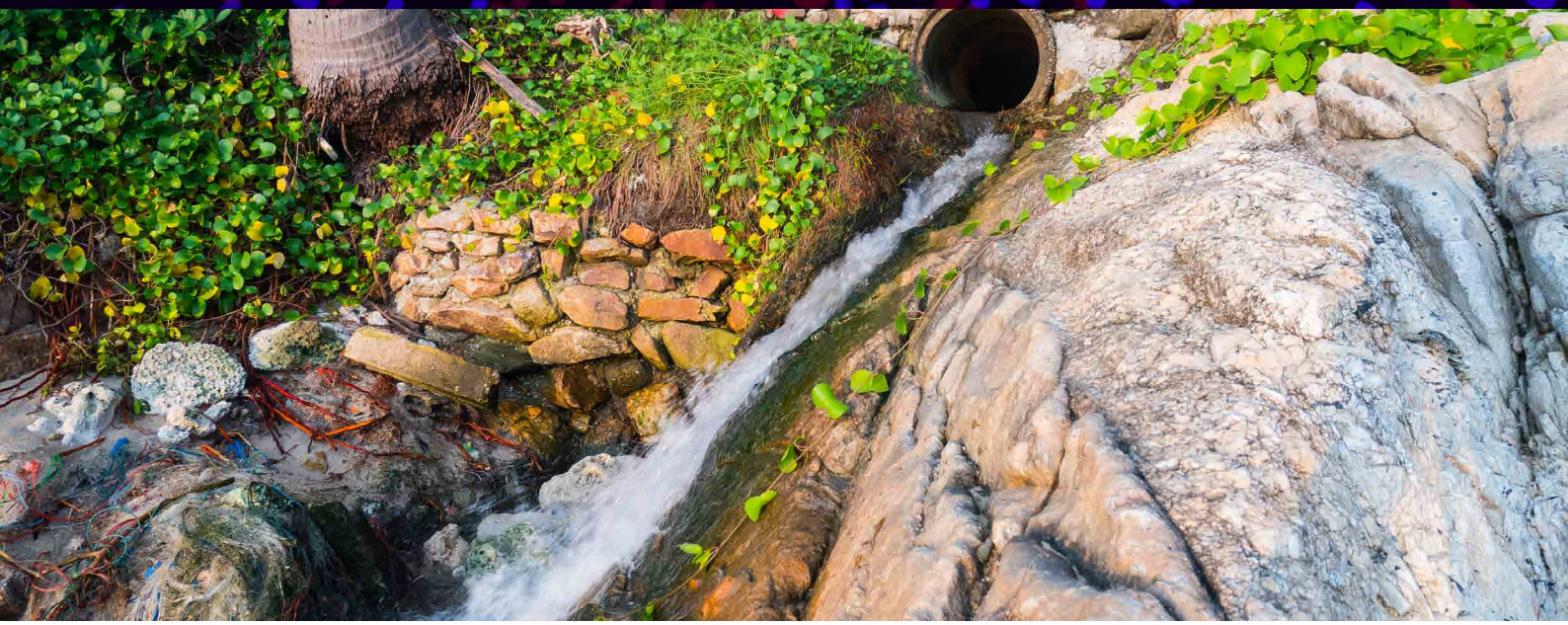
The feedback from water managers around recent flood events has been characterised by shock and awe. Furthermore, it has been about how can stormwater infrastructure ever cope with the levels of water that submerged parts of towns and cities such as Byron Bay and Lismore, Brisbane and Sydney experienced.

Of course, there is no single solution for issues resulting from extreme weather events like those experienced recently.

Not only are we trying to control unprecedented volumes of water, solutions also depend heavily on local conditions and challenges.

“It is a mistake to walk into a council area and assume they all have the same problems and they all should be taking the same approach.” said John Weaver, Contracts Manager at leading pipeline infrastructure company, Interflow. “It depends on the age of the area, on population growth, ground type and much more.”

“Newcastle, for example, is an old city that has had stormwater problems amplified by earthquakes. That is very different to a newer area like Camden, or a town like Dubbo where they have problems underneath the highways because of subsidence. Then there are other towns where many stormwater problems are caused by silt building up in the pipes.” >



Managing stormwater flows is concern for the future given weather predictions.

So, do we assume there is no solution? “Absolutely not.” Weaver said.

The secret to success is one that can be shared between water managers everywhere. It means using recent events to create greater awareness around our stormwater infrastructure and the condition of underground assets. Furthermore, it involves the utilisation of modelling to plan future developments of water infrastructure and residential and commercial buildings.

Stormwater management into the future

“Look to New Zealand for an excellent example of preparation for the effects of climate change on water infrastructure.” Weaver said. “Asset owners and town planners are focussing management strategies on flood events increasing and rising sea levels.”

“They are doing a lot of modelling, making sure that if there are future land developments or growth corridors, they fit into what is predicted to happen with water in the future.” he said.

“In Australia, our focus has been on water security, on getting ready for the next drought. It is correct to focus on water security.” Weaver said. “But at the same time, increasingly regular and extreme rainfall events also deserve attention, as the recent floods proved. Directions filter down from the Commonwealth to the states and on to asset owners around water security. These are typically mandated and, and they provide an excellent model for us to follow to successfully manage increasingly challenging stormwater issues.”

Practical solutions for current infrastructure

Outside of emptying dams and preparing communities, there is little that can be done in the way of an emergency response to such dramatic flood events.

The focus should instead be on developing greater awareness around the current state of existing infrastructure and putting in place a management plan that extends its useful life and improves its performance.

“There are two sides to innovative and successful asset management.” Weaver said. “One is around building new assets and the other is around what to do with existing assets. For example, a major authority that we work with is about to embark on a huge renewal program. We are working with them and a few other contractors to come up with options to renew their assets without increasing the chances of flooding. That works very well, taking an asset owner’s good ideas and running them through a review programme that includes advice from highly experienced >

contractors. This ensures the solutions are as good as they can be. The most powerful insight a water manager can have is into the real-time, current condition of their infrastructure."

Gradually, all stormwater assets are deteriorating. If a water manager constantly monitors those assets they will know exactly when they require maintenance. They will enjoy certainty around the order projects should be carried out and can engage with specialist contractors to plan and design solutions that extend the assets' lives whilst improving their performance.

"The focus should instead be on developing greater awareness around the current state of existing infrastructure and putting in place a management plan that extends its useful life and improves its performance."

Such insight means asset owners will know when a swift response is required to ensure public safety as experienced in the work contracted to Interflow by Ipswich City Council to restore a failing section of pipeline running beneath a popular and busy outdoor recreational space.

It also means custom solutions can be designed and developed well in advance of them becoming catastrophic, such as the bespoke renewal of the stormwater drainage culvert running beneath the bustling Brisbane Corso. Interflow's unique structural relining of the culvert, which was exposed to the Brisbane River's rising tides, meant costly cofferdam construction could be avoided whilst all structural requirements were met.

Additionally, more was delivered for less when a 50-year extension of life for a vital culvert running beneath a busy Sunshine Coast Council street was achieved. Without any traffic, telecommunications, electrical or water disruptions, the unique solution involving the installation of a glass-reinforced liner eliminated all need for excavation, enabling a 25% cost reduction.

Planning for an ageing infrastructure

Prior to the major flood events of the last several years, many Australian councils were already facing the realities of water infrastructure assets, built prior to 1970, beginning to reach the end of their life cycle.

An Infrastructure Australia report identified ageing infrastructure as a critical issue across Australia. External pressures, the report highlighted, included a growing population, a rise in single-person occupied dwellings and increasingly frequent extreme weather events.

Water managers are facing an infrastructure cliff whilst simultaneously experiencing a dramatic rise in community expectations, driven by flood and associated weather events. A proactive approach must begin with definitive insight into the condition of all parts of the infrastructure, informed by advice and input from those who've been there before.

IMPROVING FLOOD PROTECTION IN EAST BUDLEIGH

Internal view of the original culvert.

East Budleigh is a small village in East Devon, UK located about 2 miles (3.2 km) north of Budleigh Salterton. The village features a bypass culvert, constructed in the 1970s. The culvert is approximately 280 metres in length, of Armco construction, oval shaped, approximately 1,800 mm diameter and constructed from corrugated metal sheeting (with a concrete floor laid over it during the last 10 years).

The existing culvert was in a poor condition, with joints failing and large voids appearing in the material outside the culvert structure. These failures led to a small localised collapse in the road above during flooding in 2012 and there were concerns that in the future that a larger collapse could occur, causing a failure in the highway surface. >

Transporting individual segments to the culvert site.

Top: Delivering liner segments to site.

Bottom: The Amiblu NC Line segments ready for installation.

It was decided that this culvert required structural strengthening due to minimal cover to the busy road above, and to maintain flows through the culvert in storm conditions.

The Environment Agency utilised Atkins to design the culvert rehabilitation, with Kier appointed at main contractor.

Looking at the rehabilitation options and given that the location was a highly trafficked residential area with minimum cover to the road, it was decided that lining with a structural GRP segment lining system offered the best solution.

LINING OPERATIONS

Having investigated the various lining systems available, the Amiblu NC Line, non-circular GRP Structural Relining system was selected for the project. In total some 300 metres of Amiblu GRP NC Line Arch Shape liner, dimensions 2,360 mm wide x 1,350 mm high was required to complete the works.

Manufactured to WRC Type II standard, the structural, large dimension, non-circular GRP prefabricated linings were manufactured in January 2022 at Amiblu's Gdansk factory in readiness to commence deliveries on 21 February. Specialist contractor Matt Durbin Associates was awarded the contract to install the linings.

The culvert meandered with the local water course, and on inspection for the design of the linings was found to include long radius bends. These were designed for in the fabricated linings in the factory so that they would install without issue on site. Despite the apparent loss of cross-section in the culvert the design and smooth internal finish of the segment linings ensured that the flow capacity requirements for the culvert would be met.

Given the small village size and the traffic management requirements for the installation works, co-ordination with local residents and parish councils regarding the large deliveries to site was essential and during the project worked extremely well. >

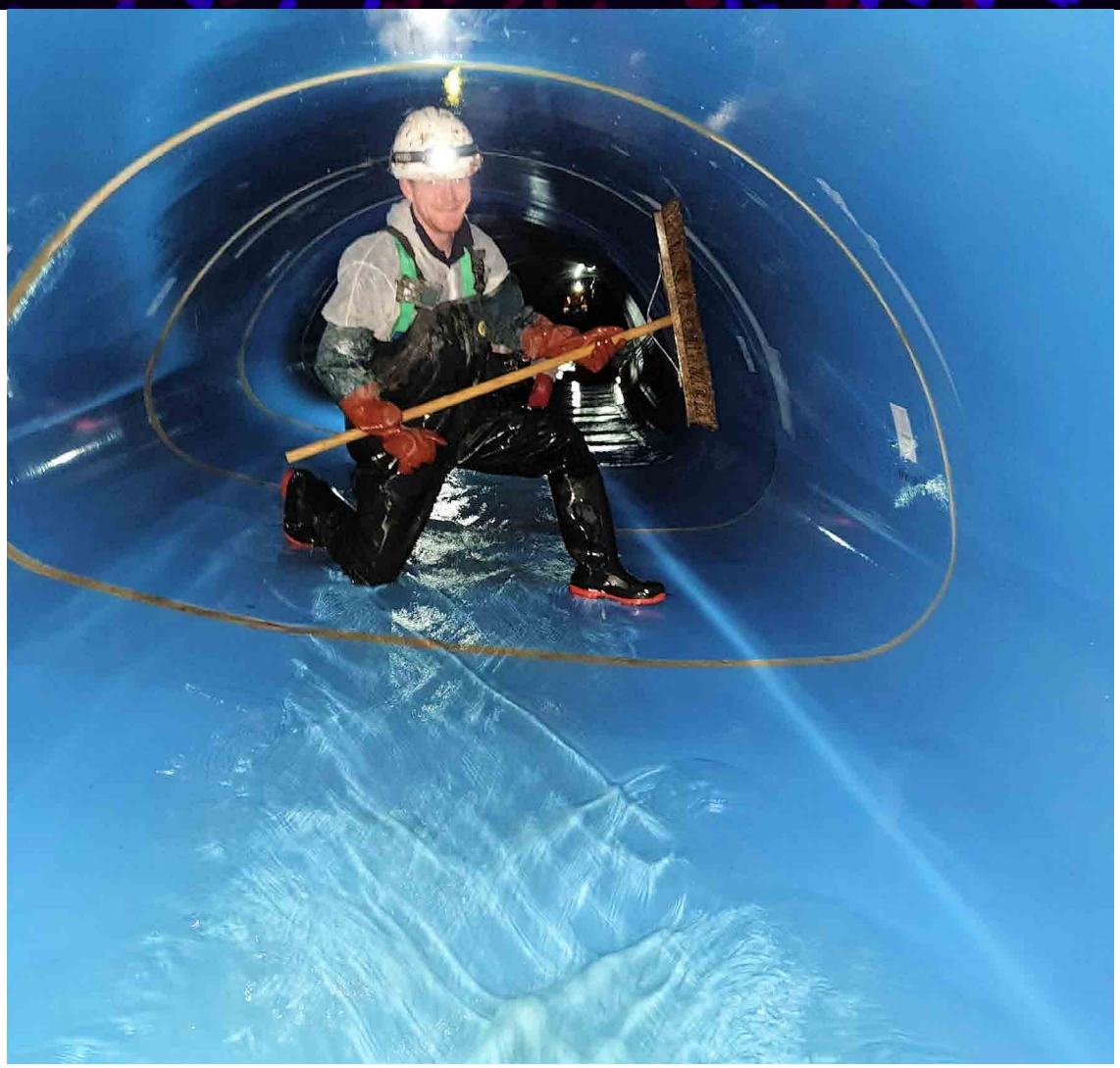
Installing the liner segments into the culvert

Work commenced on site on 14 February with site preparation works. Deliveries of the Amiblu NC Line segments commenced on 21 February. Installation into the culvert commenced in March. In total, all installation and annulus grouting operations were completed in just 8 weeks.

Client satisfaction for the project was high the Environment Agency commenting favourably on the works.

“From a client perspective, the GRP liner solution has provided a cost- and time-effective approach to prolonging the asset life. We were hopeful to avoid any requirement for open cut solutions to minimise the impact to the local community and meet delivery deadlines. We also needed to ensure that the flood risk standard of protection was not altered to upstream or downstream receptors. The structural GRP liner allowed for a bespoke unit to be installed which optimised the culvert capacity to retain the flow performance and extended the life for a minimum of 50 years. The outcome of improvements to the culvert have reduced flood risk to 27 residential properties, significantly reduced future maintenance costs and health and safety risks to the public.” said Daniel Gay, Project Manager for the Environment Agency.

For AECOM, Alexis Field, Project Director commented: “This has got to be the easiest project that I have been involved with, all credit to the team, Matt Durbin and Kier Group, for fantastic planning, proactive problem solving and having pride in their work.” >



Lining complete, just prior to the annulus grouting operation .

Matt Durbin, Managing Director of Matt Durbin Associates said: "It has been a pleasure as always working with Amiblu, great service and great products. We have developed strong partnerships with all involved to deliver this project and look forward to delivering more like it in the future."

Adrian Parker, Senior Project Manager for Kier commented: "This project is a great example of how accelerated delivery can be achieved under the Environment Agency's Collaborative Delivery Framework. From identification of the scheme for fast tracking in June 2021, the scheme was on the ground in 22 February and complete by 22 June. MDA have done a great job and thanks also to Amiblu."

In closing for lining manufacturer Amiblu, Leon Woods, Technical Sales Manager commented: "Whilst we have worked with Matt Durbin Associates on many occasions, to date (March 2022), this was Amiblu's largest NC Line project in the UK and the first for the Environment Agency as the asset owner. The project required a great deal of collaboration between the MDA and Amiblu's engineers to design the right solution, resulting in the creation of a bespoke profile for East Budleigh, manufactured to the optimum dimensions to accommodate anticipated flow rates and required capacity. We have been delighted with the positive feedback from all concerned."

REDUCING CARBON FOOTPRINT IN AREAS OF CULTURAL HERITAGE SENSITIVITY

A crew of only five people was necessary to perform the renovation of the pipeline.

For the renewal of a nearly 1 km long section of a potable water pipeline, the Primus Line® trenchless rehabilitation technology defied heat, remoteness and an ecologically sensitive environment.

Rio Tinto, the world's second-largest metals and mining corporation, is targeting a 50% reduction in scope 1 and 2 emissions by 2030 and is looking for solutions throughout its business to reduce its carbon footprint. Rio Tinto defined a section of a DN550 mild steel cement lined potable water pipe that supplies the remote mining town of Paraburdoo in Western Australia as a high risk due to the pipe condition. The 1 km long section of the pipeline crosses a creek and runs through areas of cultural heritage sensitivity. Instead of replacing the main by traditional 'dig and lay', Rio Tinto decided to look for a non-invasive, more eco-friendly approach. The trenchless relining technology Primus Line® was the perfect fit for the project. By inserting Primus Line's flexible Aramid-reinforced pipe-in-pipe system into the existing main, the life expectancy of the asset will be extended by at least 50 years. Primus Line's Australian partner, Interflow, was awarded the delivery of the project. Interflow is one of Australia's leading pipeline infrastructure companies and a specialist in trenchless pipeline rehabilitation. >

The 1 km long flexible Primus Liner came pre-folded on a transport reel.

Rio Tinto is looking for solutions throughout its business to reduce its carbon footprint.

Flexibility And Precise Planning

Only a small amount of equipment is needed to install the trenchless Primus Line® technology. For projects like this in remote regions, this is a decisive advantage, as the transport effort to the installation site is low. The 1 km long flexible Primus Liner got delivered on one single transport spool. Depending on the diameter of the flexible Primus Liner, up to 4,500 m can be coiled on one single spool. Therefore, only one truck was necessary to transport the spool and the corresponding fittings on site. To transport the same amount of new steel pipe to the mining town, which is located about 1,500 km from Perth in the Australian outback, at least five trucks would be required.

To gain access to the existing pipe only one small pit on either end was necessary, which could be created using a mini excavator. This also guaranteed that the areas of cultural heritage sensitivity remained untouched during the entire project duration.

According to global management consulting firm McKinsey, diesel emissions in the mining sector contribute to 100 million tons of CO_2 globally. By using the trenchless Primus Line® technology, the emission of CO_2 on site as well as the amount of earth movements can be reduced by over 90% compared to traditional dig and lay techniques. Besides a pulling winch, only some specialist tools are required to install the Primus Line system in the existing pipeline. Nevertheless, exact project planning is a prerequisite, because support services or subsequent deliveries would quickly lead to major project delays due to the remote location of Paraburdoo. Interflow and Primus Line therefore engineered the project hand-in-hand to guarantee a smooth execution.

Rapid Recommissioning Under Extreme Conditions

The town of Paraburdoo sits on the edge of the desert and has an average of over 70 days per year where the temperature rises above 40°C. Compared to traditional methods, a trenchless approach reduces the installation time to a fraction and therefore also the hours that the crews are exposed to the heat. The installation of the nearly 1,000 m long Primus Liner could be realised in one single pull within only one working day. Consecutively, the end fittings got installed and a pressure test confirmed the successful installation. The Paraburdoo project is not the first in which Rio Tinto has used the AS/NZS 4020 certified Primus Line® technology for drinking water. In Cape Lambert, a port facility operated by Rio Tinto, Interflow previously successfully rehabilitated over 2 km of HDPE pipeline using the Primus Line® system.

Around the globe, the technology has already been used in over 50 countries in more than 1,000 projects, not only for the rehabilitation of water pipes, but also for the renewal of oil, diesel or gas pipelines in, for example, industrial plants, refineries, airports or port terminals.

RISING MAIN REHABILITATION IN MATLOCK

Installing the rising main liner.

Sanivar recently completed a 750 m long pipeline refurbishment of a 250 mm diameter Rising Main in Matlock, Derbyshire, UK. The project was promoted by Severn Trent Water (STW) following a number of asset failures that had resulted in 10 reactive repair interventions in recent years. The project was delivered through STW's delivery alliance CSP and lining contractor Colus Specialist Projects.

The 250 mm diameter cast iron main was found to be badly corroded over a section that ran along the High Street and into a discharge chamber in the riverside park. Originally installed in 1970 the pipe had eroded from the inside and grit had worn a groove along the base of the pipe making it susceptible to bursts. >

The liner material is delivered to site on a reel making for easy installation into the host pipe.

Challenges

The project posed a number of challenges including:

- The main ran the length of the High Street which, due to local topography, is an essential throughfare meaning that traffic management and lane occupation were major considerations
- The main operates at near capacity due to recent housing developments meaning that tankering was required to maintain serviceability for the duration of the works prompting the need for a quick installation
- The liner had to navigate a number of bends along the length of the main some of which were in close proximity to each other providing a navigable challenge

Outcome

Working with Sanivar and CSP, STW selected SaniTube as the optimum repair solution. A 250 mm diameter SaniTube was selected with an outside diameter of 246 mm providing the opportunity to inflate to 250 mm under 3 bar pressure so providing a close fit to the internal diameter of the host pipe. To mitigate risk, it was decided to excavate and replace one of the 45° bends and for other logistical reasons install the liner in three 250 m long sections.

The liner was winched through the host pipe at a rate of 6 m/minute at a torque of 5.9 kN meaning that each section was completed in under 45 minutes.

The sections were then joined using back-to-back flanged SaniGrip couplings which were also used to connect onto the host pipe via a conventional flange adaptor. >

Completing the liner pull through.

Sanitube provided the only viable solution for this project due to:

- Cost efficiency - reducing mitigation measures and allowing for a quick restoration of service
- Flexibility allowing for navigation of bends and chambers
- Durability – through a pressure rating in excess of 16 bar, accommodating existing and future operating pressures
- Efficiency – rapid installation enabled by lack of curing or wetting out processes
- Sanivar's commitment to collaborative working and on-site support

"The Sanivar solution, supported by Colas, was a great solution with the tube folded prior to installation and with the cleansing and survey work being undertaken via a night shift to enable the liner to be pulled through during the day and pressurised and put back into service." said Andrew Warren – Network Operationalist Specialist Severn Trent Water

Sanitube Installation – Step by Step

The process started with a Desktop Evaluation to scope project and identify the route and configuration of pipeline including indicative diameters and potential access points. This informed the initial proposal and selection of liner. A Site and CCTV Survey was then undertaken to verify the desktop evaluation and assess the condition of host pipe. A final proposal was then presented including connections.

Enabling works followed including excavation and establishment of bypass arrangements, cleaning of the pipe (typically using high-pressure jetting) and a final survey was conducted.

The liner was then prepared, shackles fitted and winch cable attached. The liner was then pulled through host pipe typically at 6 kN force to achieve an installation rate of 6m/minute until the liner appeared in the reception pit.

Inserted end stops hold the inserted liner in place whilst the liner is inflated. The liner fully inflates within host pipe with application of some 3 bar working pressure using compressed air.

End couplings are fitted using SaniGrip bespoke couplings to achieve NP16 flanged connections to the existing or new infrastructure. Thereafter, a pressure test is undertaken to confirm the integrity of liner. A post-installation CCTV survey is optional at this stage. Finally the lined section(s) are connected to existing infrastructure and reinstatement of the excavations is completed.

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CORRECTABLE TRENCHLESS PIPE INSTALLATION MADE EASY

The GRUNDOSTEER's locatable steering head is the key to the correctability and accuracy of propulsion.

TRACTO's new GRUNDOSTEER directional pressing system makes correctable pipe laying for house connections and short undercrossings simple and safe.

With the new GRUNDOSTEER, No-Dig full-range supplier TRACTO has added a guided rod pusher to its product range, which combines proven methods of trenchless pipe installation in an easy-to-operate, robust compact machine. The special feature of the GRUNDOSTEER is the possibility to apply directional corrections during the static installation process for establishing house connections and installing product or protective pipes in the most simple and safe way.

Targeting Accuracy

In terms of installation method, guided rod pushing with GRUNDOSTEER is located between non-steerable soil displacement with impact hammers and steerable horizontal directional drilling with mini fluid-assisted drilling rigs. As with the soil displacement hammer, the target is aimed at by means of an aiming frame and the soil is displaced during driving, in this case using hydraulic jacking. As with the HDD method, the GRUNDOSTEER is first used to create a pilot hole along the planned path. In the process, the locatable guiding head is tracked above ground with a locating device, indicating any deviations from the intended path. If directional corrections are necessary, the position of the guiding head can be easily read off a time scale on the rods' position connector and changed by rotation in the desired direction. Upon arrival in the target pit, the head is replaced by an expander for enlarging the bore path to the diameter of the pipe attached as it is pulled back. Unlike the HDD method, no drilling fluid is required when utilising the guided rod pusher. >

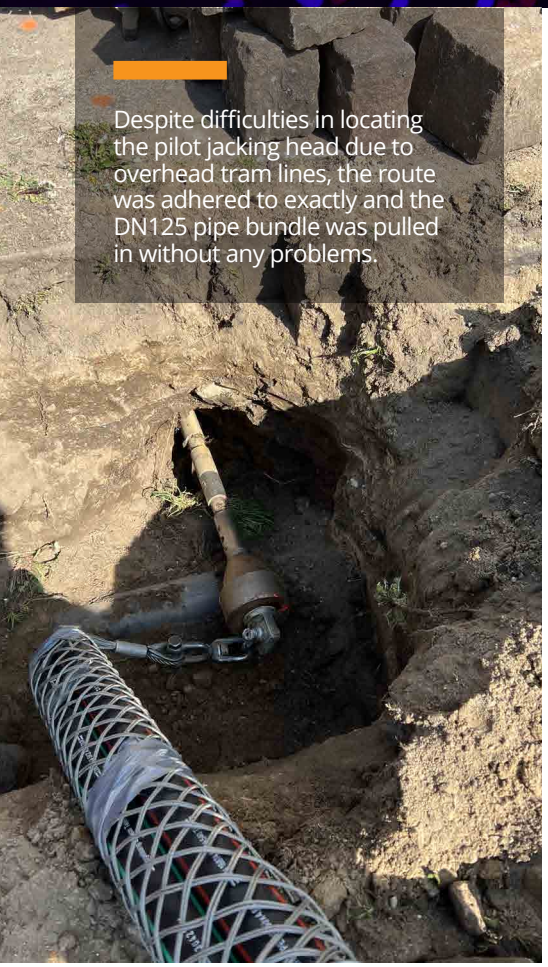
In Berlin-Pankow, the GRUNDOSTEER PS130 was used for the crossing beneath the heavily frequented 'Breite Straße' in the course of broadband expansion.

Getting started with the correctable trenchless rod pushing method is easy in many respects. Thanks to the simple, but very reliable, steering principle and the easy directional correction, even less experienced operators can accurately establish house connections or short subsurface crossings using this method and easily gain early experiences with correctable methods. Additionally, the necessary capital expenditure for the GRUNDOSTEER is relatively low. For example, users who already own soil displacement hammers can use their GRUNDOSCOPE aiming frames to align the GRUNDOSTEER. A normal hydraulic power unit, which is usually already part of the machinery, is sufficient to drive the guided rod pusher. The fact there is no need for costly drilling fluid with rod pushing and only a simple locating device is required for checking the direction, have a further positive impact in terms of costs.

Advanced design and quality

The advanced design of the GRUNDOSTEER with proven TRACTO quality also pays off quickly. The guided rod pusher 'Made in Germany' is designed for maximum durability with high operating comfort. For example, the specially designed SIMCON® rods are not elaborately screwed together, but firmly connected via a simple bolt connection. The control panel can be flexibly mounted at various positions on the machine frame and can also be optimally adapted to the height of the machine operator, enabling a comfortable work position while standing. The thrust speed is regulated by a smooth-running hand lever. Further advantages of the GRUNDOSTEER are a base frame, which can be dismantled into individual parts and a special adapter for securely bracing the unit in the excavated launch pit.

The GRUNDOSTEER is ideal for short subsurface crossings in areas of dense infrastructure without much effort and for quickly and easily establishing house connections of any kind. At just 1 m in length and 800 mm in width, the very compact rig can work from a pit towards the building or from the building through a core bore in the house wall. A total of 130 kN is available for rod pushing and pulling in of the pipes, giving the guided rod pusher its type designation PS130. >



Despite difficulties in locating the pilot jacking head due to overhead tram lines, the route was adhered to exactly and the DN125 pipe bundle was pulled in without any problems.

First successfully projects

The first successful applications of the 'PS130' at home and abroad speak for themselves. For example, during an operation of the GRUNDOSTEER for the utility company Veolia near Paris, France, a DN25 PEHD drinking water pipeline was safely laid through a dense network of pipes under the entrance hall of a building. The client, which supplies 4.6 million people in the Paris area with drinking water, was completely satisfied.

In Berlin-Pankow, three PE pipes of 50 mm o.d. were laid in a bundle for the civil engineering company F+E Tiefbau using the GRUNDOSTEER PS130 in the course of a broadband expansion project which ran underneath a busy road. As a double-track tramway ran along the centre of 'Breite Straße', the open cut method was not an option. The use of a soil displacement hammer was also not approved due to the low cover of approximately 1.0 m for the road crossing. Although interference from the overhead tram lines made locating difficult, the pilot bore was on-target and the pipe bundle pulled in without any problems with an expander of 125 mm o.d.

Test the GRUNDOSTEER

Civil engineering companies that would like to test the GRUNDOSTEER on one of their projects are welcome to contact the TRACTO sales staff or their local representative. A detailed description of the PS130 guided rod pusher with technical data is available online at:

https://tracto.com/en/Products/GRUNDOSTEER-GUIDED-ROD-PUSHER

NEW AIR LANCE LAUNCHED

The new Air Lance from Stopper Specialists.

Stopper Specialists has launched a new product that increases safety for contractors working around and removing buried utilities services.

The new Air Lance has been specifically designed to provide a safe solution to loosening soil around buried pipes, ducts and cables prior to removal either by traditional hand excavation or with suction and vacuum excavation methods.

Once the pipes or cables have been detected, an air compressor operating at 100 psi and above directs high-speed air from the nozzle up to 930 mph to effectively cut at a distance of around 100 mm without damage or penetrating buried utilities or tree roots.

Lightweight, durable and robust, with an engineering grade nylon, non-conductive body which is manufacturer tested and certified to 75 kVa as standard, the trigger design features an easy to operate, proportional air flow control making it even more user friendly for operators.

Sam Woodcock, general manager of Stopper Specialists, said: “As a company, we are always looking at new products that will improve site safety and provide cost effective solutions for our customers. The Air Lance will help to reduce the risk of hitting a cable, gas or water line which could result in workers being seriously injured as well as preventing costly repairs, contractor fines and liability issues.”

For those looking to ensure they follow safe digging practices, Groundforce Training, a sister company of Stopper Specialists, offers an EUSR accredited course ‘Locate Utility Services & Implement Safe (Digging) Excavating Practices. This course includes both theoretical and prac-tical assessments which ultimately aid those required to oversee and/or carry out work around excavations, particularly around underground services.

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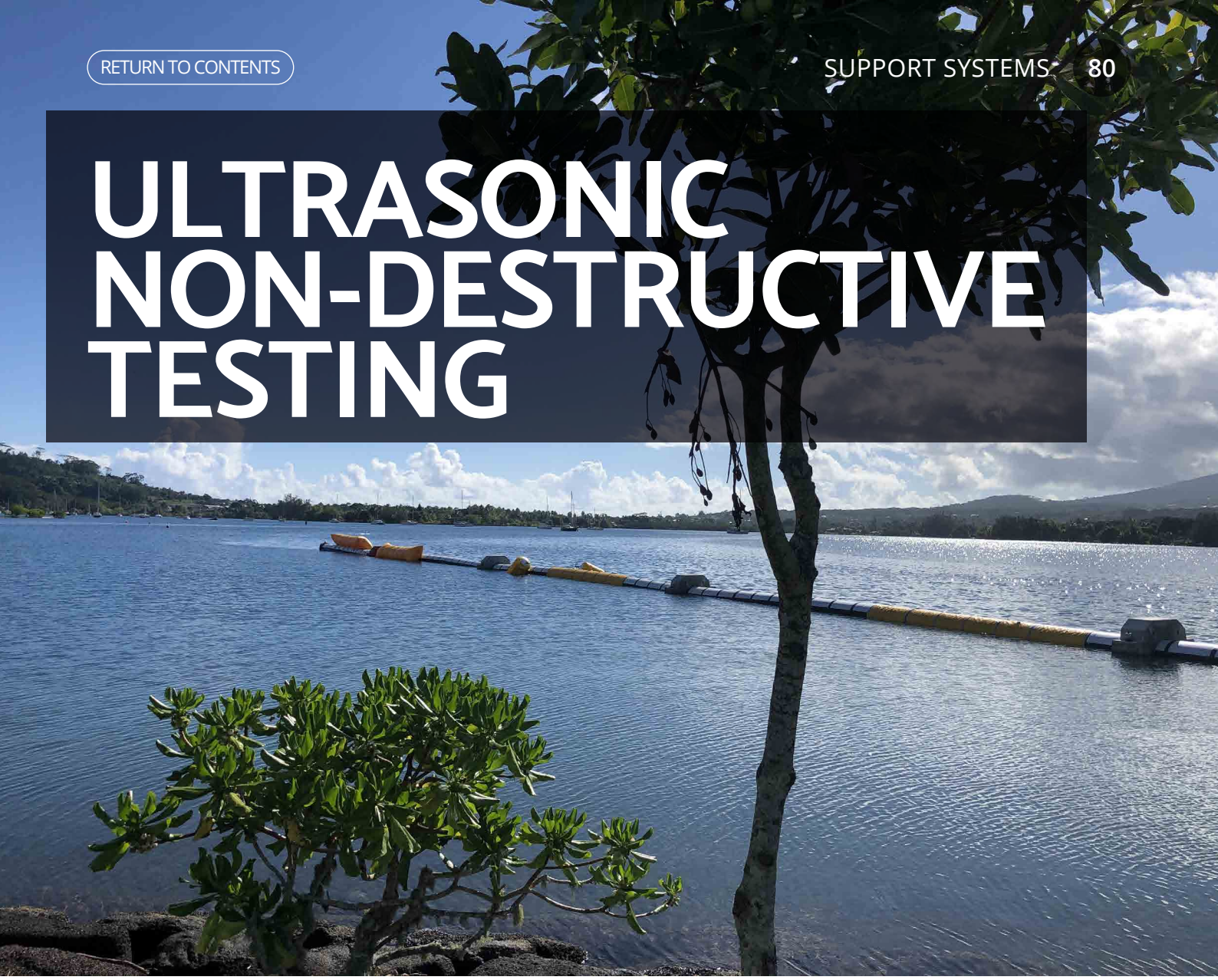


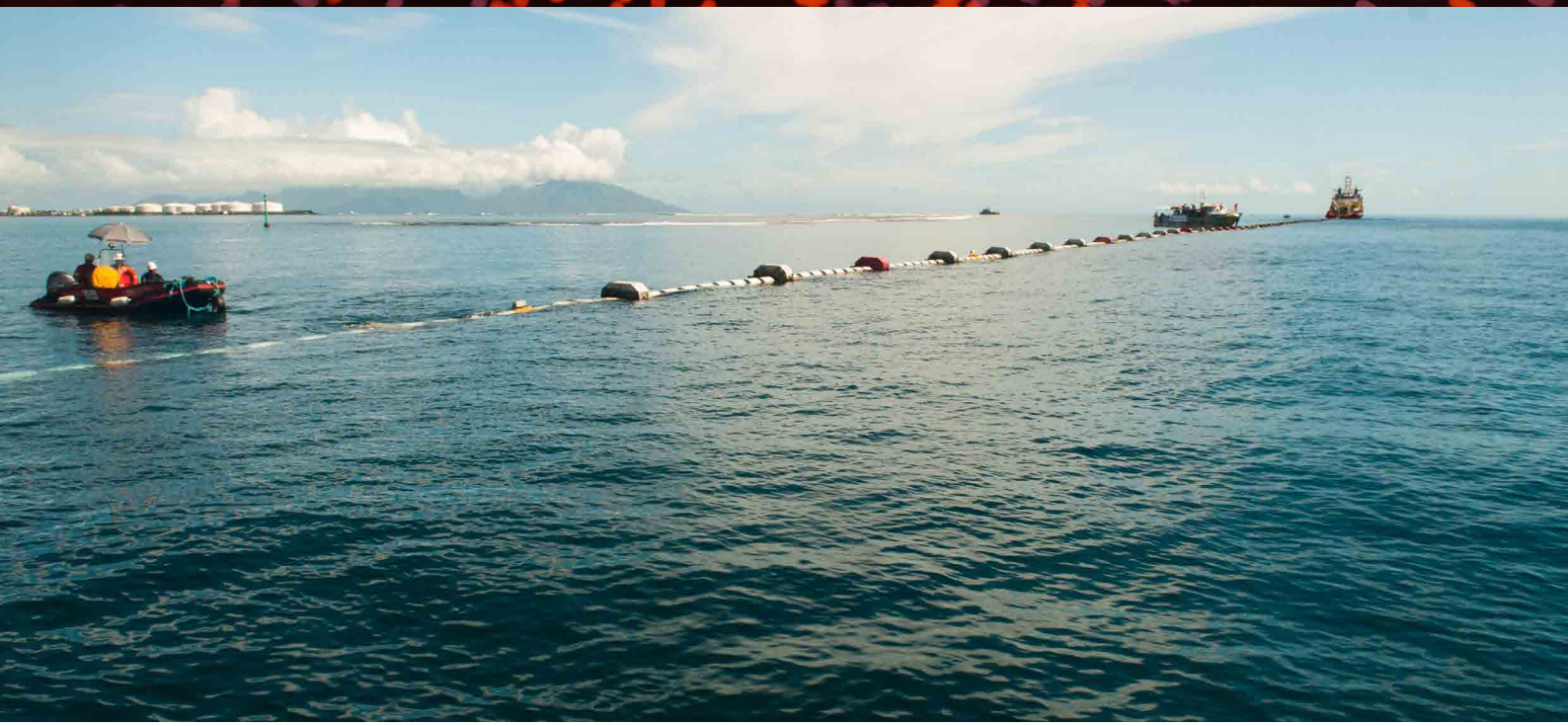
Ensuring pipeline integrity is a vital part of pipeline construction.

Piping system integrity is crucial for owners and operators of water, gas, and chemical plants. Demonstratively, 1 in 300 welds deteriorates every year due to poor construction. It costs around €1 million to repair a leak in a gas pipeline, and a single failure could jeopardise the entire system, as, on average, one initial problem results in 19 incidents. From installation to putting a project into operation, the uncertainty of the system's operational performance is a significant stressor for project supervisors, as leaks in a newly installed system can have a serious impact on the economic performance and image of their organisation or business. Assessing a system's condition, particularly by using ultrasonic non-destructive testing, can alleviate these concerns.

Ensuring piping integrity

It is essential that piping systems are safe and long-lasting. Assessing your system's condition allows you to anticipate any damage your system is susceptible to and can help with planning maintenance.

A combination of two methods allows for worry-free operation: ultrasonic non-destructive testing (NDT) provides analysis at the installation stage, while pipe condition can be assessed during operation to estimate the remaining lifespan, plan maintenance and repair work, avoid failures, and minimise revenue loss. Gaining this information means that operators can make informed decisions when installing, operating and maintaining their system, while managing any dangers, too. >



With the growing market for trenchless pipeline applications, pipe integrity is essential to prevent failure during the installation phase.

An efficient installation

Trenchless technologies are successfully used underground construction methods to install, repair and renew pipes, ducts and cables using techniques which minimise or eliminate the need for excavation. Due to the growing population in cities, the demand for water is continuously rising. In order to meet this higher demand, water utility companies rely on technology that helps them quickly and efficiently maintain their water networks. Combining trenchless installation techniques with Ultrasonic NDT minimizes risks while reducing construction costs at the same time.

A recent example: For large diameters FARYS Water Utility in Gent, Belgium formerly relied on steel or ductile cast iron (DCI) pipes, but the rigidity and missing end-load resistance of metal pipes made them not a valid option for the project. In comparison, the flexible, fully restrained, homogenously welded PE pipes with a corrosion-free service life span of more than 100 years convinced the decision makers of FARYS. To minimise possible risks and assure the quality and reliability of the welds, all HDD joints were scanned and assessed by GF Piping Systems with Ultrasonic NDT. A pass or fail 'Fit for Service' weld report is provided after using Ultrasonic NDT.

Taking the same approach now to a sea-based application was a similar challenge.

Solving problems through innovation

When installing a system, the welds are critical. They are often considered to be the weakest points but are essential for safe and reliable operation.

Until recently, assessing the quality of welds in piping systems was impossible without destroying them. Project supervisors were forced to replace welds that were potentially still in good condition or risk system failure. Conventional pressure tests cannot provide any information on the system's long-term performance, whereas destructive tests are not able to ascertain the quality of any untested welds.

Ultrasonic NDT provides scientific evidence

Developed by GF Piping Systems, the first ultrasonic NDT solution for plastic pipelines is part of a comprehensive quality management strategy. The technology provides a pass or fail grade and works on all materials (HDPE 100, RC, PP, etc.) and fusion types (butt weld, electrofusion, infrared, etc.). It uses ultrasonic waves to detect possible defects in a material and a weld assessment algorithm that identifies indications of >

Ultrasonic testing of welds and joints ensures pipeline integrity prior to installation.

weakness in the welds and extrapolates this information into an evolution of the weld's strength over the long term within seconds.

The process for ultrasonic non-destructive testing is as follows:

- Inspectors visit the construction site and assess the piping system's welds for any indication of weakness using various ultrasonic testing methods (TOFD, PAUT, etc.) and advanced, patented equipment.
- If they detect any signs of weakness, they identify and measure them before recording the information in a report. The report then feeds in to the assessment algorithm, which gives a pass or fail grade.
- If the welds are approved, trenches can be backfilled and no further action taken.

There are many advantages to ultrasonic NDT:

- The assessment algorithm at its heart ensures total objectivity.
- It improves quality and safety.
- It contributes to increasing efficiency and reducing costs.
- It helps to extend the lifespan of piping systems.

Cost efficiency, guaranteed

When installing the underwater SWAC (Sea Water Air Conditioning) piping system for the General Hospital of French Polynesia (Centre Hospitalier de Polynésie Française, CHPF) in Papeete, Tahiti, Geocean used the GF Piping Systems Specialized Solutions ultrasonic NDT service and welding machines. The Polynesian Government commissioned the SWAC with the aim of advancing energy transition and benefiting from the reduced costs that result from lower energy consumption. Sea water air conditioning is a solution to the problem of energy-intensive cooling systems, providing air conditioning to nearby buildings using cold water from the depths of the ocean. The principle is simple: the first pipe pumps sea water at 5°C into the hospital air conditioning system. Once used, the water is then discharged back into the ocean at a temperature of around 12°C. >

Installing a fully tested pipeline.

The CHPF SWAC is the longest of its kind globally and involved the installation of two pipelines:

- A 3,800 m long intake pipeline reaching a maximum depth of 900 m.
- A 200 m long discharge pipeline.

These pipelines are formed of several NPS 710 mm HDPE pipes welded together through polyfusion. The ultrasonic NDT checks that the 400 welds are completely sealed and provides an immediate pass or fail grade, with a full report available within 24 hours. Polyethylene pipes are flexible and mould around their environment on the seabed, thereby creating areas of tension on the pipe walls. These can cause weak points around the welds in the fused material. Ultrasonic non-destructive testing is the best way to guarantee the same level of efficiency in welds as in the rest of the pipes throughout the system's lifespan, as it can be used prior to installation and operation and without needing to send random welds to a laboratory or conduct pressure tests, which would result in costly repairs. In other words, thanks to ultrasonic non-destructive testing, weld quality can be guaranteed immediately from installation.

The SWAC help the Polynesian Government to reduce electricity consumption by 12 GWh, creating an annual saving of 5,000 metric tons of CO_2 and €2.9 million in hospital energy costs. Ultrasonic NDT contributes to these energy savings by ensuring the pipelines are completely sealed, thereby maximising the system's air conditioning capacity.

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A SMART TRANSITION TO TABLET-BASED LEAKAGE DETECTION

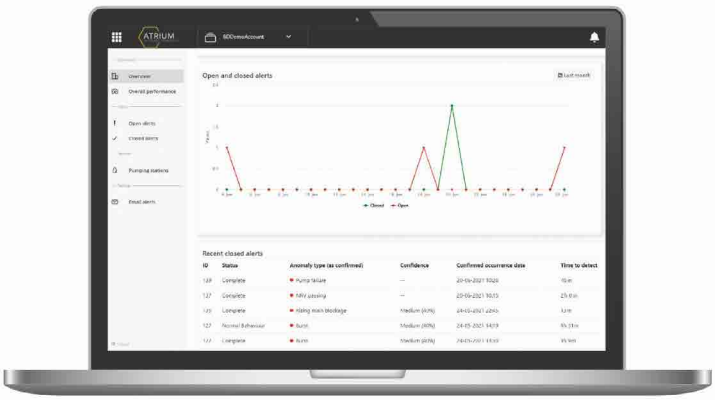
The next-generation leak noise correlator Eureka5 system.

A tablet-based leakage detection system has recently been launched by technology company Ovarro. The next-generation leak noise correlator Eureka5 will become the basis for Ovarro's leak detection platform. The system displays information on an android tablet and does not require a dedicated processor or laptop, cutting down the number of devices field teams need to have in their vans.

The ability to access network information on tablets and smartphones is another step forward in the digitalisation of the water sector, commented Chris Moore, product line manager at Ovarro.

Digital transformation of the UK water sector is well underway, with utilities now widely integrating smart, data-driven solutions to manage their water and wastewater networks. When it comes to leakage reduction, smart technology is giving the sector the ability to pinpoint precise locations of leaks, in real time. Utilities are seeing the benefit of this switch, with 13 water companies in England and Wales achieving their 2020-2021 performance targets for leakage.

A major driver of this transition is consumer use of smartphones and tablets, nearly everyone uses some kind of digital device, a shift that has been replicated by water companies, accelerated by the skills of digital natives joining the sector, who have never known a time without the internet and digital devices. >



Conveniently packaged and easily monitored leak detection.

This has made the development and implementation of smart, user-friendly technology easier and faster. At the same time, the cost of these technologies is also coming down while they become more and intuitive, robust and secure.

In terms of hardware, Eureka5 comprises two radio transmitters: a radio receiver with signal-processing electronics which interconnects with the bespoke Eureka Go app, as well as Ovarro's existing cloud-based portal, PrimeWeb. GPS technology enables precise pinpointing of leaks, including in difficult conditions, such as where there is substantial background noise, where only the quietest of leak noise is present, and on a variety of pipe materials, including plastic.

Eureka5 enables users to listen to noise on the pipe, upload this data directly to Eureka Go and view the data instantly on a tablet, rather than the bespoke processing unit used previously. As well as simpler functionality for operators, who Ovarro liaised with closely when developing the product, the solution reduces capex costs. Why have multiple different versions of a PC in the back of a van when operators can work off one tablet?

Smart networks are already significantly improving leakage performance. The ability to carry out multiple tasks on just one device will further streamline processes, making processes simpler and faster for operators.

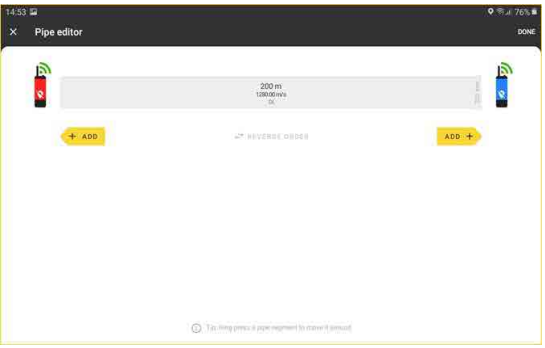
Looking forward to the water industry's 2025-2030 asset management period - AMP 8 - we can expect a full rollout of app-based network management tools, all accessible on a single tablet or smartphone.

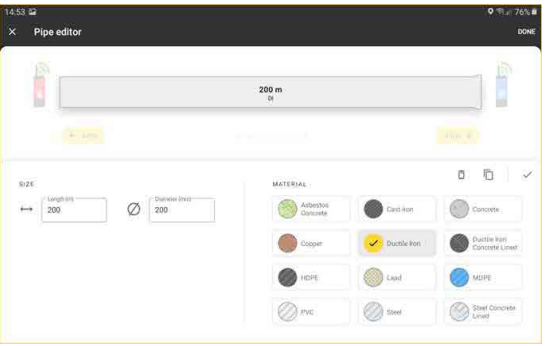
Further to this it has also been announced recently that Anglian Water has become the first utility to adopt new cloud-based technology to detect rising main sewer bursts.

In a world-first, the UK utility is implementing early-warning system BurstDetect from Ovarro, as part of its drive to eliminate serious pollution events in its region by 2025.

Through a dashboard, BurstDetect provides an overview of system status together with current and historical burst alerts. If data suggests a potential burst, an alert is sent to control rooms for early response.

Such early action can prevent the escape of sewage and resulting environmental damage, ensuring companies fulfil their environmental obligations and avoid fines, regulatory penalties and prosecutions, and long-term reputational damage. >





Easy-to-read outputs from the Eureka5 system.

George Heywood, analytics innovation lead for Ovarro, said: "We are proud that Anglian Water has become the first utility to implement BurstDetect as part of its pollution prevention strategy. The technology was developed in collaboration with UK water companies, in direct response to the sector's challenge to cut pollutions in a sustainable and cost-effective way. Rising main sewers pose a unique challenge to water companies. The pumped wastewater they convey can have a catastrophic ecological impact in the event of a burst, causing major disruption to customers, resulting in expensive tankering and clean-up operations and serious reputational damage, such events are just not acceptable in the eyes of customers and regulators. By being the first utility to invest in BurstDetect, Anglian Water is leading the way, proving its commitment to cutting pollutions by embracing innovation."

Claire Moore, head of water recycyling networks at Anglian Water, said: "With 'zero sewage pollution' as one of our 12 ambitious business goals, we have committed to eliminating serious pollutions by 2025, and to reducing the number of less significant incidents by at least 45%. Working with the supply chain to develop innovation and adopt new solutions will revolutionise our ability to meet these goals. Implementing BurstDetect will enable us to respond rapidly should a rising main burst occur, and take proactive action to prevent pollution and protect the environment."

BurstDetect uses unique algorithms to detect bursts using existing data from wastewater pumping stations. The technology can be applied to nearly all pumping stations, even those with just basic pump status monitoring, and requires no additional hardware, with the aim of achieving 100% coverage in networks being monitored.

The system accepts data at a range of monitoring frequencies with algorithms being applied to understand and characterise 'normal' pumping station behaviour. This training and testing approach to machine learning is becoming increasingly important to water companies, giving them more actionable insight than ever before, utilising data that may not have been fully harnessed otherwise.

While this is Anglian Water's first purchase of a wastewater management solution from Ovarro, the two organisations have worked in partnership to reduce leakage for many years, with the utility installing Ovarro acoustic loggers across its network of water mains.

This collaboration led to the development of game-changing remote leak detection device Enigma3hyQ and cloud-based analytics platform LeakVision, which saw Anglian Water and Ovarro win the award for Alliancing and Partnership Initiative of the Year at the Water Industry Achievement Awards 2021.

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SOCIETY NEWS

ISTT News brought to members by Trenchless Works

A MESSAGE FROM THE CHAIR

Jari Kaukonen, Chair, International Society for Trenchless Technology

FSTT past chairman, Area governor, Mayor on deputy in Paris and chair of FSTT enjoying the presentations and meals.

Hi ISTT members!

Wow! I had an opportunity to pay a visit to VST in Paris, this was something I have waited for, for a long time and I was not disappointed. I enjoyed the whole of the conference and exhibition. It was so nice to see people gathered together to see the new ideas in trenchless.

I was happy to cut the ribbon at the opening ceremony with the chairman of FSTT Patrice Dupont and Jean-Marie Joussin. I have the colours of the French flag as a memory. There were more than one thousand delegates at the show, amazing! Many of those have become as a friend to me so that I hope to see you all in Helsinki in October. I also had the possibility to promote the International No Dig show 2022 in Helsinki there. Many people were interested ij attending and there is no doubt that our show will be remarkable for everyone taking part. My estimation of the number of delegates has increased to above 300. We have also received many replies from professors round the world that they will come to the research colloquium which will be held before the conference. Dr Sam Ariaratnam has done a marvellous job in bringing together all research from around the world to present the newest results in the field. They will take part in the conference as well.

The program for the International No Dig show in Helsinki is almost ready. We have received almost 70 papers and that shows that we will have a qualified high-level programme at the conference. We will have two parallel conferences in English, which is ISTT's official language. Then we have reserved a third room where we will have one day with the Finnish language and on Wednesday a student master class by first class professors in the field from around the world. All students are more than welcome to the student masterclass which is free of charge for students.

The pre-conference tour will be to Tallinn and the water company there where a lot has happened. >

istt.com

SOCIETY NEWS

ISTT News brought to members by Trenchless Works

Kuva: signing the agreement between TRC and ISTT plus witnesses

We have received votes for the post-conference tour on Thursday the 6 October for which every Affiliated Society could vote out of five different possibilities. The most voted programme was the underground city of Helsinki.

The Gala Dinner on Tuesday is surely something you will not forget, I promise. There will be some surprises in the programme..... but I will not tell you more about it now. It would be nice to receive an ISTT Award there, so it is time to see if you have some good proposals to be entered.

Meanwhile visit the show website: www.nodighelsinki.com and book the week or two from your calendar. I have heard that many of the visitors will arrive in good time before the event. Registration will be open in a week or so also for the Gala Dinner and the tours.

I am writing this in Bucharest where I signed the contract with TRC to join ISTT as an Affiliated Society. About the conference, I will write more in the next issue.

I wish to all of You an active trenchless summer!

With best regards,

Jari Kaukonen

Chair, ISTT

ALL TOGETHER FOR THE 6TH EDITION TRENCHLESS ROMANIA CONFERENCE & EXHIBITION

14 JUNE, BUCHAREST

The 6th Edition of Trenchless Romania Conference & Exhibition took place on the 14 June at Caro Hotel Bucharest. The event succeeded to combine a full day conference that included technical papers with indoor and outdoor exhibition area, within a dynamic atmosphere that brought together professionals for the trenchless industry in the region.

Trenchless Romania Conference & Exhibition is the only event in Romania supported by ISTT (International Society for Trenchless Technology) and the official opening of this 6th edition was made by Jari Kaukonen – President of ISTT. Welcoming words were also presented by Jens Hölterhoff – Chairman of GSTT (German Society for Trenchless Technology) and we were delighted to have with us Mark André Haebler – Vice Chairman AATT and Klaus Beyer - International Director of GSTT, two of our main supporters since the first edition of the event.

Since the first edition in 2016 Romanian Water Association (ARA) is very close to us and supports Trenchless Romania event. Once again ARA was represented during the conference by Ioan Bica, Vice President ARA member of the Board of Directors. Furthermore, for this year we had the special visit of Ahmed Lundgren-Bekov, Head of Economic Section for German Embassy in Bucharest and Dr. Ilinca Pandele, Business Consultant of the German-Romanian Chamber of Commerce and Industry (AHK Romania).

During the event Jari Kaukonen, President of ISTT made the official announcement of Trenchless Romania Club affiliation to ISTT. With this affiliation all Trenchless Romania Club members now benefit of ISTT benefits such as: extensive international collaboration and networking, access to annual International No-Dig Conference and numerous conferences and meetings organized by Affiliated Societies/ISTT, free participation to regular ISTT webinars, free downloads of technical papers and reports that were presented at International No-Digs and other relevant sessions etc.

The conference day was structured in two technical panels with relevant presentations about the latest equipment's for the No-Dig industry and related activities for water, sewage, gas, and optic fiber. Each year we look to have high quality programme, that can provide a rich source of information bringing added value for all our participants. Therefore, we were extremely glad that in this edition we had a special guest, Roland W. Waniek from IKT (Institute for Underground Infrastructure, Germany) presenting "How testing installed CIPP liners for quality assurance helps sewer network operators protect their scarce money".

The exhibition had two areas, the indoor exhibition area with booths for each partner company of the event, and the outdoor exhibition area where participants could see demonstrations with the equipment. The highlight of the outdoor exhibition was the newest horizontal directional drilling machine TERRA JET DJ 40 presented for the first time in Europe by the local dealer IMOCON. The event also hosted the 6th Edition of TRENCHLESS ROMANIA AWARDS, the ceremony for awarding the projects that use trenchless technologies and products in the trenchless industry.

www.trenchless-romania.com/

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SOCIETY NEWS

ukstt.org.uk

Society News brought to members by Trenchless Works

HELLO FROM THE CHAIR

Dawn Greig, Chair, UKSTT

Lynn Maclachlan – Associate Director for UKSTT

Hi everyone, finally Summer is almost upon us! Thanks to everyone who sent in entries for the much coveted UKSTT Awards. The deadline has now passed, so there is now the tense wait to find out who will be shortlisted across the eight categories. All will be revealed at No-Dig Live at the UKSTT Annual Awards Dinner and Gala Evening. Start making your reservations now for our James Bond themed evening, we have been expecting you **#theworldisnotenough**

There is so much to look forward to at No-Dig Live. The conference programme is coming together with another opportunity to bring the Utility Companies what they want, with a call for innovation coming soon for the Sewer Rehab Contact Group panel. This is an excellent platform to showcase new or existing products or services that resolve current priority issues. This event will also be free to attend, so make sure that you come along on the morning of Wednesday 14 September to find out the real needs and participate in the discussion. Details will be confirmed very shortly.

Even though the awards deadline has passed, you can still showcase your product, service or project. UKSTT Corporate and Corporate Plus Members can schedule a Member webinar at any time, using our Zoom platform. Contact Lynn or Linda for further details and get something in the diary. Don't be shy, we want you to take part and use as many UKSTT resources as possible to get the most out of your membership!

Finally, before you start foraging for your flip-flops, I would like to remind you that members are always welcome to attend Council meetings. Our next face-to-face meeting is at Woodland Grange, Leamington on Thursday 7 July at 10 am, we would love to see you but please let us know in advance for numbers. Otherwise, meeting minutes can be found in your member area login at www.ukstt.org.uk. If you have any suggestions to be brought to Council, please contact any member of the Council, Lynn, Linda or myself and we will be happy to put it forward for consideration.

Enjoy the sunshine!

Dawn x

UPDATES IN CIPP TECHNOLOGY OVER THE LAST 10 YEARS

Clockwise: Dec Downey, Ian Naismith and John Bentley giving their presentations at the event.

The UKSTT recently held a Masterclass covering developments in Cured in Place Pipelining (CIPP) over the last 10 years.

The class was well attended with over 50 contractors, engineers and consultants present. Speakers, including Dec Downey, Ian Naismith, John Bentley and Borje Persson, gave a comprehensive overview of one of the leading forms of trenchless technology which has been widely used around the world since its concept 50 years ago in 1971. Over 18,000 km of material is installed around the world per year and as such the developments in installation techniques, materials, updates to testing and standards as well as design and QA/QC are an important part of the trenchless market. Attendees appreciated the update and opportunity to understand the innovations and developments currently existing and also planned.

Several case studies were presented and the attendees were very appreciative of the overall depth and variation in this important technology.

NEW MEMBERS

UKSTT would like to welcome all new members this month....

Patch Repair – This localised repair offers a cost-effective solution to fix individual defects within a drain or sewer. Ambient Cured Lining – Ambient cured lining consists of the full or partial lining of sewers or drains to cover multiple defects. Heat Cured Lining – This is like Ambient cured lining; however, Heat Cured Lining is predominantly used for larger diameter pipes or where an increased resistance to chemical attack is required. Excavation – Excavation is the traditional method of drain repair and replacement and a technique used for new drains, drain replacement, to rectify collapsed drains or to gain access to lining repairs. One of the most common sewer blockage problems that require the deployment of remote-controlled cutting technology is root ingress. Tree roots, especially, can cause significant damage to pipes, while blocking water flows. IDS Ltd has a range of Jetting Nozzles and Root Cutters to effectively remove tree roots. CCTV Drain Surveys CCTV Specialist Highways Drainage Surveys HADDMS Reports, Commercial Drain and Culvert Cleaning and High-Pressure Water Jetting, Commercial Services and Gully Emptying and Drain Blockages and Cleaning.

Established in 2005, carrying out nationwide Trenchless Installations including Directional Drilling, Pipe Ramming and many others. SWDD largely specialises in drainage, and complex crossings of Highways/Railway lines, including carrying out the associated reports (in-house). Accreditations include Constructionline Gold, Acclaim SSIP, CQMS, RISQS and many others. The company has installed up to 900 mm diameter (drainage), through strong rock, and completed individual installations up to 300 m in length. All CAD work (layouts, long sections, configurations), reports and geotechnical assessments are carried out in-house, and all trenchless equipment and vehicles are 100% owned. SWDD prides itself on its record of no environmental or health and safety incidents or accidents since the company was formed in 2005. Its installation success rate is second to none, despite carrying out installations which are often deemed impossible by others, this is largely due to having a small tight-knit specialist team. Key clients include Balfour Beatty, Vistry Homes, Sir Robert McAlpine many, many, others. The company manufactures a lot of equipment to suit individual schemes, to make them possible.

STEP OILTOOLS is a leading global provider of Solids Control and Drilling Waste Management services to the oil and gas, and civil engineering industries. Launched to fill a need in the market place for an independent Drilling Waste Management service provider, STEP Oiltools has grown significantly since its inception in 2011 and is now proud to include some of the biggest names in the industry as our customers. Located in over 13 countries STEP Oiltools has a strong regional presence in Asia, the Middle East, Europe and Caspian. STEP Oiltools is dedicated to Service and its vision is to be recognised by its customers as a leading provider of quality Drilling Waste Management products and services.

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The UKSTT Awards

in association with Westrade

Wednesday 14 September

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For more details regarding exhibiting and sponsorship opportunities please contact:
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THINK TRENCHLESS FIRST

Using trenchless techniques, to install, replace or repair underground pipelines, is not only less disruptive but is also a cost effective and environmentally friendly way of doing so. Why dig when you can 'Go Trenchless'!,


Image courtesy of TT

There are so many reasons why choosing trenchless techniques can be the best option for everyone, including;

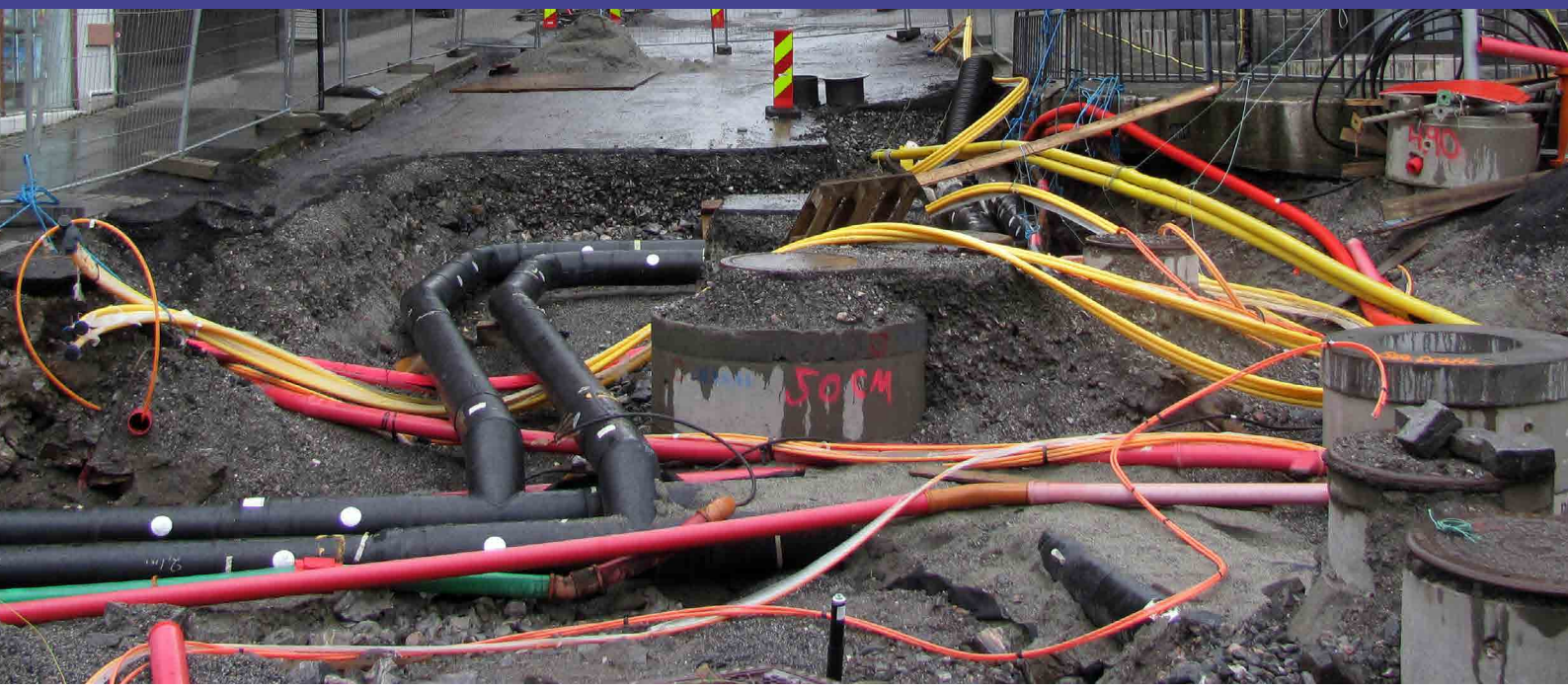
- Less $C0_2$ Emissions
- Cost effective
- Less disruptive to the general public and the local eco system
- Time saving
- Safer

UKSTT can help you decide if Trenchless methods are suitable for your project. Our website has a dedicated link for visitors to raise any technical enquiries they may have concerning trenchless technology and whether it may be applicable to any specific project: https://www.ukstt.org.uk/technical-enquiry/.

Any enquiries received are circulated to our Corporate Members and if more detailed advice is required UKSTT have a dedicated team who will advise separately. All technical enquiries are stored on the members only area of the UKSTT website. For all your trenchless solutions and latest news visit the UKSTT website https://www.ukstt.org.uk/

#ThinkTrenchlessFirst

UKSTT TECHNICAL ENQUIRY SERVICE



The UKSTT website has a dedicated link for visitors to raise any technical enquiries they may have concerning trenchless technology and whether it may be applicable to any specific project:

https://www.ukstt.org.uk/technical-enquiry/.

We have had some interesting enquiries recently ranging from invitations to tender in various locations of the UK & Europe while others received are looking for advice and proposed solutions for projects currently on-going. All of these enquiries are circulated to our Corporate Members and if more detailed advice is required UKSTT have a dedicated team who will advise separately. All technical enquiries are stored on the members only area of the UKSTT website. For all your trenchless solutions and latest news visit the UKSTT website. https//www.ukstt.org.uk/

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You can call us on +44 (0)1926 513 773 or email us: admin@ukstt.org.uk

SCAN ME

EVENTS AND MEETINGS

2022

September 13-15: No-Dig Live 2022
Peterborough, UK.
Details from: www.nodiglive.co.uk
Includes the UKSTT Gala Dinner and Awards Ceremony

September 20-22: ITTC China 2022 26th China International Trenchless Technology Conference (ITTC) & Exhibition
Suzhou International Expo Centre, Suzhou, China
Details from:
http://www.cstt.org.cn/Yhome/Index/index.html

October 3-5: ISTT's 38th International No-Dig Helsinki
Helsinki, Finland
Details from: www.nodighelsinki.com

October 24–30, 2022: bauma
Munich, Germany
Details from: www.bauma.de/

November 2-3: No-Dig Turkey 2022
Istanbul Lutfi Kirdar
International Convention and Exhibition Centre
Details from: https://www.nodigturkey.com/

November 30: Trenchless Technology International Seminar
Westin Hotel, Santa Fe, Mexico

2023

March 2023: Trenchless Egypt 2023
Cairo

April 30-May 4: NASTT 2023 No-Dig Show
Portland, Oregon

May 17-18: Trenchless Asia 2023
Kuala Lumpur Convention Centre, Malaysia.
Details from: www.trenchlessasia.com

October 17-19: International No-Dig Mexico 2023 ISTT's 39th International No-Dig Conference and Exhibition
Expo Santa Fe, Mexico

2024

November: International No-Dig Dubai 2024 ISTT's 40th International No-Dig Conference and Exhibition
Dubai World Trade Centre, Dubai

If you have an event, course or meeting scheduled and would like to add it to this listing please forward details to: editorial@trenchless-works.com