



TRENCHLESSWORKS

THE VOICE OF THE TRENCHLESS COMMUNITY

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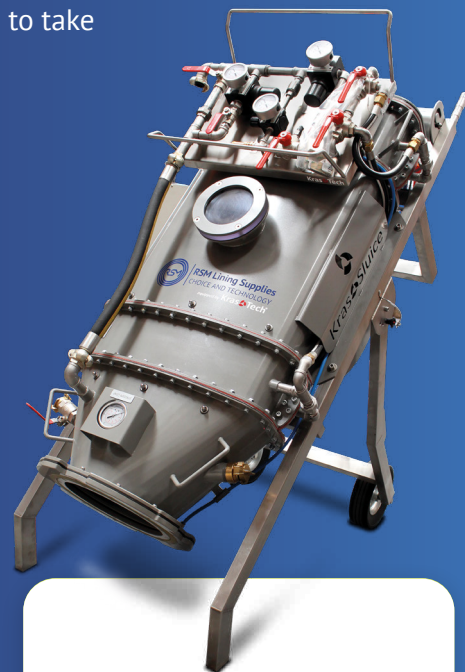
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CONTENTS

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ARTICLE	PAGE	PIPELINE REHABILITATION	
SPOTLIGHT	5	FROM THE AGE OF STEAM TO THE SPEED OF LIGHT	61
		CIPP HAS DEFINITELY NOT LEFT THE BUILDING	67
NEWS		ASSET MANAGEMENT	
SLOW INNOVATION FRUSTRATES SUPPLY CHAIN	6	DUCT SURVEYS PREPARE HINKLEY POINT C FOR NATIONAL GRID LINK-UP	72
MCELROY NAMES BARRY JOHNSON NEW QUALITY DIRECTOR	8	PRESSURE PIPE REHABILITATION WITH SWAGELINING IN MAGDEBURG	74
SVI APPOINTS NEW NON-EXECUTIVE DIRECTOR AND SHORTLISTED FOR GAS INDUSTRY AWARD	10		
PIER (UK) LTD ACQUIRES VACUUM EXCAVATION SOUTHWEST LIMITED	13	ISTT SOCIETY NEWS	
PRIMUS LINE EXPANDS PRODUCT PORTFOLIO AT IFAT	14	A MESSAGE FROM THE CHAIR	80
JET AIRE SHORTLISTED FOR WIA AWARD	17	TRC NOW AN AFFILIATED MEMBER OF ISTT	83
CELEBRATING EXCELLENCE IN UK WATER	18	WEBINAR: 30 JUNE 2022 SOIL FRICTION AND INTERACTION DURING MICROTUNNELING	85
LANES GROUP CELEBRATES 30TH	19		
INDUSTRY COMMENT		UKSTT SOCIETY NEWS	
LEAKAGE MANAGEMENT: A MISSED OPPORTUNITY?	20	HELLO FROM THE CHAIR	89
ONLINE PIPE REPLACEMENT FOCUS		UKSTT AWARDS CALL FOR ENTRIES	90
ONLINE PIPE REPLACEMENT TECHNIQUES	23	NOMINATIONS FOR THIS YEARS 'YOUNG PROFESSIONAL AWARD' IS NOW OPEN	92
IMPROVING EFFICIENCY AND HEALTH & SAFETY WITH PIPELINE REPLACEMENT TECHNIQUES	42	THINK TRENCHLESS FIRST	93
BURSTING IN THE BAY: OVERCOMING DIFFICULT CALIFORNIA CONDITIONS	45	UKSTT TECHNICAL ENQUIRY SERVICE	94
HDD		EVENTS AND MEETINGS	96
APOLLO A2000R-120T USED IN GAS MAIN RELOCATION	50		
DCA - LEADING THE CHARGE FOR HDD	54		
BULLS TO MARTON WASTEWATER CONNECTION UTILISES HDD	59		

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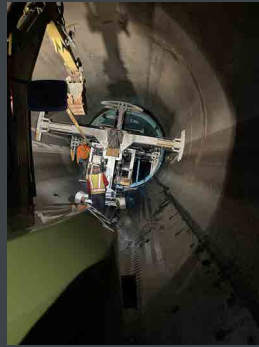
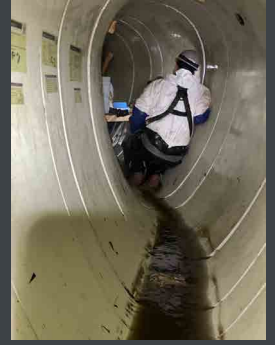
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Beyond the Ordinary

SPOTLIGHT



Ian Clarke, Editor-In-Chief,
Trenchless Works

It has been about 30 years or so since Online Pipe Replacement first came onto the Trenchless scene, starting as pneumatic pipe bursting. Since then, the technology has developed in so many ways, as you will see later in this issue.

Whilst some parts of the world have taken this technology on with some gusto, others have not and have either undertaken limited use of this option or are still to understand and utilise its full potential as it is still very new to them.

Yes, as a technology, it has some draw-backs where the proximity of adjacent third-party utilities exist and there have at times been circumstances where third-party damage has been done as the result of a bursting operation passing by. But, in most cases (if not all) the lessons have been learnt and the understanding of where and when this technology is applicable is now fully available to those who need to know.

There are also other options than bursting which are less impactful on the surroundings and therefore less likely to cause such damage. These too are discussed later in this issue.

What this tells us though is that trenchless technology, whilst a strongly developed family of options for underground buried service installation renewal and renovation, is still, to many, a field that they are not fully familiar with. Some look at trenchless as the technology they use every day without thought that there may 'be another way'.

The family of trenchless is very broad and it is still again to many a set of technologies in their infancy to those that are unfamiliar with it. This is where the Societies and organisations like ourselves have to play a very demanding part. It is up to us to keep pushing the potential of what are in many cases well-established methods to those that they remain unfamiliar.

If you have a back-ground in trenchless and know someone that may benefit from it, point them in the direction of the Societies that are local to them or towards magazines like Trenchless Works. It is only by bringing to the attention of those that may use what they see as Trenchless Technology other options, or introduce it those that do not yet know what is available to them that these technologies will achieve the dizzy heights that they offer across the buried service industry.

SLOW INNOVATION FRUSTRATES SUPPLY CHAIN

A new survey from British Water has revealed there is an ongoing lack of innovation uptake by Water Companies and their delivery partners in England and Wales.



Lila Thompson, chief executive at British Water

In 2021, the Government and water regulators in England and Wales – Ofwat and the Environment Agency – set out an ambitious programme of reforms driving water companies to give greater attention to innovation, collaboration and communication.

The trade association's annual UK Water Company Performance Survey asks contractors, consultants and suppliers to rate their clients' performance in 11 areas, including professionalism, contractual approach and communication.

Innovation was again the lowest scoring area in 2021, at a time when regulator Ofwat is encouraging water companies to find new ways of working to address key issues, without increasing customer bills. Respondents reported 'collaboration with the supply chain on innovation, R&D and testing' had decreased significantly in the past 12 months.

While noting the impact of the pandemic, the findings highlight a concerning downward trend, with levels of engagement with the supply chain falling by 28% between 2020 and 2021.

"The water sector is moving in the right direction on innovation, with the introduction of Ofwat's Innovation Competition, Spring's emerging centre of excellence, along with water company innovation days, dedicated portals and other innovation initiatives in the sector. However, our survey clearly shows the supply chain still finds it challenging to engage with clients on innovation," said Lila Thompson, chief executive at British Water.

"Utilities are facing urgent challenges to deliver their core water and wastewater services, while protecting the environment and providing value for money for customers. It is clear that the best way for the sector to improve is by engaging more closely with supply chain innovators to deliver the best possible outcomes," she added. >



Mar Batista, British Water's head of programmes

"The last five years has seen water companies under ever increasing scrutiny from regulators and unprecedented pressure from the public to improve their environmental credentials and customer experience."

British Water announced that from 2022, the water company survey will be redesigned to streamline the number of questions and focus on the issues that matter most to the supply chain.

Five year trends analysis

Instead of the traditional 2021 water company survey chart, British Water has created a five-year trends analysis, mapping water companies' performances on key areas between 2017- 2021 and identifying key themes and trends occurring across the sector.

Hearteningly, the trend shows overall the water sector is responding to legislative pressures and customer concerns with an increased focus on policies that drive environmental performance, health and safety and value for money. The highest scoring year was 2019, with water companies improving across all areas.

"While encouraging, the high scores in 2019 are likely to be due to the surge in work and spend during the final phase of AMP6, which ran from 2015-20." commented the analysis author Mar Batista, British Water's head of programmes.

"Despite the pandemic, positive scores in these key areas continued to rise in 2020, the first year of AMP7, before falling slightly in 2021, in part due to the sustained impact of the pandemic on workforces across the country." added Batista.

The worst scoring year was 2018, which is believed to be due to where it sits in the cycle of regulatory asset management periods (AMPs), as water company spending and projects for AMP6 were not yet completed.

"The last five years has seen water companies under ever increasing scrutiny from regulators and unprecedented pressure from the public to improve their environmental credentials and customer experience." added Thompson. "While the 2021 survey clearly identifies there is room for improvement, the five-year trends analysis shows there are some promising moves within the sector to work more closely with the supply chain to tackle the issues that matter most to the public such as the environment."

MCELROY NAMES BARRY JOHNSON NEW QUALITY DIRECTOR

McElroy, one of the world's leading designers and manufacturers of thermoplastic fusion equipment, recently announced the arrival of Barry Johnson as the company's new Quality Director. He will replace Steve Burgess, who has announced his retirement after 35 years of service to McElroy.



Barry Johnson, Quality Director,
McElroy

"Steve Burgess has been the leader and steward over our quality culture for many years," said McElroy President and CEO Chip McElroy. "Given how our product has changed and evolved, we were looking for a quality professional with experience in large, complex organisations to help us build and improve our systems, as well as implement new processes that will allow us to continue to lead with the quality and performance our products are known for. Barry Johnson fits that bill, and I am excited to have him on board."

Johnson will lead McElroy's quality team, identifying opportunities to improve the company's overall customer experience. Prior to arriving at McElroy, Johnson held positions at several companies including Ford Motor Company, Brunswick, and TriMas. Most recently, he served as Senior Director of Quality and Continuous Improvement at NORDAM, an aerospace manufacturing and repair firm.

"We are thrilled about Barry joining us. He brings a long history of operations, manufacturing, engineering, and quality experience to complement our operations team," said Paul Lui, McElroy Vice President of Operations.

A native Tulsan, Johnson is a University of Tulsa graduate whose career has centred around Tulsa and northeast Oklahoma, USA. He is an American Society of Quality-certified Six Sigma Black Belt and holds a bachelor's degree in mechanical engineering from the University of Tulsa, along with a master's degree in leadership from Grand Canyon University in Phoenix, Arizona.

Johnson is excited to become part of the McElroy team and looks forward to learning a new product line and approaching problem-solving in a new area.

"As a Tulsa native, I have watched McElroy grow over the decades, and I am thrilled about joining the McElroy team," he said. "As with any company, solving problems and conducting root cause analysis is key to providing quality products to our customers. This is my passion and I look forward to applying my skill set at McElroy."

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SVI APPOINTS NEW NON-EXECUTIVE DIRECTOR AND SHORTLISTED FOR GAS INDUSTRY AWARD



Barry McNicholas, Non-executive Director, Steve Vick International

Steve Vick International (SVI) is pleased to announce that Barry McNicholas has been appointed as a non-executive director to its board of directors.

Steve and Barry first met in the late eighties when Barry joined his family company McNicholas Construction which was for many years one of SVI's principal customers in the gas industry. With Barry's experience as CEO of a large family company, he and Steve have always kept in touch to share their experiences of the special nature of family businesses.

Barry was most recently Group Managing Director of Kier plc where he had full executive responsibility for its Utilities & Rail business.

Crock Harrison, Managing and Technical Director commented: "Following on from Tony Day's departure at the end of 2021 we welcome Barry and his wealth of experience across the different utilities industries. His knowledge will certainly help us as we continue to grow and diversify into other sectors. We are delighted he has been appointed to serve on the board and look forward to working with him." >

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“The Gas Industry Awards, from IGEM and the Energy and Utilities Alliance (EUA) recognises the contribution of the gas industry’s most innovative, dedicated and outstanding members.”

On his appointment, Barry commented: “Having worked with Steve for so long and been involved in numerous projects with both him and the company I am delighted to join Steve Vick International. SVI is a successful market-leader that has been in the business for 40 years and continues to develop innovative engineering solutions that offer significant benefits to the organisations with whom they work.”

Steve Vick International also recently announced its delight at being shortlisted for Company of the Year at the Gas Industry Awards 2022, taking place on 11 May 2022.

The Gas Industry Awards, from IGEM and the Energy and Utilities Alliance (EUA) recognises the contribution of the gas industry’s most innovative, dedicated and outstanding members.

In compiling the shortlist, a panel of esteemed judges deliberated over more than 100 entries for the prestigious awards.

The winners of each of the 10 categories will be named at the award ceremony held in-person at the London Hilton, on Park Lane, London, UK.

The shortlisted nominees for Company of the Year are, Steve Vick International, United Living Infrastructure Services (ULIS) and SGN Ltd. For further details, and to book your place at the Gas Industry Awards please visit: www.gasindustryawards.com

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PIER (UK) LTD ACQUIRES VACUUM EXCAVATION SOUTHWEST LIMITED



Two of the fleet of Suction Excavation vehicles that will now form part of Pier UK's fleet with the acquisition of Vacuum Excavation Southwest Limited.

"We became the largest operator of vacuum excavation systems in Europe back in 2015 and we are aiming to maintain this status for many years to come."

Pier (UK) Ltd recently announced the completion of the purchase of Vacuum Excavation Southwest Limited from Marcus Wilcox. The company will become a trading division of Pier (UK) Ltd.

Following the acquisition, the company has been quick to invest further in the company and has received the first two vacuum excavators carrying the new branded group livery from MTS UK and there are plans already in place for many more to follow.

The two new systems will add to the already large existing fleet that Pier (UK) has operating from its new Exeter premises.

Sean Quinn, Joint Managing Director of Pier (UK) Ltd, said: "We became the largest operator of vacuum excavation systems in Europe back in 2015 and we are aiming to maintain this status for many years to come. We are now in our 14th year of providing vacuum excavation services to over three hundred customers and we continue to regularly add to this customer base."

Sean continued: "I am sure Marcus will be proud to see the company name he created (now under the Pier (UK) Ltd logo) passing him on the roads in the Southwest on a daily basis."



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PRIMUS LINE EXPANDS PRODUCT PORTFOLIO AT IFAT

A schematic of lining under a busy roadway shown not interrupting traffic flows.

The system for trenchless pipe rehabilitation, Primus Line®, is designed for long rehabilitation sections. The system is seamless, safe and almost independent of unforeseen pipe conditions.

Just in time for IFAT, the manufacturing company from Bavaria, Germany is expanding its product range for water applications. The new low-pressure liner serves pipes with a nominal diameter of DN400 and, with a permissible operating pressure of 12 bar (MOP), aims in particular at applications with a pressure rating of PN10. The need for rehabilitation of wastewater pressure and drinking water pipes in precisely this area has recently increased significantly.

Primus Line can therefore once again offer a safe and economical rehabilitation solution, even for lower pressure levels. The low-pressure system is a cost-benefit-optimised version of the medium-pressure system. Through the targeted reduction of the aramid share in the fabric layer of the liner, cost savings of up to 30% were achieved in the case of the DN400. >

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Samples of Primus Line®.

“The Primus Liner® is completely prefabricated in the production plant according to ISO 9001 standards and delivered ready for installation – seamlessly and under continuous quality control.”

Products for diverse applications

With the low-, medium- and high-pressure system, the company has a differentiated portfolio that includes a custom-fit solution for a wide range of applications. In addition to the medium water, the technology is also suitable for gas and oil applications and can also be installed as a bypass due to its flexibility combined with high material strength. With over 1,500 completed projects worldwide, the company has experience in a wide range of applications, including large-scale projects with long insertion lengths. Due to its features, Primus Line® can do even more than purely special applications in the form of culverts or crossings of bridges or traffic routes. Last year, for example, Primus Line rehabilitated a 1.2 km long DN300 grey cast iron drinking water pipeline in Zweibrücken in two sections. On the Italian island of Sardinia, a 6 km long rehabilitation project on a DN500 drinking water pipeline made of asbestos cement was completed in 2020. The longest section pulled in there covered more than 1.1 km and took only three hours at a pull-in speed of about 6 m/min. Designed for long rehabilitation sections, Primus Line® is designed for exactly this purpose, that is for long rehabilitation sections, transport pipelines and transmission lines. Pipeline lengths of up to 2,500 m in one section can be rehabilitated with Primus Line®. It can even be produced up to 4,500 m in one piece.

The Primus Liner® is completely prefabricated in the production plant according to ISO 9001 standards and delivered ready for installation – seamlessly and under continuous quality control. This not only reduces the installation time on site, but also increases the safety and quality of the product with a service life of at least 50 years.

Risks that arise with alternative renovation methods due to improperly executed welds or pre-assembly under difficult conditions on the construction site are eliminated. Nevertheless, Primus Line® remains flexible for many unforeseen situations. Smaller pipe offsets, bends of up to 45°, deviating materials or valves to be passed through, which only become apparent during the construction of the excavation or during the camera inspection, hardly pose a project risk.

The flexibility of the liner and the annular space that remains between the liner and the old pipe make the rehabilitation solution independent of many external conditions. Time and costs therefore remain within bounds, even in the event of unexpected conditions. Visitors to IFAT will also be able to see this for themselves. First and foremost, the broad-based trade fair team with technical experts and regional contacts is looking forward to meeting all customers in person and discussing specific project plans or application scenarios.

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JET AIRE SHORTLISTED FOR WIA AWARD

Jet Aire Services has been shortlisted for a prestigious award in a ceremony which recognises outstanding work between water companies and their partners.

The company's work over the last 12 months has attracted the attention of the judges at the Water Industry Awards 2022, and Jet Aire is in with a chance of winning the Contractor of the Year honour.

Jet Aire Services, which runs from a headquarters in Leeds and has additional bases in Darlington and Tyneside, will go up against Galliford Try, Network Plus and MWH Treatment at a glittering ceremony at the Birmingham Hilton Metropole on 29 June. >

Ian Willis, Marketing
Manager at Jet Aire
(DC) Ltd.

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“It has been an exciting time for us over the past year, and it is a great honour to be shortlisted in such a high-profile event which recognises the very best in the sector across the whole of the UK.”

Over the past year, Jet Aire Services has acquired Tyneside-based drainage experts KwikFlow to expand its fleet and coverage, and was subsequently taken over by environmental specialists Adler & Allan in a deal which was mutually beneficial for both parties.

The trenchless expert has invested in excess of £1.5 million in new technology to enhance its service offerings.

Darren Pavan, Managing Director at Jet Aire Services, said: “It has been an exciting time for us over the past year, and it is a great honour to be shortlisted in such a high-profile event which recognises the very best in the sector across the whole of the UK. Our business has grown dramatically in the past year, firstly with the deal which saw us acquire KwikFlow and then the opportunity which saw us join the Adler & Allan group.”

“With a head office in Leeds and other depots in Darlington and Team Valley, we have been widely regarded as a northern-based specialist in the sector. But, the work and investment we have made in recent months has helped us to flourish and grow to the level where we can pick up work anywhere in the UK. To be recognised in the Contractor of the Year category shows just how far we have come.” he continued. “Our crews carry out fantastic work in often difficult conditions 365 days a year, but there is an awful lot of hard work carried out by our support teams in the three offices to ensure things run smoothly so I see this as a real team effort and offer my thanks to every single person who has played a part in our growth. We congratulate all of the other companies who have been shortlisted, and we look forward to what I am certain will be a fantastic evening.”

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LANES GROUP CELEBRATES 30TH



Lanes Group plc
Chief Executive
Wayne Earnshaw
cutting the
celebratory cake.

Success tastes sweet as UK sewer cleaning leader Lanes marks 30th anniversary. Lanes Group plc Chief Executive Wayne Earnshaw has marked the 30th anniversary of the company his father founded by making the first cut in a cake shaped like a jet vac tanker at the company's Greater Manchester HQ.

As what is claimed to be the UK's largest independent drainage and wastewater specialist, the company operates hundreds of the specialist vehicles that can clean sewers and suck up waste for safe disposal.

So, it was perfectly apt that the cake baked to mark the 30th anniversary looked like a mini version of the eye-catching pink and white tanker lorries that have become an increasingly common sight on roads across the UK.

Slices of the chocolate cake, made by East Lancashire professional baker Molly Robbins, former star of Channel 4's *Extreme Cake Makers*, later made tasty treats for colleagues at the Lanes Manchester depot and HQ offices.

Wayne Earnshaw said: "We are proud of what Lanes has achieved over the last three decades, delivering drainage services on behalf of many water companies, tens of thousands of businesses and millions of people. Over the years, those services have been delivered by many thousands of dedicated and highly professional people, including our current teams. So, we will be celebrating their contributions over the rest of 2022."

Wayne Earnshaw's father, Allan Earnshaw, and Graham Tattershall triggered the company's rapid development when they bought Lanes for Drains from its founder, John Lane, on 21 April 1992.

What began as drainage company with one depot in Leeds, West Yorkshire, has since grown rapidly to operate more than 35 service depots and utility hubs, and a turnover of over £300 million.

Lanes is now one of the UK's largest wastewater maintenance service providers. Clients include Thames Water, Severn Trent, Yorkshire Water, Scottish Water, Dwr Cymru Welsh Water, and Northumbrian Water.

In 2020, the company launched its latest business venture, setting up Lanes Infrastructure to deliver excavation and ducting installation services for the broadband industry.

The Lanes-i launch has been a big success, with the business building a rapidly growing portfolio of contracts, aided by an innovative business model that combines digital operational systems with industry-leading safety and quality standards.

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LEAKAGE MANAGEMENT: A MISSED OPPORTUNITY?



Tim Farley, Business Development Manager, Sanivar.

Leakage has been a key metric measured by water companies for decades and has become so engrained in the industry, that the 22nd Annual Leakage Conference was recently 'celebrated'. It represents a huge admission of failure that our industry continues to accept leakage on key infrastructure assets in both waste and potable networks, instead of realising that this is a fundamental failure their customer service and a waste of our most precious resource.

Is there any other industry that would invest in transforming a raw resource into a valuable commodity, only to waste volumes by failing to deliver to the customers it was produced for, and who paid for its production? Then, to add insult to injury, the same customers are charged to collect effluent, only for their local environments to then be polluted through failings in transfer networks.

Following years of the water industry accepting leakage as an operational inconvenience best addressed through reactive repairs, there is now an established culture of tolerance that has spawned terminology such as the 'Economic Level of Leakage', as well as a myriad of repair technologies, from clamps to platelets. The fact that Ofwat sets leakage targets is evidence of settling for lower standards and never has the term 'fail to prepare or prepare to fail' been more relevant. >

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“Whilst considerable advances have been made in leak detection, data logging and condition monitoring of networks, the fundamental approach of ‘find and fix’ remains unchanged.”

A lining operation underway.

With networks under growing stress because of age related deterioration, population growth and climate change, now is the time to adopt a proactive approach that consigns leakage to history, in much the same way as Water Quality was addressed in the Section 19 Programme of the 1990's.

Whilst considerable advances have been made in leak detection, data logging and condition monitoring of networks, the fundamental approach of ‘find and fix’ remains unchanged. Instead of future proofing assets to prevent leakage, companies continue to play ‘chase the leak’ on pipelines, demanding multiple interventions and causing disruption for customers. Such an approach had been taken on a wastewater asset in Matlock, Derbyshire, until an alternative, sustainable solution that extended asset life by 50 years and eliminated the risk of leaks and future pollution incidents was adopted.

Severn Trent Water had experienced frequent bursts on a 10 in (250 mm) diameter Cast Rising Main running along Matlock High Street with at least 10 repair interventions over a two-year period. A programme of ‘patching’ was attempted to resolve the issue, involving a number of excavations and traffic management that caused delays for customers. Subsequent CCTV surveys showed that the pipe had been subjected to internal erosion and that a groove had been worn along the base of the pipe providing a continuous weakness. Severn Trent turned to Sanivar's innovative pull through liner, SaniTube, to refurbish 750 m of main, repairing existing leaks and mitigating against future internal erosion. SaniTube was chosen because of its:

- Ease of installation, requiring minimum excavations
- No curing time, minimising customer disruption
- Pressure tolerance of 34 bar
- Ability to navigate 45° bends present on main
- 50-year warranty providing extension of asset life

INSTALLATION

The liner was installed by Colus, a specialist lining contractor, in three 250 m sections running from the top of the High Street through to a discharge chamber in the park adjacent to the river at a rate of 6 m/min.

Having proved this concept of refurbishing to future proof assets against leakage, Severn Trent has now adopted SaniTube as a BAU solution for rising main failures and other water companies including Yorkshire, South West and Anglian are also >

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The liner is delivered to site on a reel.



Inserting the liner off the reel into the host pipe.

Monitoring the liner curing process.



using SaniTube on wastewater networks. Furthermore, there is an appetite to use this technology on potable networks and, subject to final leachate testing, Sanivar expects to achieve Reg 31 approval within the next three months.

One of the barriers to wider adoption of Sanivar's solutions is the relative cost of lining, versus a dig down repair. There is no doubt that on a like-for-like analysis the latter is the cheapest option. However, this is a short-term view and ignores the wider benefits of refurbishing and protecting a length of pipeline rather than repairing a small section. What is also often overlooked is the cost of accessing underground assets both in terms of excavations and temporary service provision. Excavations are disruptive and carry inherent HSE risks, not to mention increased carbon emissions. A liner can be installed over a 200 m section of pipe with the same excavation footprint that it would take to install two isolated repair clamps. Meanwhile, tankering costs to maintain serviceability can typically exceed £5,000 per day and would apply equally for a single repair or wider refurbishment.

Totex was supposed to extend analysis to 'whole life costing' and benefit analysis, yet many asset owners continue to look at short term Opex costs in favour of a holistic intervention that delivers wider benefits.

It is clear that the water industry's culture of tolerance will stand as a barrier to its own progression, as they favour traditional, temporary fixes over new, alternative techniques that offer a long-term, cost effective solution to the problem of leakage.

SaniTube and other lining technologies can repair and mitigate against future asset failures and need to be widely considered as viable alternatives for future proofing networks, mitigating leakage and improving customer service – all key priorities for water companies whose responsibility will only increase with depleting resources.

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FOCUS

ONLINE PIPE REPLACEMENT

ONLINE PIPE REPLACEMENT TECHNIQUES

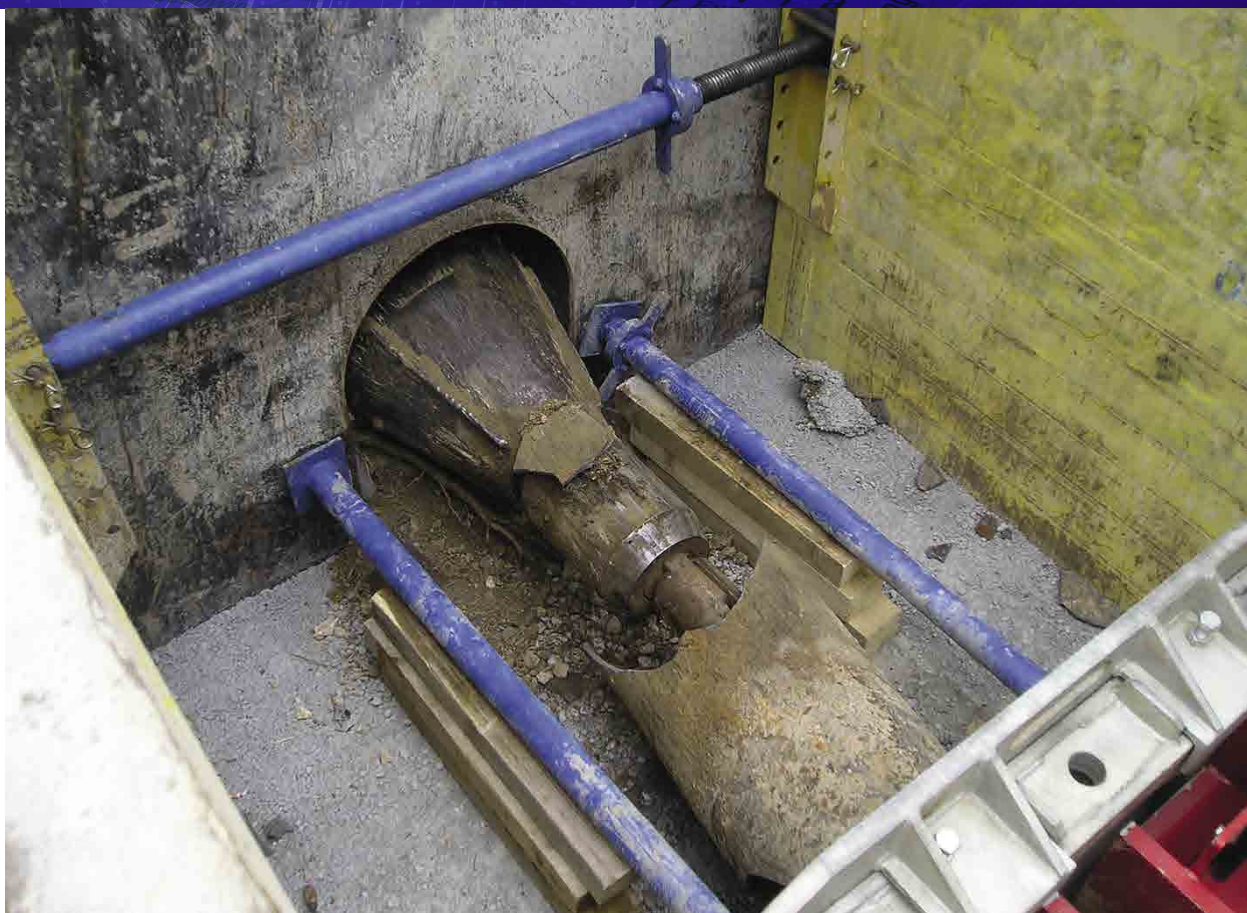
For the past 50 years, if not more, one of the biggest factors affecting underground works in has been the highly, and increasingly, overcrowded nature of the subsurface with the various utilities and services that are already installed. This is particularly the case in urban areas where huge developments on communications technology are taking place, so adding to the plethora of pipes, cables and ducts that are found from just a few centimetres deep to several metres deep below the surface. >

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Monitoring the liner curing process.

A bursting head emerging into the launch pit after completing a run.



This led to a train of thought that meant clients and contractors went from simply looking at 'putting in a new one' when a service or utility needed to be replaced to 'can we fix or replace the old one where it is'.


Having previously looked at renovation and rehabilitation systems for repairing ageing and deteriorated pipelines back in our February issue this year, it is now time to look at another option, that of Online Pipe Replacement.

Where a pipeline that is beyond repair or is of a material that is no longer deemed suitable for use, this family of techniques is able to utilise the original route of the pipeline or duct so as not to impinge on virgin ground that might first of all be used for some other utility or service, whilst affecting the replacement without the need for full length trenching.

DYNAMIC SYSTEMS

The first move into this area came in the 1990's and utilised impact hammers that were guided through the original pipe using a winch cable to keep them on the existing route. The impact process of the hammer then broke down the fabric of the old pipe, provided it was of a material that could be fractured. The head of the hammer is fitted with a specially designed attachment that not only aided the fracturing of the pipe fabric in the ground but also pushed the shards of the now broken pipe outwards into the surrounding ground. This then created a void into which a new pipe could be pulled, normally fixed to the rear of the impact hammer so that the new pipe was installed as the hammer advanced through the old pipe. The surrounding ground also had to be sufficiently compressible. This technique has thereafter become known as Dynamic Pipe Bursting.

The problem then arose that not all pipes that were in need of repair could be fractured in this way. Ductile Iron and steel pipes as well as plastic pipes do not usually fracture but need to be split or cut and they do not always respond well to the impact action of the hammers used. >



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

“Several different approaches have become popular over the ensuing years with different ideas became commercially available and increasingly popular.”

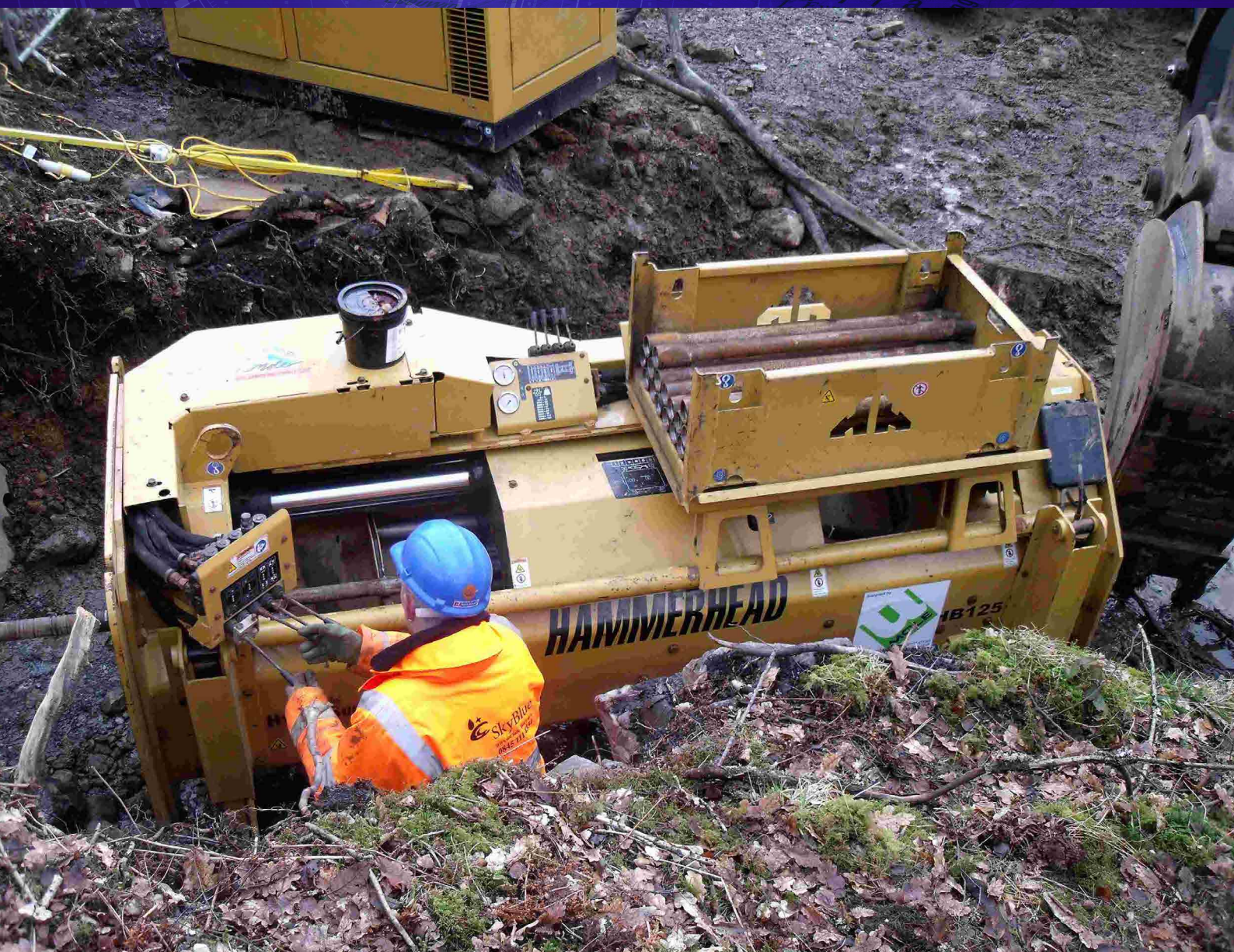
CHANGING ATTITUDES

A further problem with impact hammer technology for pipe bursting (also known today as ‘online pipe replacement’ because of the various different options now available), was that particularly in the urban environment having relatively heavy impact operations not too far below ground often led to complaints from local residents and businesses due to the vibrations that were being felt at surface. So other options were investigated.

Several different approaches have become popular over the ensuing years with different ideas became commercially available and increasingly popular.

One of the early options that is now not commonly used, if at all, was the expansion shell system. Similar to the impact hammer technique in some ways, the bursting head, instead of being more or less self-advancing through the original pipe, was drawn through the pipe on a winch cable. Depending on the diameter of the unit and the length of the head, this advance was made in unit length increments. At each stopping point the bursting head was expanded inside the pipe using hydraulic rams built into the unit, pushing the steel framework outwards against the pipe wall.

In friable pipes, such as unreinforced concrete, clay, asbestos cement, pitch fibre etc., which are generally designed to be strong when under compression from the surrounding ground but which are less so under tension from internal pressures, the outward pressure broke the pipe relatively easily. The new pipe attached to the rear of the shell was drawn in as the system advanced. >



A static pipe bursting machine from Hammerhead.

The disadvantage here was that the minimum size of bursting head was limited by the need to have an effective shell expansion system within the body of the head, so the smaller pipe diameters were more difficult to replace using this technique.

Both impact hammer and expansion shell systems could however be used to install a larger diameter new pipe if required and if ground conditions were sufficiently compressible to allow for the surrounding ground to be opened up to allow for the required larger void to be created. Where the surrounding ground is not compressible this does have an adverse effect on the potential to use pipe bursting options (of any sort) that utilise force from inside the pipeline outwards.

Another factor that sometimes influenced the applicability of the impact hammer and expansion shell systems was the state of stability of the old pipeline. Because both systems required the installation of a winch cable before the process could begin, if the pipeline being replaced was in a serious state of collapse at any point along the route it might be impossible to position the cable required. >



A Hammerhead 100 XT pipe bursting system in operation.

“The bursting head demolishes the old pipe, an expansion cone, which normally sits just to the rear of the busting head, pushes aside the broken pipe shards and expands the void to the required diameter thereby making room for the new pipe that follows along behind.”



Splitting a gas pipe using a Hammerhead unit.



STATIC SYSTEMS

Despite being quite effective, both impact hammer and expansion shell systems had their disadvantages in terms of speed of operation and impact on the surroundings and nearby buildings, utilities and people. They do still have their place in the market but with the need to minimise local and environmental impact, many pipe bursting situations now use what is known as Static Pipe Bursting.

With this system a rod pusher/puller machine is used to push a steel rod through the old pipe as a first stage. Often the lead rod is specially designed to negotiate its way around or through obstructions. Some systems even offer a rotational capability that enable a form of drill head to be used to negotiate through even the toughest and most blocked pipelines.

Because the rod is a solid metal bar it is much easier to get the rod string through most obstructions in the pipeline, something that is not always possible when installing a winch cable. Once the rod string is installed a bursting head arrangement is attached to the rod string and the new pipe to be installed is usually attached to the rear of this head using a swivel.

The rod ‘pusher’ then becomes a rod ‘puller’ and the whole bursting arrangement is drawn back towards the start pit. The bursting head demolishes the old pipe, an expansion cone, which normally sits just to the rear of the busting head, pushes aside the broken pipe shards and expands the void to the required diameter thereby making room for the new pipe that follows along behind. The rods are removed from the machine as the process proceeds until the bursting head arrives at the start pit. The head arrangement is removed and the new pipe is connected to the existing pipe network.

The rod systems can vary also. In most cases the bursting rods are simple solid steel rods with screw fittings at the end that join the individual rod lengths together. In this case the pulling action is achieved using grips around the rod that either push or pull the >



“The air driven GRUNDOCRACK’s blade shatters the old pipe while advancing through the old pipe and radially displaces the fragments into the surrounding soil while pulling in the new pipe simultaneously.”

Pipe bursting using a TRACTO Grundcrack unit.

rod string as required. There is a different rod system where the rods link together and are designed in a ladder format. Here the rods simply link together at the ends and the ladder design allows the pulling and pushing action to be achieved by a rack and pinion action.

There are a number of different designs for static pipe bursting some of which will be highlighted later in this article. They vary in physical size and pulling power and each will be need to be selected by the end user to suit the varying installation scenarios.

One of the disadvantages of these systems is that in the majority of cases there is a need for an often reasonably sized start and reception pit to enable the operation to take place effectively, although in the modern industry this is not now always the case.

Where this situation arises, some manufacturers have brought to the market small footprint bursting systems that utilise a wire rope as a ‘pulling’ medium that provides the bursting forces required to complete the work. In many cases these systems can be either surface mounted with pulley systems that align the cable to the old pipe or which can be mounted within existing manholes so negating any need for start and reception pits with smaller dimension pipe being added to the pipe string as the burst advances so as to fit int the manholes being used. These cable-based machines again come in various designs and should be investigated by potential users to endure they are suited to the project in hand.

Where old pipe materials are not conducive to simple fracturing, there has been a need to develop pipe splitter ‘bursting’ heads that do not so much break the existing pipe as cut it in a manner that will allow the remains of the pipe to again be pushed aside by the expansion cone into the surrounding ground. It should be noted that different old pipe materials react to different cutter heads in different ways and anyone looking to use any of these techniques should consult closely with their equipment provider to ensure that the right head is applied to the right job – otherwise it will simply not work and waste both time and money! >

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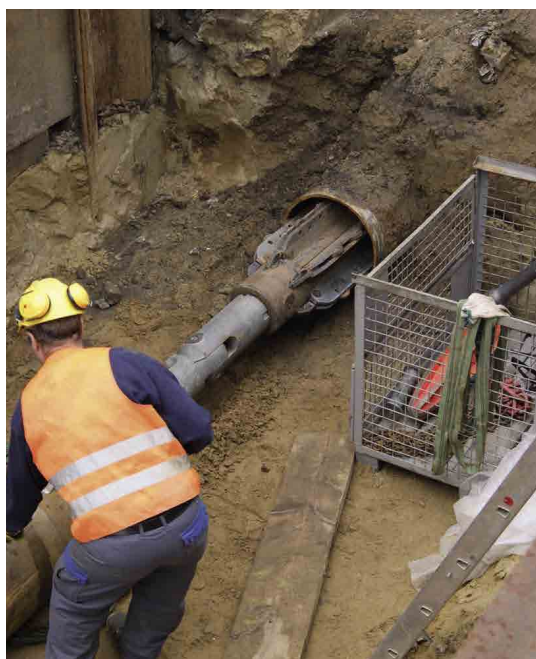


Come by: Hall C3, Booth 305/404





A TRACTO Grundoburst Tracto 1900G in action in Münster.



A TRACTO Grundoburst 800 G operating in Botswana.

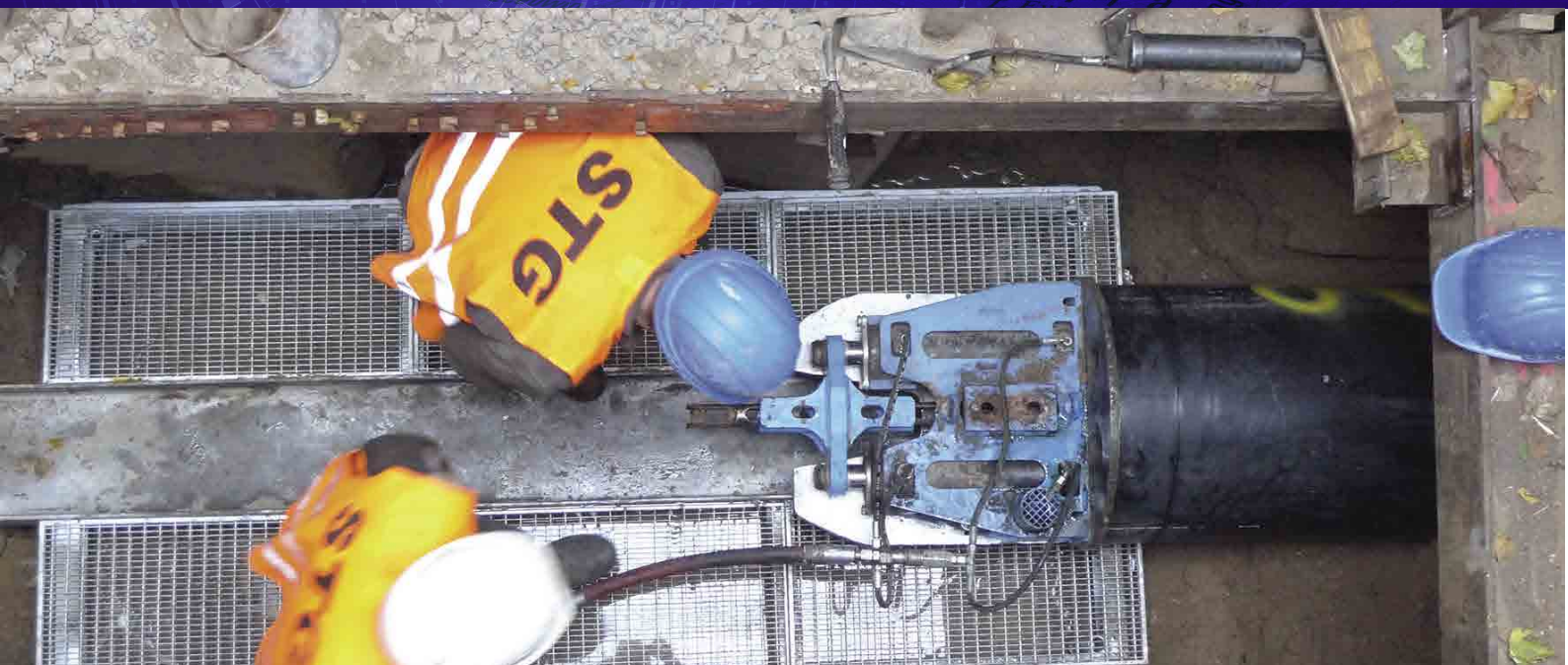
The development of the specialist cutter heads also had a significant impact on use of the systems for even friable pipe materials. As the use of the techniques has evolved and expanded, one problem that occurred early-on was that repair collars would not fracture even when the pipe itself could, usually because they were made of steel. The development of the new splitter heads did however in the main negate this problem as the repairs could also be split. Sometimes however the strength of these collars meant that the stresses/loads on the equipment required larger machines than necessary being used on projects.

The drive across many countries to reduce drinking water network leakage rates has meant most pipe replacements so far have utilised plastic, usually PE or uPVC pipes, as the replacement material, with leakage rates in many being reduced significantly over the past decade or so. But even now across Europe there is still a problem with, according to some, up to 20% of treated water leaking out of the various systems before reaching the customer. So, the move from gravity to pressure pipe systems in the use of pipe replacement techniques has been quite considerable.

A major advantage of both Static and Dynamic pipe bursting systems has been the facility, under the right ground conditions, to replace an old or deteriorated pipeline not just size-for-size but to upsize the pipe along its original route to offer increased capacity. This is an option which, with increasingly dense populations in existing urban areas, has major significance.

OTHER OPTIONS

Over the years and given the many different situations in which there has been and is still a need for the replacement of deteriorated or undersize pipelines, it is no surprise that in particular the static pipe bursting and cable-based systems appear to have taken a lead in popularity amongst both contractors and clients looking at the replacement options available. This is largely because they are relatively easy to use and cost-effective which is a 'must' for all client operations in the modern world. >



Undertaking a bursting operation in Braunsberg with a TRACTO unit.

However, there are times when even the most popular systems do not provide the solution to the problem in hand. To answer these situations there have been other not always but possibly more costly but also highly effective solutions developed.

Typically, these situations arise where due to ground conditions, proximity of other utilities or circumstances where it is not advisable or possible to leave the remains of the old pipe in the ground due to potential for contamination or other environmental reasons.

Two options have been developed for such circumstances. The first is what had become known as 'Pipe Eating'. To replace a pipe using pipe eating normally requires the use of equipment that will not only fracture or fragment the old pipe sufficiently to install the new one but also one that will remove all traces of the old pipe from the site/route. This until recently has usually been achieved using either a microtunnelling technique or the use of a specialist cutting head on an HDD (Horizontal Directional Drilling) machine.

With the microtunnelling system, a shaft is sunk at the launch position at one end of the pipe being replaced. The cutter head is designed such that it will not only extract any ground around the old pipe but also grind or break down the pipe material itself. As the cutter head advances along the line and grade of the required replacement the old pipe is removed by the spoil extraction system of the microtunneller and the new pipe is jacked into position behind the microtunneller. One advantage of this system is that if the new installation is required to have a significantly larger diameter, then the surrounding ground does not have to be compressible just boreable. Also, should the alignment of the old pipe have altered over time due to ground movement, loadings etc., it is possible to realign the new pipe to the precise line and grade required.

Similarly with the HDD option, the drill string of the HDD rig is pushed through the old pipe until it reaches the reception end of the pipe line being replaced. A special cutter head is again fitted to the drill string and the new pipe attached via a swivel to the rear of the cutter head. The whole arrangement is then pulled back towards the HDD machine with cutter head demolishing the old pipe as it advances whilst installing the new one immediately behind the cutter head. The drilling fluid system for the HDD rig extracts the remains of the old pipe in a similar fashion to that used when reaming a pilot bore the correct size during a traditional HDD operation. Again, the diameter of the final pipe replacement can be adjusted by allowing the cutter head to not only remove the old pipe but also any surrounding ground, provided that other utilities will not be affected by such an enlargement. >



Commencing a bursting run with a TRACTO unit.



A TRACTO static bursting unit showing the ladder rods.

A more recent adaptation of the pipe eating technique has been the use of an impact hammer that would normally be associated with the pipe ramming technique. Here, a new pipe was installed along the line of an existing pipeline with the new pipe being rammed by a hammer around the outside of the old pipe. At the leading end of the new rammed pipe a special arrangement was placed inside to fracture the existing pipe so that it could be removed along with spoil created by the ramming method.

SMALLER DIAMETERS

At, usually, smaller diameters such as service pipe connection to houses or business premises there is also a need to replace ageing pipes. In many instances this is because, particularly in long established and well-developed countries, many of the services still remaining in use are lead pipes. The requirement to renovate or replace these has become increasingly urgent as more becomes known of the effects of lead on the human condition and lead-in-water limits are decreased further and further with currently many of the developed world looking limits of lead at not more the 10 ppb (parts per billion) concentration.

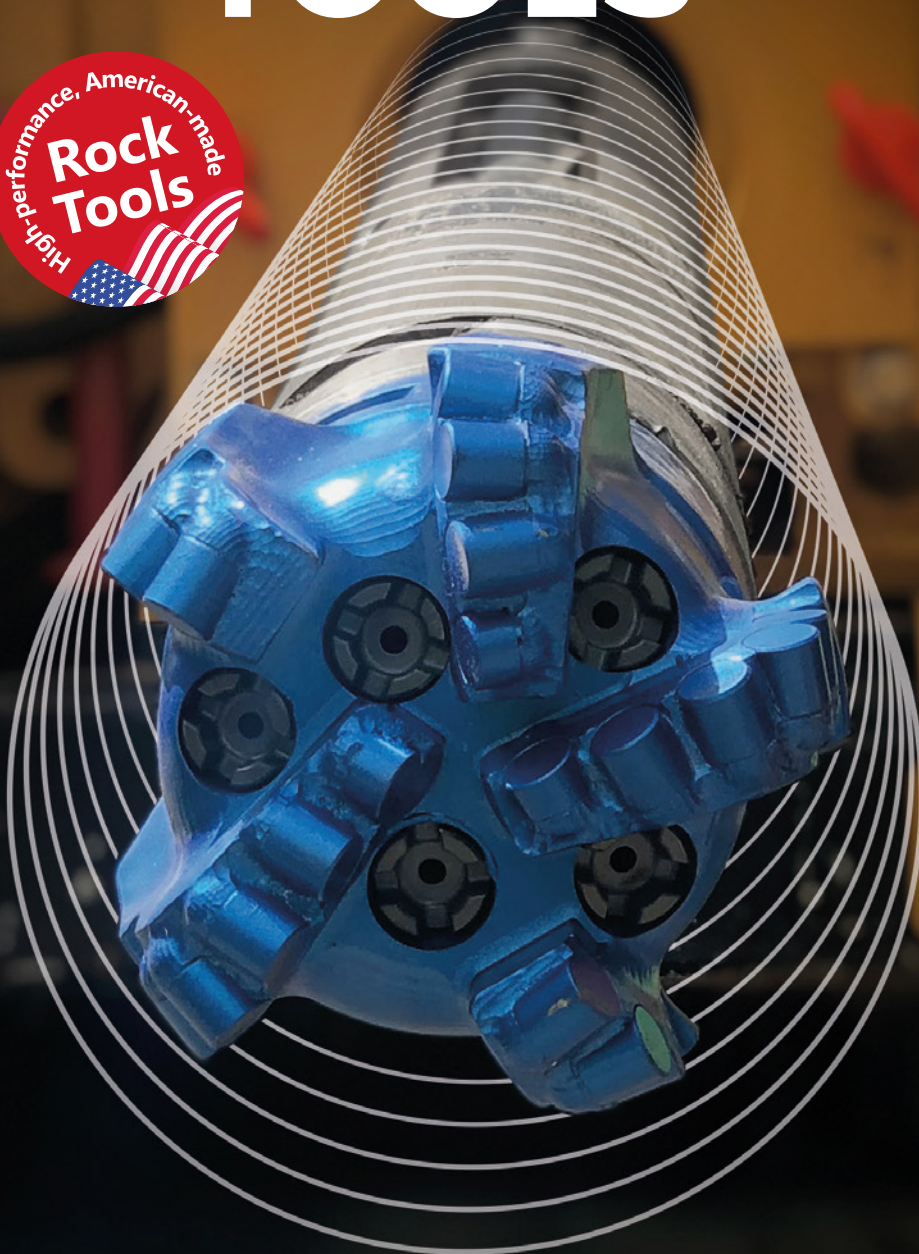
Where this situation arises the small diameter of these pipe makes it increasingly difficult to replace them using the more recognised technique covered earlier. This has led to the development of what are known as 'Pipe Extraction' techniques.

In general, with pipe extraction techniques the old pipe is first isolated at both ends and a cable/wire rope is passed through the pipe. In some instances, this cable is fitted with 'teeth' that, when the cable is pulled back towards its launch point, expand and contact the inner pipe wall digging into the softer lead to gain grip along the rope length. As the cable is withdrawn the pipe is pulled out of the ground and wound onto the drum of the winch pulling the cable. The new pipe is usually attached to the free end of the winch cable and is drawn into place as the old pipe is removed.

The technique is similar where instead of the 'toothed cable' the wire rope is 'glued' into place over the extraction length thereby enabling the extraction to be completed. >



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So, to summarise, what has tended to happen is that individual terms have come to be associated with specific types of pipe replacement technique of which there are number. These include:

- Pneumatic Pipe Bursting or Pipe Cracking or Dynamic Pipe Bursting
- Expansion Shell Pipe Bursting
- Rod-based Pipe Bursting or 'Static Pipe Bursting' and 'Splitting' using varying designs of bursting heads for friable and non-friable pipes
- Cable/Rope-based Pipe Bursting smaller diameters difficult to access for rod systems
- Pipe Extraction
- Pipe Eating

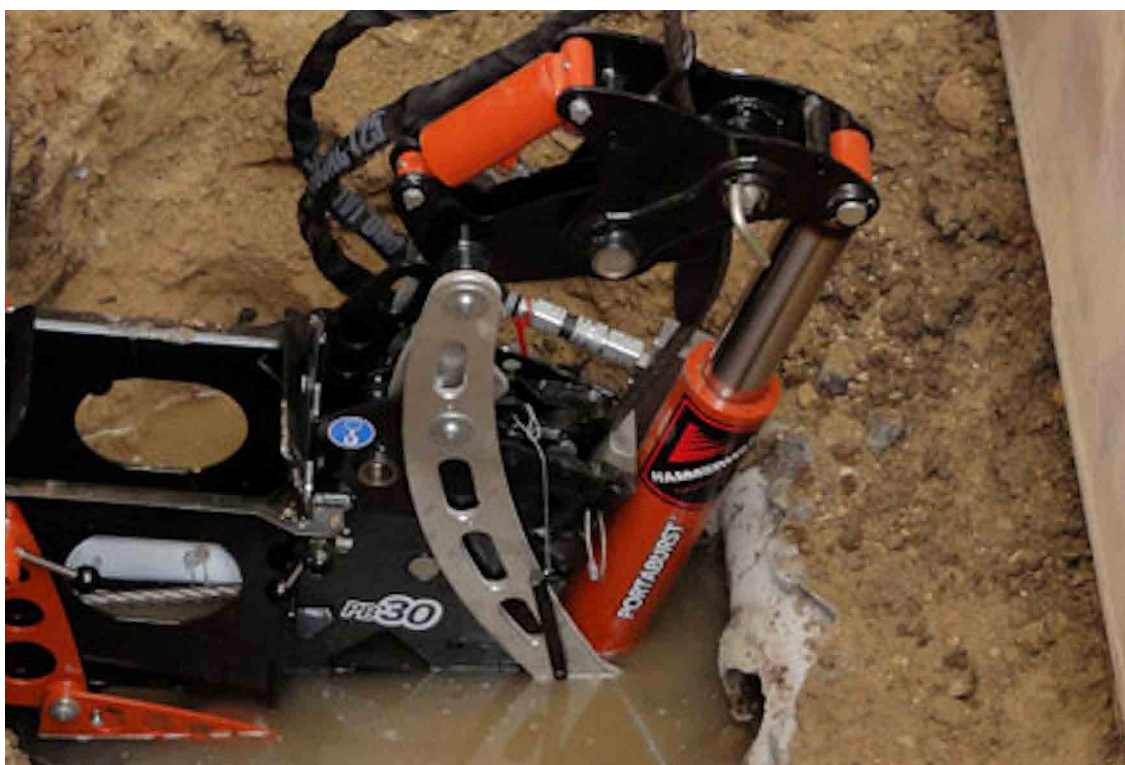
Today, in many areas of the world, Static pipe bursting and Pipe Extraction seem to be taking a lead as the more popular options but the other options still have their place and continue to be used where circumstances are favourable.

MACHINE OPTIONS

What follows is a small selection of the various machine types that are available from just some of the manufacturers in the pipeline replacement field. The popularity of the Static and Cable systems is reflected in the fact that almost all of the information provided by manufacturers in response to the information request for this article covers just these technologies. But it should be borne in mind that the other options are out there if needed but may be a little more difficult to source. Just do not forget they are there when considering project options. Who knows when they be just the right choice!

HammerHead Trenchless Equipment: Hammerhead Trenchless, part of the Charles Machine Works Group is available worldwide through the Ditch Witch dealership chain. In the UK, Mammoth Equipment Ltd is the distributor of Hammerhead Trenchless Equipment in the UK and Eire. Based in Ely in Cambridgeshire, Mammoth provides sales, support, service and training for the full range of Hammerhad Moles, Pilers, Rammers, Bursters and Winches. >

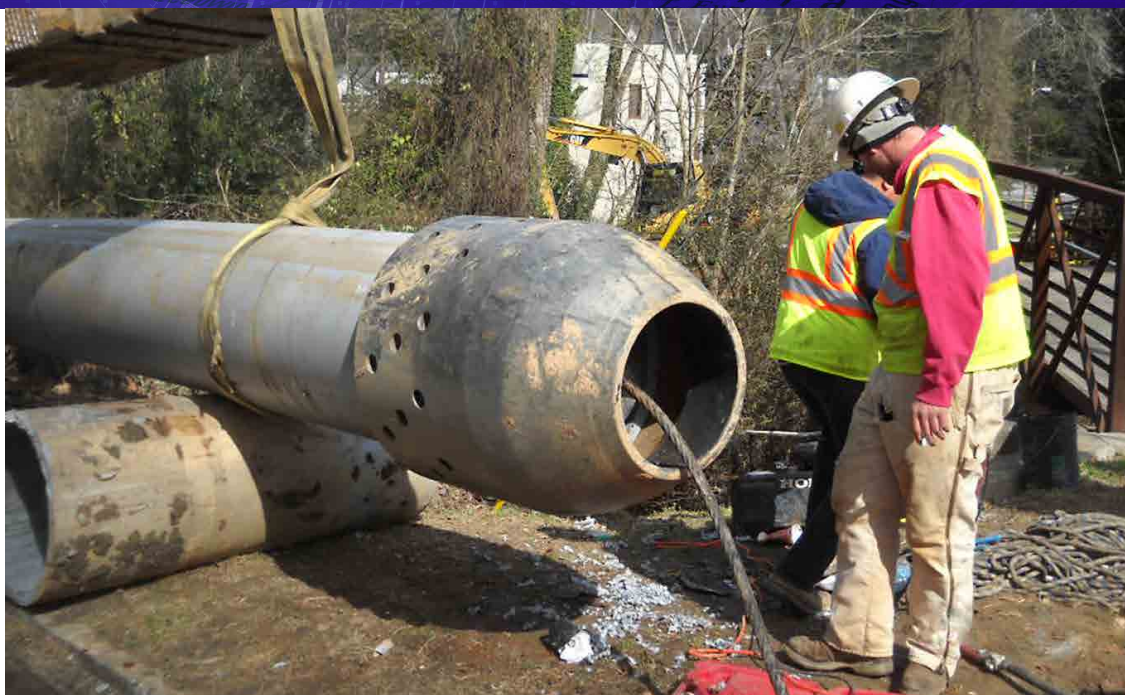
A Hammerhead PB30 cable-based pipe burster.



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A Hammerhead
pneumatic
burster.



Pipe Bursting, has become a well excepted method of replacing failing gas, water and dirty water mains.

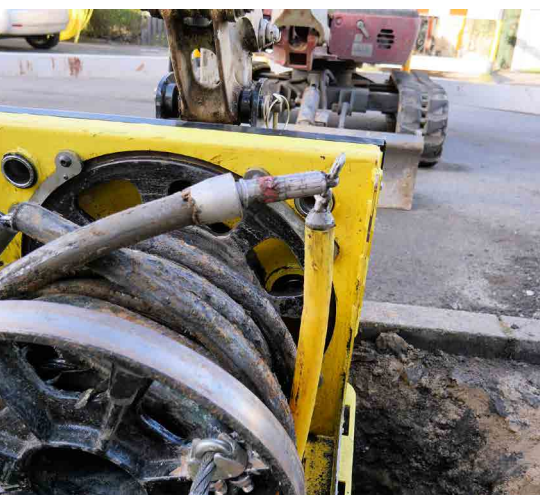
Hammerhead offers a full range of bursters divided into four categories which include:

- **Portaburst Lateral Rope Bursting Systems** – Developed to satisfy the rising demand for small diameter sewer line replacement in 3 in (75 mm) and 4 in (100 mm) diameter range at lengths up to 45 m, Portaburst provides a small footprint, low weight, high power solution that can be used in manholes in difficult access locations such as gardens and backyards. With 30 tons of pull back the Portaburst used a compacted steel cable rather than steel rods to ease installation in mains and also features special compact burst heads in 4 in (100 mm) and 6 in (150 mm) diameter sizes reducing bursting train length enabling retrieval in a manhole.
- **Hydroburst Static Rod Bursting Systems** – Hydrobursts are available in 50, 100, 125 and 175 ton variants depending on the pipe size requirement, the systems utilise 1 m long screwed steel rods to pull back burst heads in existing mains from 2 in (50 mm) up to 24 in (600 mm) diameter with size-for-size or upsized new mains being installed. The Hydroburst HB125 and 175 units feature rod rotation as standard to enable the drilling through of in-pipe collapses that can often prevent the use of other types of bursting equipment
- **Pneumatic Pipe Bursting Systems** – The original pipe bursting systems utilised small air hammers to crack and expand existing failed mains. The development of static rod bursting systems, especially for the water industry with pre-chlorinated pipe, revolutionised pipe bursting and replaced pneumatic bursting in smaller sizes. However, this was not the end for Pneumatic pipe bursting which in the dirty water industry is often seen as the preferred method over static rod burster due to rig size and the elimination of the requirement for fixing high tonnage burster in the ground.
- **Same Path™ Gas-Line Slitting** – Whist pipe bursting is recognised as a cost-effective trenchless method to replace old metal gas pipes, the replacement of dated plastic pipe does pose some unique challenges. Static rod bursters can cause plastic to overheat, buckle and even jam up leading to multiple dig downs to free up the process. Hammerhead recognised this and has developed a Same Path™ gas line splitter for the replacement of 1½ in (38 mm) to 4 in (100 mm) diameter old PE plastic gas lines. The system uses specialist splitter heads and a Hammerhead Hydroguide winch to pull the head through whilst installing the new main. >

The Kobus Pipe Puller KPP300 is compact and easy to use. The modular construction allows ease of manual handling by 2 operators.



“The Kobus Pipe Puller KPP300 is compact and easy to use. The modular construction allows ease of manual handling by 2 operators.”



Kobus Pipe pull complete.

Kobus: Kobus offers a range of Pipe Puller equipment for pipe extraction purposes.

The Kobus Pipe Puller KPP300 is compact and easy to use. The modular construction allows ease of manual handling by 2 operators and is ideal when site access is difficult for pipe sizes from ½ in i.d. to 1¼ in o.d. (13 mm i.d. to 36 mm o.d.). The unit is driven by its own separate hydraulic power pack with power-on-demand, and manual control lever. The unit can be used for lead pipe and service pipe replacement and features Power-on-demand hydraulic power pack delivers controlled pulling, 10t pulling force at spool, modular construction allows for manual handling and ease of access in restricted areas. It also offers a compact foot section minimises size of excavations required, easy and quick to assemble on site for each pipe replacement, a dead man operating lever on power pack for safety, a robust safety cover to protect personnel and will fit in most site vans for ease of transportation.

The KPP400 Kobus Pipe Puller is an all-in-one, excavator mounted unit for ease of moving around site. It mounts on most types of compact 2 t excavator. The Puller is driven from the auxiliary hydraulics of the excavator and is capable of generating up to 20 t of pulling force at the spool. The bottom foot section rotates to allow optimum positioning of the excavator for best access. >

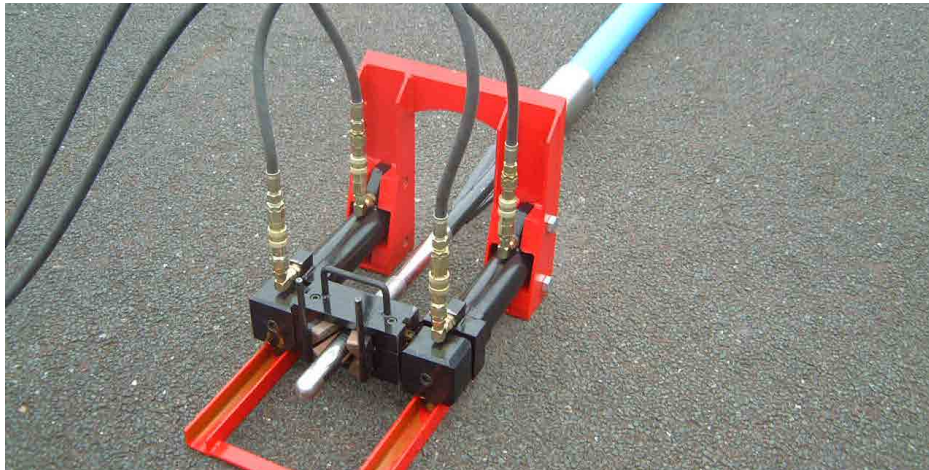
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Attaching directly to a mini-excavator, there is less manual handling and no need for separate power pack. With a 360° rotatable foot to allow optimal positioning of excavator for access, the Puller offers 20 t of pulling force at the spool with male and female spool sections to allow automated removal of old pipe from the spool.

Operating at lengths of up to 25 metre the unit can extract galvanised steel, lead, copper, poly and PE pipe and replace pipes with PE pipe of 20, 25 and 32 mm diameter.

The Pipe Equipment Specialists Ltd Miniburst system.



Pipe Equipment Specialists Ltd (PESL): PESL offers two pipe bursting units, the Miniburst and the Maxiburst.

The Miniburst is a portable pipe replacement system for small diameter pipes in limited access locations. The unit is designed to work usually with segmental PE pipe which also aids the installation in tight working spaces and can replace pipes from 4 in to 6 in (100 mm to 150 mm diameter).

PESL's other option the MAXIBURST Pipe Bursting System is currently capable of bursting 100 m of 4 in (100 mm) diameter pipe in less than 30 minutes. There are two models available, the MaxiBurst 40 and the MaxiBurst 70.

The MaxiBurst 40 is suitable for pipe sizes from 3 in (75 mm) to 8 in (200 mm) diameter, whilst the MaxiBurst 70 can be used for all pipe sizes from 4 in (100 mm) to 14 in (350 mm) diameter. Both units have been designed with safety, reliability, speed and low operational costs as the primary objectives and have proved themselves to be rugged and reliable.

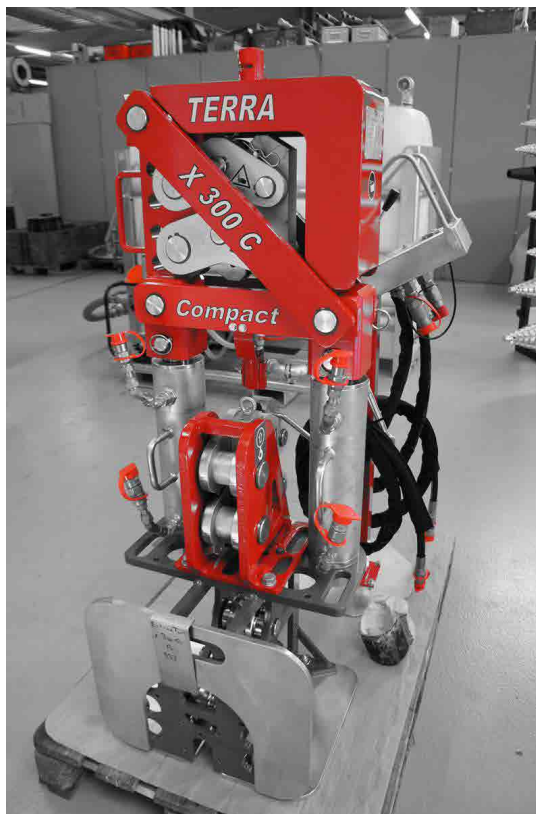
Terra AG: Terra has been operating in the field of trenchless technology for many years having been established in 1975. It now offers equipment for HDD, geothermal and pipe replacement operations.

The TERRA-HYDROCRACK HC 600 is one of the most productive Rod Burster for the replacement of old pipes 50 to 350 mm diameter made of cast iron, ductile, steel, clay ware or plastic. With a maximum pulling force of 60 tonnes at 235 bar new pipes up to 350 mm diameter can be replaced over a length of 150 m. The pulling speed lays by industry leading 225 m/h. Powered by a proven 49 HP strong PERKINS Diesel engine it operates always at maximum performance.

The TERRA-EXTRACTOR X 1000 is one of the most powerful Rod Bursters for the replacement of old pipes 100 to 600 mm diameter from cast iron, steel, clay ware or PE/PVC. With a maximum pulling force of 100 tonnes at 250 bar, new HDPE pipes up to 600 mm diameter can be replaced. Smaller pipes can be replaced over lengths up to 200 m. The operation speed is 96 m/h. Powered by a 142 HP strong JOHN DEERE engine, it fulfils the newest environmental emission norms Tier 4 interim (Euro 3B). >



The Terra Extractor x 400.



The Terra Extractor x 300 C.



The Terra Hydrocrack HC 600 in operation.

In the company's cable burster family, the TERRA-EXTRACTOR X 400 is an extremely powerful and productive cable burster for your tough pipe bursting jobs. Powered by a proven 25 HP strong KUBOTA Diesel engine you get the power to get the job done quickly and the durability to be up and running burst after burst. The X 400 replaces 40 to 300 mm main lines with up to 40 tons of pulling force at 215 bar. New pipes up to 355 mm diameter can be replaced over length up to 150 m.

Equipped with a 25.4 or 14 mm diameter cable the X 400 is ideal for the replacement of old pipes made from cast iron, ductile iron, steel, clay ware or PE/PVC.

The TERRA-EXTRACTOR X 300 C is an extremely powerful and compact cable burster for your tough lateral pipe bursting jobs. Equipped with a 22 or 14 mm diameter cable the X 300 C is ideal for the replacement of old pipes made from cast iron, steel, clay ware or PE/PVC. Pipe bursting with a TERRA cable burster provides a high degree of flexibility. Its compact footprint requires minimal excavation and the system is built to help you cut down on wasted time, maximising productivity. Its user-friendly, modular design makes it easy to operate, easy to set up and easy to transport.

The TERRA-EXTRACTOR X 100 is an extremely powerful and compact cable burster for your tough lateral pipe bursting jobs. Equipped with a 13 mm or 8 mm diameter cable the X 100 is ideal for the replacement of old pipes made from PE/PVC, thin-walled steel and lead. Pipe bursting with a TERRA cable burster provides a high degree of flexibility. Its compact footprint requires minimal excavation and the system is built to help you cut down on wasted time, maximizing productivity. Its user-friendly, modular design makes it easy to operate, easy to set up and easy to transport. >



Launching
a TRACTO
Grundocrack
unit.

TRACTO: As a pioneer in trenchless technology, No-Dig full-range supplier TRACTO offers the most comprehensive product range for underground pipe replacement in the existing pipe path applying either dynamic pipe cracking with GRUNDOCRACK or static pipe bursting with GRUNDOBURST. The major advantages of both pipe replacement methods are:

- Applicable for almost all types of damage and old pipe materials
- Long service life of new pipes from 80 to 100 years
- Upsizing of pipe capacity by 1 to 2 nominal widths possible
- Short assembly and setup times
- No subsequent costs due to ground settlement, road damage etc.
- Safe application according to latest rules and standards

Using dynamic pipe cracking, old pipes made of brittle materials can be replaced with new PE pipes (long and short) or PVC-U pipes up to ND560 mm in quite a simple way. The air driven GRUNDOCRACK's blade shatters the old pipe while advancing through the old pipe and radially displaces the fragments into the surrounding soil while pulling in the new pipe simultaneously. The pulling force of a winch supports the pipe cracker, guaranteeing safe guidance through the given pipe path. The machine's heavy duty one-piece housing transmits dynamic energy optimally for maximum impact. The smooth machine body ensures easy recovery through the new pipe in confined spaces. In addition to pipe cracking, the GRUNDOCRACK system is also applicable for calibre pipe bursting and for the TIP relining method. >

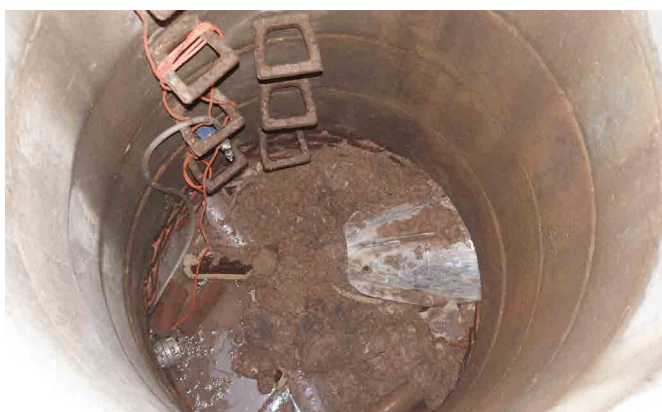
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Preparing a TRACTO Grundocrack for operation.



A TRACTO Grundocrack completing a burst into a manhole.



The static pipe bursting system GRUNDOBURST makes pipe replacement even along slight bends quick and easy. It consists of the bursting rig with hydraulic cylinders, a hydraulic power pack, the click shut QuickLock bursting rods with cutting tool and various diameter expanders for pulling in the new pipe. Using GRUNDOBURST, damaged long or short pipes with circular or oval profile up to ND1200 of almost any material (plastic, metal, GFRP or stoneware) can be replaced with new pipes up to ND1200 having identical or larger diameters. Five different GRUNDOBURST models with a pulling force 400 to 2,500 kN allow for application out of pits and/or manholes into pits and/or manholes. After pushing the QuickLock rods through the old pipe, a roller blade with expander and the new pipe attached are connected to the rod string. When pulling back the rods, the roller blade cuts the old pipe while the expander pushes its fragments aside and the new pipe is pulled in either from the pipe coil or as a welded pipe string. To simplify tool retrieval later, the roller blade and the expander can be pulled into the pit inside the extension frame of the rig. The GRUNDOBURST system is immediately ready to use and can be easily operated by only two people.

Apart from the complete replacement of pipes, The GRUNDOBURST rigs can equally be applied for partial repair or rehabilitation of damaged pipes applying calibre bursting, Tight-in-Pipe, pipe reduction or pipe relining.

Whilst the foregoing is just a small sample of the range of online pipe replacement systems available, it should be stressed that these are not all there are. Anyone looking to enter the market for pipe replacement or expand their presence with new equipment should be sure to examine the full range of systems available before making their choice to ensure that the machine and equipment selected are suited to the likely conditions to be found on any projects they are to be used on.



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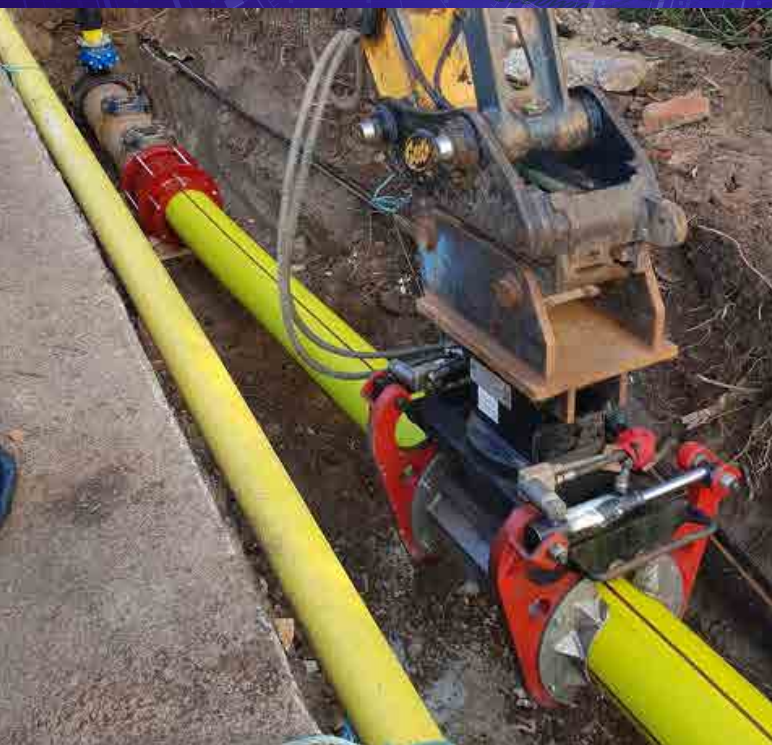
IMPROVING EFFICIENCY AND HEALTH & SAFETY WITH PIPELINE REPLACEMENT TECHNIQUES



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Steve Vick International (SVI) pioneered Live Mains Insertion (LMI) back in 1981, a pipeline replacement technique which maintains gas supplies to customers during the insertion process. The technique is still widely used by Gas Distribution Networks (GDNs) today and renowned for reducing customer 'off-gas' times and promotes safe working best practice. >



Left: Inserting the replacement pipe during Live Mains Insertion.



Centre and right: The replacement pipe on its Hextrailer transport coil with the 4 in (100 mm) diameter Live Mains Insertion head.



Live Mains Insertion is similar to normal insertion of polyethylene pipe (PE) into an existing metallic main with one important difference. By using a special gland box and a live head on the PE, the old main is kept live throughout the insertion process and the new PE is gassed up to maintain supplies to customers.

Once insertion is complete, the main is kept live to supply customers with gas via the annular space until it is operationally convenient to transfer the services to the new PE main.

As part of the development of this technique several innovative products were designed. As mentioned, the Lyontec gland box for example is a fitting that fixes onto the end of the metallic main and houses special glanding which allows the PE to be inserted but prevents gas escape. This is key to keeping the feed live whilst the pipeline is replaced. Another important innovation designed for LMI was the live head, a metal nosecone which screws into the leading end of the PE and allows gas to transfer from the host main into the coil or sticks of PE.

Both products have seen further development and innovation over the years. The gland box has been adapted for SVI's latest foam technique, Foambag Operation on Stubs (FBOS). FBOS is a live mains replacement technique for 4 in to 8 in (100 mm to 800 mm) stubs that delivers 100% abandonment. FBOS uses two umbilicals, used to deliver expanding PU foam to fill the annular space between the host main and the PE, and the SVI gland box was adapted in order to allow these umbilicals to pass through without gas escaping. The SVI live head has also seen some evolution with a new electro fused Live Head now available. The internally electro fused Live Head offers a streamlined shape with the Live Head sitting flush with the PE. This allows for easy insertion into a 4 in (100 mm) diameter main and makes negotiating bends less challenging. The new PE head can also be used on up to 8 in (200 mm) diameter mains.

Following the development of LMI, SVI identified further products to help GDN's become more efficient and improve health and safety for both the general public and their engineers. Commonly used on an LMI or FBOS project is SVI's range of Pipe Handlers and Pipe Coil Trailers. SVI's Pipe Handlers which can insert and manoeuvre pipe from 40 mm up to 900 mm, offer a safer alternative to using an excavator bucket and sling to insert the pipe and helps to avoid the need for operators to work in the trench. The SVI Pipe Handlers offer fast insertion speeds of approximately 5 to 10 m/minute, with their Perpetual Pipe Pusher achieving pushing speeds of 25 m/minute. >



Left: Tooling used as part of the mains transfer process on completion of the Live Mains insertion into the host pipe.



Right: The Hexitrailer with the replacement pipe set up on site for the insertion operation.

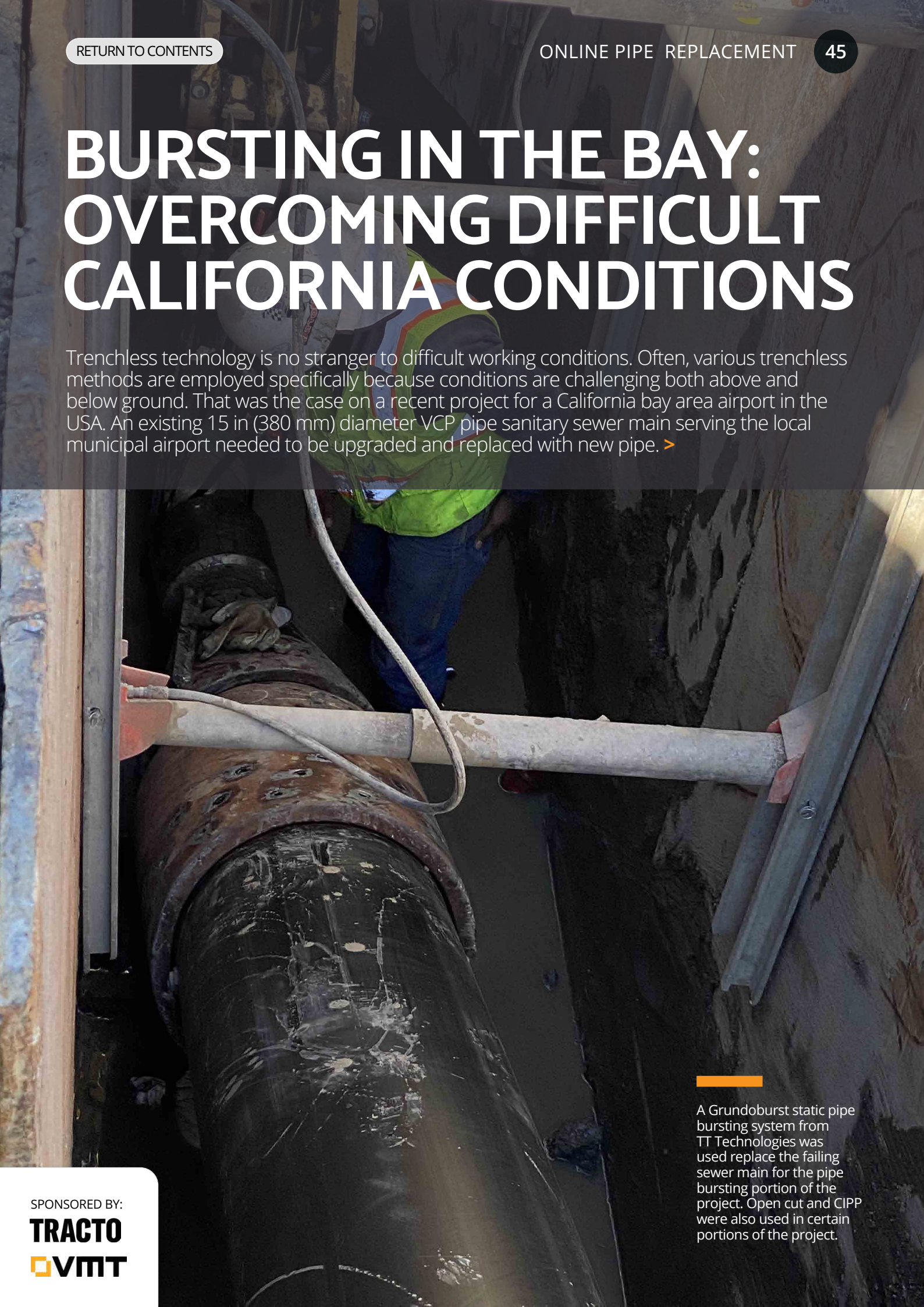
Steve Vick offers a range of Pipe Coil Trailers that work well in unison with their Pipe Handlers and these can often be seen on site at FBOS and LMI projects. All SVI trailers have been designed and engineered with the optimum safety of the operator in mind. The Hexi Trailer has the facility to hydraulically raise and lower the retaining bars and the safe access to remove the bands means that this trailer is much safer than the alternatives. The brakes on the Hexi Trailer also must be locked on before any other element can be altered and the pipe can be jacked up inside the trailer, to a point whereby it is dispensed slightly downhill directly from the carousel, instead of being dragged over a set of rollers which makes dispensing effortless and eliminates the need for uncontrolled operative intervention. Another significant benefit of the Hexi Trailer is that it offers a safe way to transport and store coiled PE, which helps to reduce pipe wastage. By using 500 m coils for example, useful lengths can be left on the trailer for the next job. This has been proven to reduce pipe wastage by up to 20%.

On LMI or dead inserted projects, SVI Rapid Rotary Cutters are often used as a preparation tool on ductile and steel mains. This includes the cut to allow 'bagging-off' a main in preparation of installing a Gland Box, or each time an Insertion Seal or Live End Seal is installed when decommissioning a section of main in order to transfer the services to the new PE gas main. SVI's Rapid Rotary Cutters circumferentially cut steel, ductile or cast-iron mains up to 300 mm (12 in) diameter. They have a quick cutting time, approximately 2 minutes per cut on 4 in (100 mm) ductile iron and 4 minutes per cut on 4 in (100 mm) diameter steel. They offer a safer alternative to more traditional methods of cutting pipe, such as Stihl saws and the cutting blade is mounted away from the operator's hand.

When transferring the services to the new PE main an SVI Rapid Window Cutter can be used to cut access windows at each service Top Tee location for the new service connection to be made to the gas main. SVI's Rapid Window Cutters are a compact, hand-held cutter for cutting windows in live or dead inserted mains, without risking damage to the inserted PE. They are suitable for all sizes of steel and ductile mains up to 13 mm in depth. They also have the cutting disc mounted well away from the operator's hand and have an automatic emergency cut-off on the trigger handle.

BURSTING IN THE BAY: OVERCOMING DIFFICULT CALIFORNIA CONDITIONS

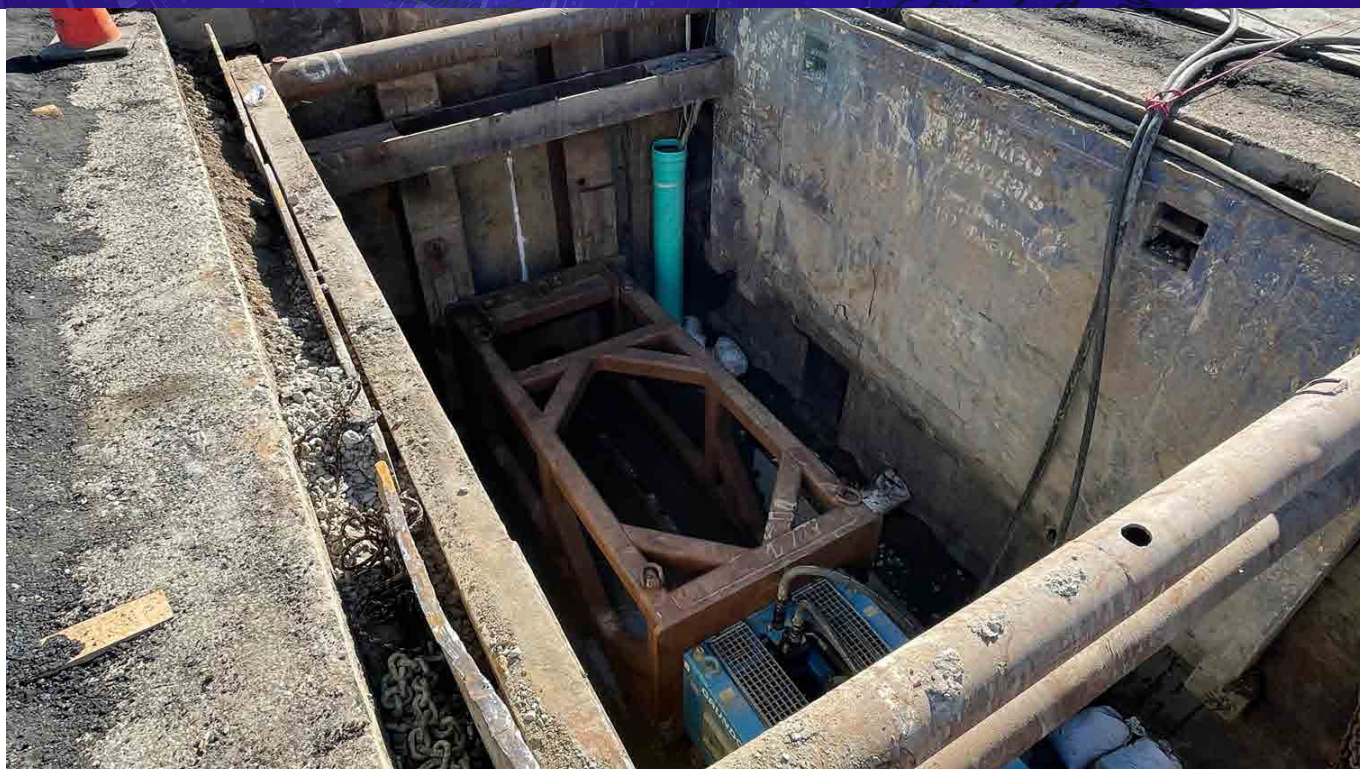
Trenchless technology is no stranger to difficult working conditions. Often, various trenchless methods are employed specifically because conditions are challenging both above and below ground. That was the case on a recent project for a California bay area airport in the USA. An existing 15 in (380 mm) diameter VCP pipe sanitary sewer main serving the local municipal airport needed to be upgraded and replaced with new pipe. >

A photograph showing a construction worker in a trench. The worker is wearing a high-visibility yellow safety vest over a blue shirt and blue jeans. They are standing next to a large, dark, cylindrical pipe that is being installed. The pipe has some rust and wear on its surface. A white cable or hose is connected to the pipe. The trench walls are made of concrete or metal, and the ground is dark and muddy. The lighting is dim, suggesting an underground or enclosed environment.

A Grundoburst static pipe bursting system from TT Technologies was used to replace the failing sewer main for the pipe bursting portion of the project. Open cut and CIPP were also used in certain portions of the project.

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With projected geotechnical conditions and the potential to encounter 'Bay Mud' soil conditions, project planners were looking to maximise the use of trenchless technology on the 3,200 ft (975 m) sanitary sewer project.

The sewer pipe, which serves an airport terminal area, is located in close proximity to San Francisco Bay. Ground conditions including sand and water were such that trenchless rehabilitation and replacement options were preferable over open cut construction for the project.

According to trenchless specialist George Mallakis, with trenchless equipment manufacturer TT Technologies of Aurora, Illinois, USA, the project was a good candidate for trenchless applications. He said: "The objective of the project was to rehabilitate the existing 15 in Vitrified Clay Pipe sanitary sewer. In order to limit disruption, overcome sandy soil conditions, ground water, and pipe depths up to 15 ft (4.5 m), trenchless rehabilitation methods were desirable. The 3,200 ft (975 m) long project was divided into three parts with an open cut section, a section to be lined and a final section to be replaced through static pipe bursting."

The project plan was completed by engineering firm West Yost. Headquartered in Davis, California, West Yost employs over 200 individuals and is focused exclusively on potable water, wastewater, groundwater, recycled water, and stormwater projects. The company has broad experience in master planning, design, construction management, hydraulic modelling, regulatory compliance, grant management, supervisory control and data acquisition (SCADA), operations technology and more.

According to West Yost Associate Engineer Anne Girtz, planning the bursting section of the project was a collaborative effort. She said: "Ultimately, George was instrumental in assisting West Yost in weighing all the pros and cons related to bursting during the design portion of the project. That way we were able to address the soil conditions, depth of installation and size of expansion in order to make the best effort possible and have a biddable, constructible project."

Utility contractor Ranger Pipelines of San Francisco, California was awarded the project to replace all portions of the sanitary sewer. Ranger Pipelines specialises in underground construction projects and has been serving greater California since 1982. The highly successful contractor is skilled in projects that require complex shoring and heavy dewatering systems because of difficult ground and site conditions. The company has extensive experience working in congested urban areas and in rural areas with a variety of environmental constraints throughout California, making it particularly well >

Static pipe bursting proved to be an efficient and effective choice.



suited for the airport sewer main project. In addition, Eduardo Davila, Ranger Pipeline's project manager and crew have prior experience with pipe bursting and are efficient with the method.

Mallakis said: "Due to the proximity of the project to San Francisco Bay, geotechnical borings indicated that there was very high groundwater and a high likelihood of encountering Bay Mud soils during excavation. Bay Mud, as it is called, is characterised by soft, unconsolidated silty clay, saturated with water making it an element to contend with, especially in an underground utility project. The Ranger Pipelines crew was ready for the difficult conditions."

A Grundoburst 1900G static pipe bursting system from TT Technologies was selected for the project.

Static Pipe Bursting in North America

Static pipe bursting has experienced a high level of growth in North American. According to Mallakis, several things have contributed to the method's popularity in the marketplace.

He said: "The growth of static pipe bursting in North America has been significant over the last ten to fifteen years. The method was introduced several years after pneumatic pipe bursting, which has had a tremendous impact on the trenchless construction industry. The static or hydraulic bursting process has become an extremely popular trenchless method for several reasons."

"First, the method is very capable. It can be used for a wide range of pipe diameters, as well as pipe material. The second is the ability to install any number of product pipes. From fusion welded and restrained joint to non-restrained joint and sectional >

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pipes, static pipe bursting can install an ever-increasing number of pipe options. This is really a key to the success that static pipe bursting has had in North America. Product pipe specification can often determine or limit the options that contractors have for completing projects. Many utilities or owners are partial to or invested in specific pipe material for their systems," he said.

For the municipal airport project, High Density Polyethylene pipe (HDPE) was chosen for the bursting.

Project Planning

The pipe was in poor condition. CCTV inspection highlighted various defects that were present through the area designated for replacement. The total footage was divided into portions that were replaced by open-cut, rehabilitated with CIPP, and replaced by pipe bursting.

Girtz said: "The method of rehabilitation was selected based primarily on the type of defects to be corrected and the pipe material. The open-cut excavation and replacement section was performed due to the existing pipe having settled over the years and having portions of reverse slope."

Pipe bursting was selected for areas with structural defects which protruded into or compromised the roundness of the pipe such as bulges or deformities. CIPP was selected for areas with structural defects that did not protrude into the pipe and materials that were not able to be pipeburst.

Mallakis said: "Because of the pipe depths, as well as the ground and soil conditions, a thicker wall, DR 11, product pipe was recommended. That also contributes to overall bursting difficulty. In order to provide equivalent HDPE DR11 pipe capacity to the existing VCP pipe, a two-upsize burst would be required. Ranger Pipelines was given the option to utilise a thinner pipe a DR17 pipe at a smaller diameter or the DR11 pipe at the larger diameter. Ultimately the thinner DR17 pipe was used."

According to Girtz, the decision was made to include the cost of manhole removal and replacement with the cost of pipe bursting, giving the contractor the option of how they wanted to approach the bursting without dictating means or methods. In the end, the contractor decided to burst through some of the manholes, increasing the pull length.

On the Job

The geotechnical conditions were studied extensively during the design process as they can pose challenges during pipe bursting. Girtz said: "Potential issues discussed in employing pipe bursting included:

- A hole collapsing on the pipe
- An increase in friction on the new pipe during the pullback
- 'Wandering' of the bursting head
- Disturbance of adjacent utilities or structures.

To mitigate this, TT Technologies recommended specifying static bursting and application of a bentonite slurry."

Ranger Pipelines used a 500 gal (1,900 l) bentonite pump and mixing system to deliver lubricant through hoses inside the pipe being pulled in. The lubricant is released behind the expander filling the temporary annulus and keeping sands wet and open while thickening and holding water back from grabbing the new pipe. That allows the pipe to be more slippery and helps prevent resistance and pipe stretching, especially in the longer runs. >

“By being strategic about the jobsite layout, the contractor can place a machine pit in the middle of two bursting runs. That way when one burst is complete, the contractor can turn the unit 180° and burst in the other run.”

There were no traffic issues with the implemented traffic control plans, the location of the existing sewer line allowed the layout of the pull and insertion pits with minimum impact to the public. On average, the machine pits were 35 ft (10 m) long by 10 ft (3 m) wide and 12 ft (3.6 m) deep.

The pits were located at existing manholes, allowing Ranger Pipelines to pull in both directions. According to Davila, Ranger crews were able to save time bursting by positioning launch and exit pits in a way that bursting can be completed in two directions utilising one machine pit. He said: “By being strategic about the jobsite layout, the contractor can place a machine pit in the middle of two bursting runs. That way when one burst is complete, the contractor can turn the unit 180° and burst in the other run. That technique can save time and help limit overall disruption. If things align properly, it is even possible to simultaneously rod the next run as the bursting rods pass through the bursting unit.”

Overall, the ground conditions were better than anticipated, which helped with bursting efficiency. Bursting runs varied in length from the shortest at 242 ft (74 m), to the longest at 635 ft (194 m). The pipe bursting times ranged from one hour to three hours depending on the length of the run.

Mallakis said: “This was a highly collaborative, well-planned and executed project. Everyone really contributed at a high level and the results show that. A very successful project.”

GRUNDOBURST- STATIC PIPE BURSTERS

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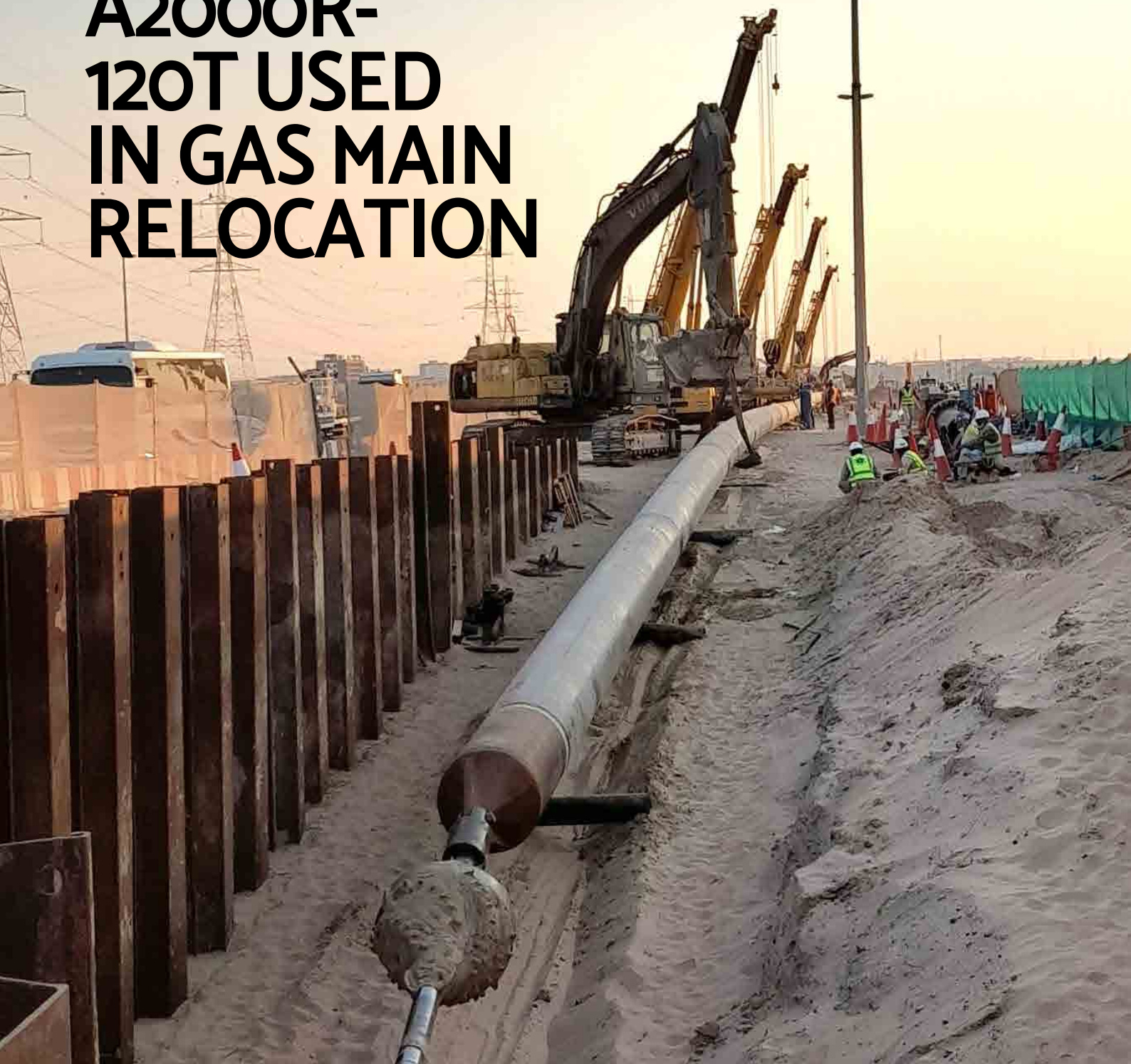
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APOLLO A2000R- 120T USED IN GAS MAIN RELOCATION



Pipe pulling commences.

Equipment provided by UAE-based equipment supplier Apollo Techno International FZCO was recently employed on a gas main diversion project at Emirates Road E-611 close to Sharjah in the United Arab Emirates (UAE). >

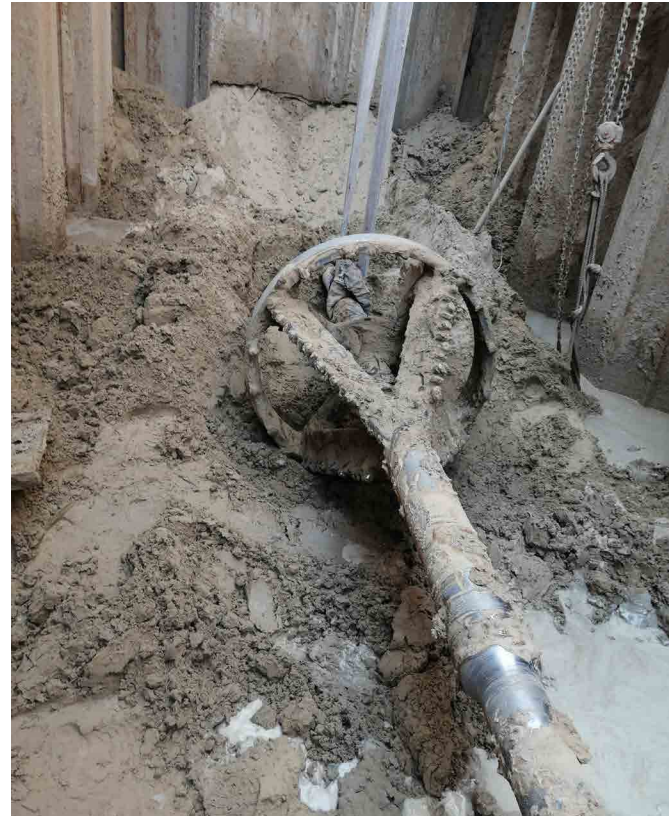
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Preparing for the pipe pulling operation with the Barrel reamer.

Reaming to the full bore size used Fly Cutter reamers over several stages.



The work was required as part of a road widening project for the expansion of 2-way road which will ultimately be 60 m wide and 12 m deep. The existing live SEWA gas main runs at just 6 m depth and had to be relocated to allow for the greater depth of the new roadway. The new main required the construction of a new pipeline near Khorfakan road.

The client for the project was Government of Sharjah-Road & Transportation Authority-(SRTA) with Equilibrium Engineering Consultancy as the project consultant and Astra Engineering & construction L.L.C as the main contractor.

With local ground conditions comprising mixed ground including fine to coarse grain very dense silty sand from surface to a depth of about 14 m and very weak, thickly bedded sandstone from 14 m to 20 m depth, it was decided that best option for installation of the new culvert to carry the gas main was the use of horizontal directional drilling (HDD).

The HDD work was ultimately awarded to trenchless contractor, Hydrotech Engineering Co. L.L.C – NDRC Division.

HDD was selected as the preferred option as it is often the most cost-effective, quick and more sustainable method which also creates less disruption for stakeholders.

This option was also well-suited to the project due to the available access at the side of the State Highway which enabled to contractor to keep traffic management to a minimum which reduced public disruption. It also offered increased productivity relative to any potential trenched installation option with significant cost and time savings. >



Commencing the pilot bore.



The pilot bore successfully holes out.

DRILLING OPERATIONS

The drilling rig selected for the work by Hydrotech Engineering was an Apollo A2000R-120T from UAE-based equipment supplier Apollo Techno International FZCO. The navigation system used was a DCI, Falcon F5 with a 19 in beacon and IGPS module which allowed greater accuracy over the pilot bore and a better final as-built upload for the client.

All underground tooling was supplied by Inrock Industrial with the drilling fluid being a bentonite mixing system, an Apollo MT 80 – 2,100-gallon unit.

The project required the installation of a pipe over some 293 m which comprised a 30 in (760 mm) diameter, 15 mm wall-thickness Carbon steel pipe API 5L.Gr.X60 for the SEWA Natural Liquefied Petroleum Gas line.

After the completion of the pilot bore, several stages of reaming were required to enable the new pipeline to be successfully installed which included the use of rod recycling and Fly Cutter reamers starting at 18 in (460 mm) diameter and staging upwards through 24 in (610 mm), 30 in (760 mm), 36 in (915 mm) and 42 in (1067 mm) diameters. This was followed by the use of a Barrel reamer of 36 in (915 mm) diameter for backwashing and the pipe pulling operation.

Hydrotech Engineering commenced the drilling operations with mobilisation of the drilling machine and other accessories on 30 January 2022. The pilot bore started on 31 January with completion 1 February.

The up-sizing of the pilot bore with the multiple reaming stages commenced on 2 February and was completed on 15 February. Backwashing and pipe pulling commenced on 16 February with the pipe pulling starting immediately after as a continuous process on 17 February. The pipe pull was successfully completed on 18 February. >

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The 120-t Apollo A2000R drilling rig on site.



Commenting on the installation a representative of Hydrotech Engineering said: "We had worked near this area before with the same mixed ground conditions, so local knowledge gave us an edge over our competitors to win and successfully deliver this project."

For Apollo Techno International FZCO, Subhash Sadashivan, Sales Director added: We have been able to gradually build our reputation since our inception in 2018. Our customers have shown immense faith and confidence in our product and we stand by our customers at all times. A2000R (120T Rig) was a proud moment for our team as Hydrotech Engineering believed in our product and our expertise. We were thrilled to see first project of A2000R completed in style.



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DCA – LEADING THE CHARGE FOR HDD

A large diameter pipeline installation using HDD.

The Drilling Contractors Association (DCA) is a technical association for the horizontal directional drilling industry in Europe. Horizontal Directional Drilling (HDD) has established itself worldwide as a technical and economic alternative for the laying pipelines, particularly where open cut options would be environmentally damaging, where obstacles would create significant difficulties for the pipelaying contractor and where timely and cost-effective installation is required.

Pipeline infrastructures form the lifelines of modern society and it is difficult to imagine the construction of this type of infrastructure without using trenchless construction methods, in particular horizontal directional drilling.

For almost 30 years, the DCA has successfully represented the interests of HDD technology in the areas of technical development, quality assurance, training and further education, and research and development vis-à-vis clients, authorities and other institutions.

Taking a look at what DCA offers to the industry, Trenchless Works (TW) undertook an interview with the organisation's UK Representative and DCA Board Member, Scott Stone (SS). >

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HDD operations take place across a wide range of ground conditions.

TW: When was DCA established?

SS: In December 1994, the then leading companies in the HDD Industry came together and thought it would be a beneficial to have a Society representing them. They also thought it would be a good idea to have various stakeholders in the industry join, so the DCA has always been open for Contractors, Clients and Suppliers of equipment and other materials suppliers and industry engineers. Most of the companies that were present from the start are still members!

TW: How many members across how many countries does it have?

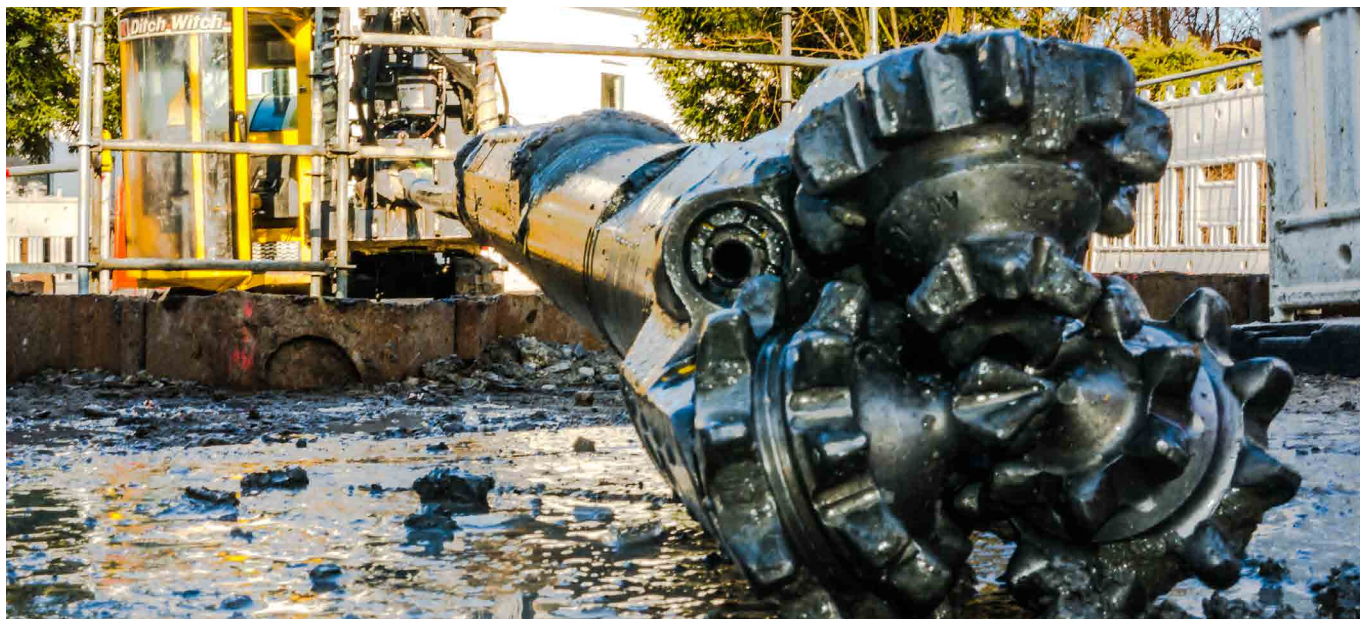
SS: Currently DCA has a total of 142 members from 13 different countries. I was the first Country Representative (representing the UK) and we have started to appoint representatives in various other countries where our organisation is less well known. This is working very well in the UK and has already brought us some new members as well as from other countries.

TW: In which global areas is DCA aiming to increase its membership?

SS: The DCA is a European society, so focusses on European members. Should companies from other areas be interested, for example because they have lot of European customers, membership is possible and they can become a member as well, with the same rights as all other members. DCA is also looking to expand into Scandinavia, although we only have a very limited number of members there. Southern Europe is in our focus as well, but there the bigger hurdle is language. Within the DCA we are using both German and English as our two main languages, and we are publishing our guidelines in French as well. But at our meetings and gatherings, catering for 2 languages is difficult enough. We see this being a problem, more in southern Europe than in the north. >

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HDD can handle a wide range of ground conditions from soft soils to hard rock given the correct tooling.

“In order to reach a reasonable level of quality in the execution of HDD operations we are promoting and supporting training, in the form of a course for drillers, site supervisors and experts.”

TW: Can you summarise the aims and objectives of the organisation?


SS: I think our website covers this quite well (<https://dca-europe.org/>). In short however, the aim of the Association is to maintain, promote and further develop the technical standards of horizontal directional drilling at a European level. In addition, to establish framework conditions for use in this comparatively young methodology which can be improved primarily using uniform standards of quality assurance and the standardisation of approval procedures and the promotion of training, research, and development.

Furthermore, the association provides an international forum for the continuous exchange of experience between HDD contractors, subcontracting companies, planners, clients, and authorities.

Also, in order to reach a reasonable level of quality in the execution of HDD operations we are promoting and supporting training, in the form of a course for drillers, site supervisors and experts. This is currently running in Germany, and, based on the same contents, in The Netherlands. We try, as much as possible, to support our members in gatherings for their clients. We are also supporting the development of these courses in English and working towards a uniform training standard which would be acceptable in Germany for example even if the course was completed in the UK.

By organising our yearly Congress, we want to promote the social aspect and make it possible for people across the industry to get to know each other. This year is particularly pertinent to the UK as the Congress will be held in Stratford-upon-Avon between 5 and 7 October 2022. More details are available on our website.

In addition to the Annual Congress, we also have a members forum, which is held once a year at the start of May and this year looked in depth at drilling tools and their application. I believe this is extremely beneficial for the members of both small- and large-scale drilling applications and its interesting to see the different approaches. >



Commencing a large diameter pilot bore in hard ground.

TW: In DCA's opinion what are the biggest challenges for the HDD sector now and moving forward?

SS: In normal times, it is important to keep the quality at a sufficient level. There are more and more companies starting to do HDD, but some of those have little knowledge of what they are doing and are doing more harm than good and are sometimes working in an unsafe manor and this can hurt the whole industry. We also want to maintain a level playing field by ensuring our clients are asking for HDD work according to a standard and not forcing contractors to take unreasonable risks. In the current environment, we need to come together and make sure the outrageous price increases due to the shortage of materials etc. is not put on our shoulders of the contractors.

TW: How can DCA aid its membership in achieving solutions to these challenges?

SS: We assist in organising training, and we have our technical guidelines, which we are continuously reviewing (the 5th edition is expected to be published shortly), we form task groups creating guidelines for specific issues we are running into in the industry, and we are working on standards whereby we may try to create an EN or ISO standard for HDD works. Furthermore, by organising events, we want to keep our members in contact to each other.

The DCA offers its members numerous important services, training opportunities and information. In addition, the DCA offers an international forum that facilitates a constant exchange of experience between HDD contractors, suppliers, planners, customers and authorities.

Our thanks go to Scott and DCA for providing the time for this interview and their responses.

So, what does this tell us about DCA and HDD? It appears that, as with most areas of construction and industry, the key for DCA today is largely based on communication. Keeping industry members informed of what is available to them within the methodology (equipment, applications, technology) etc.), maintaining training and safety standards across the industry and creating and implementing a set of standards that will be accessible and easily understood by all those involved in HDD operations across Europe and beyond. This high level of communication will ultimately keep HDD at the forefront of the minds of planners and specifiers who will be able to understand how successful and effective HDD can be when correctly undertaken by those with the right experience.

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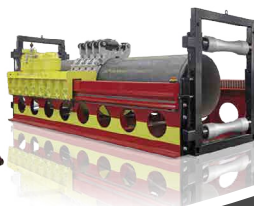
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BULLS TO MARTON WASTEWATER CONNECTION UTILISES HDD

Fulton Hogan Manawatu, as main contractor for Rangitikei District Council in New Zealand required the installation of some 8,000 m of 315 mm diameter PE wastewater pipeline between Bulls to Marton in the Manawatu area. Rangitikei lies roughly south-central on New Zealand's North Island. The consulting engineer for the project was GHD.

The main route of the wastewater connection pipeline ran alongside a State Highway, so the methodology selected for the installation works had to minimise the need for traffic management and where ever possible reduce interference for the public.

This led to the selection of horizontal directional drilling as the preferred option, particularly as the ground conditions along the route proved ideal for technology, these being silty and sandy clays. >



Commencing a pipe pull
back on the Marton project.

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Navigation of the pilot bore is a vital aspect of any HDD installation.



The Vermeer drilling rig on site.

After a careful selection process, the project was awarded to Utilities Infrastructure New Zealand (UINZ). HDD also offered increased productivity when compared with traditional trenched installation techniques. UINZ required several visits to the site as part of its own ground investigations and ultimately selected its Vermeer Navigator 6090 with a Falcon F5, IGPS and DCI Aurora guidance set-up on board for the project. Given the sandy clays in this area UINZ also decided to utilise an MI Swaco Max bore Bentonite and a small amount of MI Swaco, Polyplus RD and Platinum DD additives as the drilling fluid to provide more efficient bore cleaning. All down-hole tooling was from specialist tools manufacturer Melfred Borzall, and this instance the contractor used a Tornado reamer for pilot hole expansion.

INSTALLATION

After completing each pilot bore, the sandy clays and the diameter of the pipe at 315 mm required UINZ to undertake a pre-ream for each bore path prior to pulling in the final product pipe. Pilot boring was undertaken at the various project locations at between 300 and 350 m long with the excavation of an intermediate hole between the HDD entry and exit points. This method enabled UINZ to pre-ream each pilot hole over lengths of between 150 and 175 m at a time, pushing the reamer back out to the reception hole and then attaching and pulling in the product pipe on the second run through this time using a 450 mm diameter Melfred Borzall Tornado reamer.

Due to the stable nature of the clays in the bore, UINZ was able to pre-ream and pull back the product pipe without having to step up in reamer size. This sped up the operation considerably as no swapping out of reamers between pre-ream and pull back was necessary.

The PE pipeline being installed totalled some 8,000 m of 315 mm diameter wastewater pipeline with pipe welding being carried out by Polyweld NZ Ltd. Electro fusion welds were completed using MSA 2.1 Eletrofus Welders, with blue tooth capability and a welding range 25 mm up to 1,000 mm diameter. For Butt welding requirements two George Fischer systems were used: the George Fischer CNC 315 mm with blue tooth and GPS capability and a welding range from 90 mm up to 315mm diameter, and a George Fischer CNC 400 mm with blue tooth and GPS capability and a welding range from 125 mm up to 400 mm diameter.

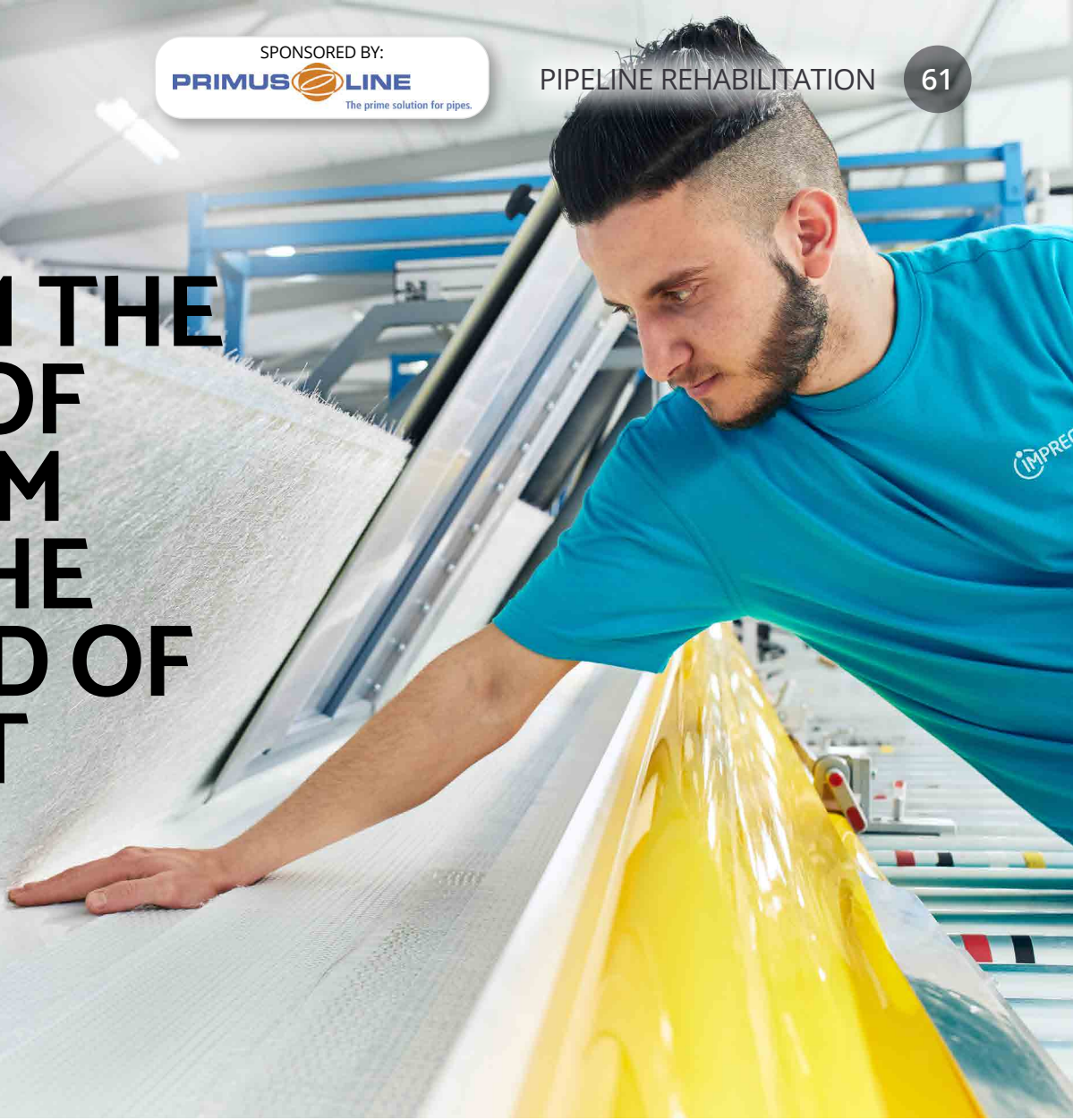
Work on the project commenced on 9 January 2022 and is due to be completed in June 2022.

Utilities Infrastructure New Zealand Ltd has the capacity to deliver a range of PE products for HDD and steel casing for pipe rams.

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FROM THE AGE OF STEAM TO THE SPEED OF LIGHT

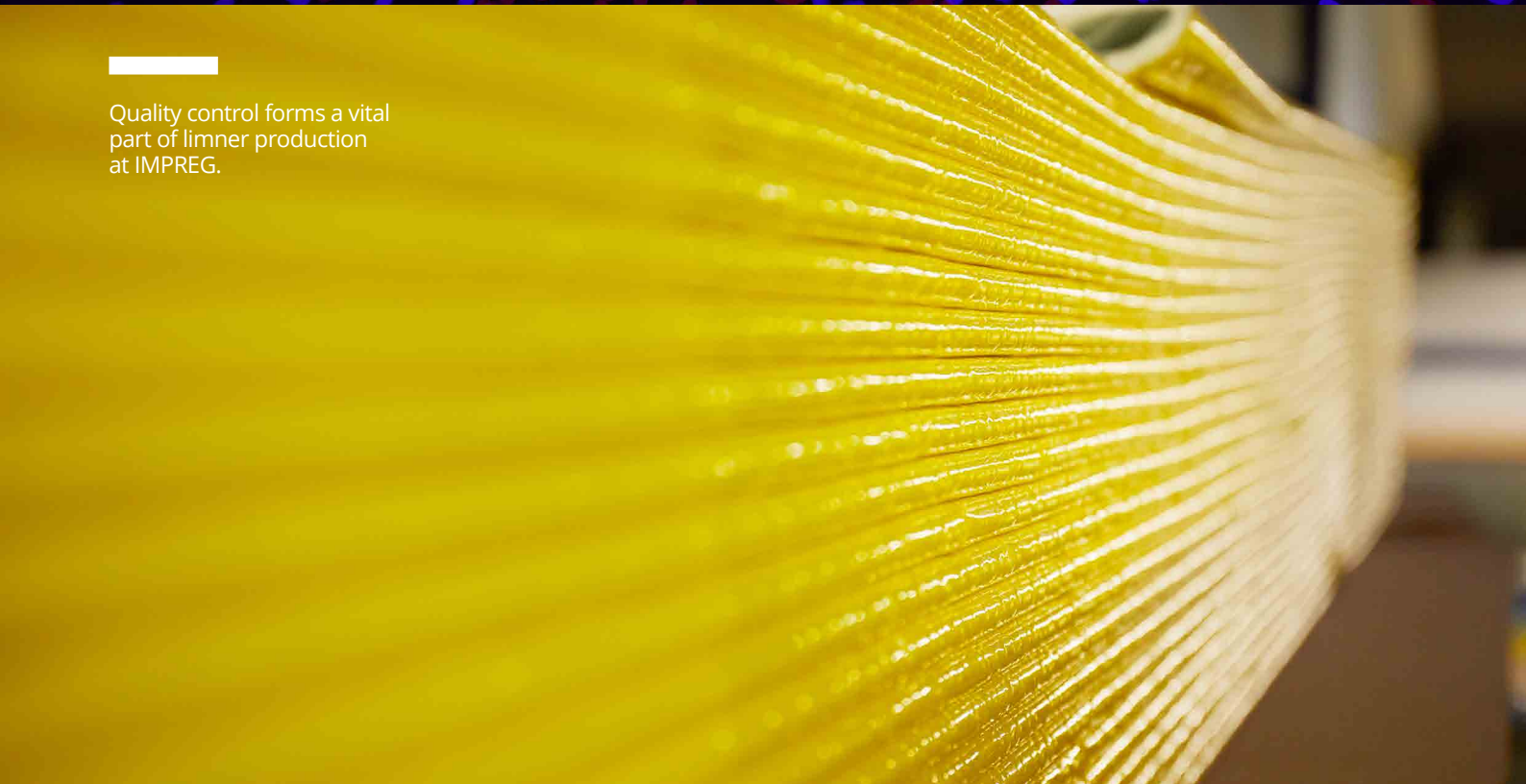


IMPREG CIPP Liner
production Germany.

Whilst the title of this article may appear to be a potted 250+ year history of the Industrial Revolution to the modern day, it is not. This is because the description mirrors the development of what is now one of the most world-renowned and leading CIPP liner manufacturing companies for trenchless sewer repair solutions using UV-curing technology, IMPREG GmbH.

Established in 1999, IMPREG, for those who may not be aware, started life as a developer and manufacturer of steam cure lining systems from its headquarters in Ammerbuch, Germany. However, watching the market for UV liners developing in both Germany and Scandinavia it became obvious that this was the lining option for the future being safer, faster and, handled correctly, more cost-effective and ultimately greener than other lining options. However, given that the 'Green' arguments were yet to take hold fully this was something that was to come over time.

So, by 2002, IMPREG's move away from its original main market of steam cure liners to the 'new' UV cure market was complete with investment in the development of its own UV based systems. At this time the company boasted just 10 employees. >



Quality control forms a vital part of liner production at IMPREG.

Just 3 years later, in 2005, IMPREG made its first major inroads into the UV market with a project carried out in Poland which, with EU funding backing, required the installation of a 1,200 mm diameter UV cured liner along with some steam cured liners which the company was also still able to provide.

At this time also IMPREG was working with some of the larger contracting companies with a view to creating UV cure liner with extended pot-life and other requirements that clients were seeking.

MARKET GROWTH

From that time forward IMPREG has not looked back. From 2005 through to 2015 the company has enjoyed on average between 15% and 20% growth year-on-year, with a European market share of around 20% to 25%.

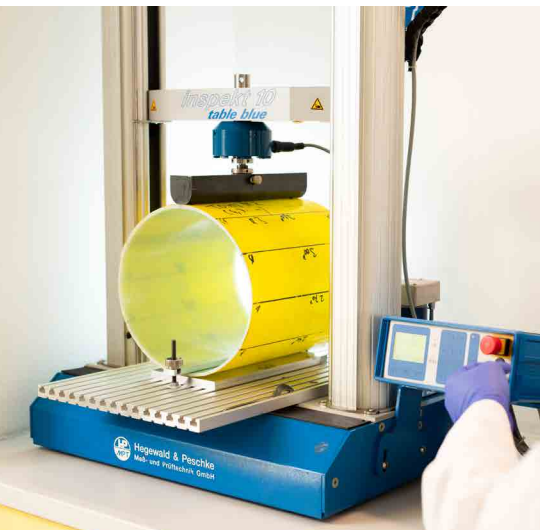
However, with the range of competitors in the European arena limiting the potential for growth, IMPREG then look at where in the world its UV cure might find significant new market share. So, in 2016 the company made its first move outside of its European market with establishment of operation in Asia with the development of a production facility in China. This facility reached full capacity in 2018. >



Monitoring liner production in February 2022.



Close inspection of the liner as it finished production completes the production control process.



Testing the liner ensures quality.

With success of the Asia operation IMPREG then turned its eyes toward North America and built a new production facility in Richmond, Virginia, which was fully operational by 2019.

What perhaps makes this global expansion truly remarkable is that it has been completed without recourse to local partnerships or any of the other more usual local tie-ups that the industry has seen over the years. According to Robert Papp, IMPREG executive Director: "The success of our expansion can be put down to the expertise of our highly knowledgeable sales team which has over the years since our establishment generated excellent contacts in all parts of the world. Without these people on our team, we would have had some difficulty in establishing ourselves as an independent operator in most markets. They should be congratulated on their efforts."

Today IMPREG has developed a significant global market share in the UV cure sector, with some 25% in Europe and the Middle East, 40% in Asia with some 85% of this being China-based and some 15% being Australasia-based. The African market is currently served from Germany, but with only small amounts of work being undertaken across the region this is a future market to develop in the long run.

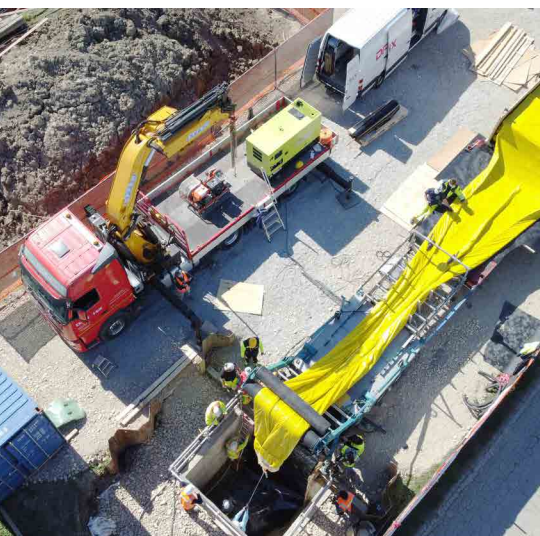
North America is something of a different story. This is largely due to the fact the UV-cure liners are still somewhat in their infancy in the region, this totalling just 5% to 10% of the total rehabilitation market. However, with the establishment of the Richmond facility, IMPREG now believes it holds some 40% of the UV market in the region. With the use of UV curing becoming more popular however, there are plans to establish a West Coast facility with a second US production plant within the next 4 years or so.

LOCAL SUPPLY

Whilst IMPREG has established and planned production facilities around the world, over recent years one aspect of the industry that has become obvious to the company management team is the need for fast and efficient local supply of ready-impregnated liners. >



IMPREG liner being installed on various sites.

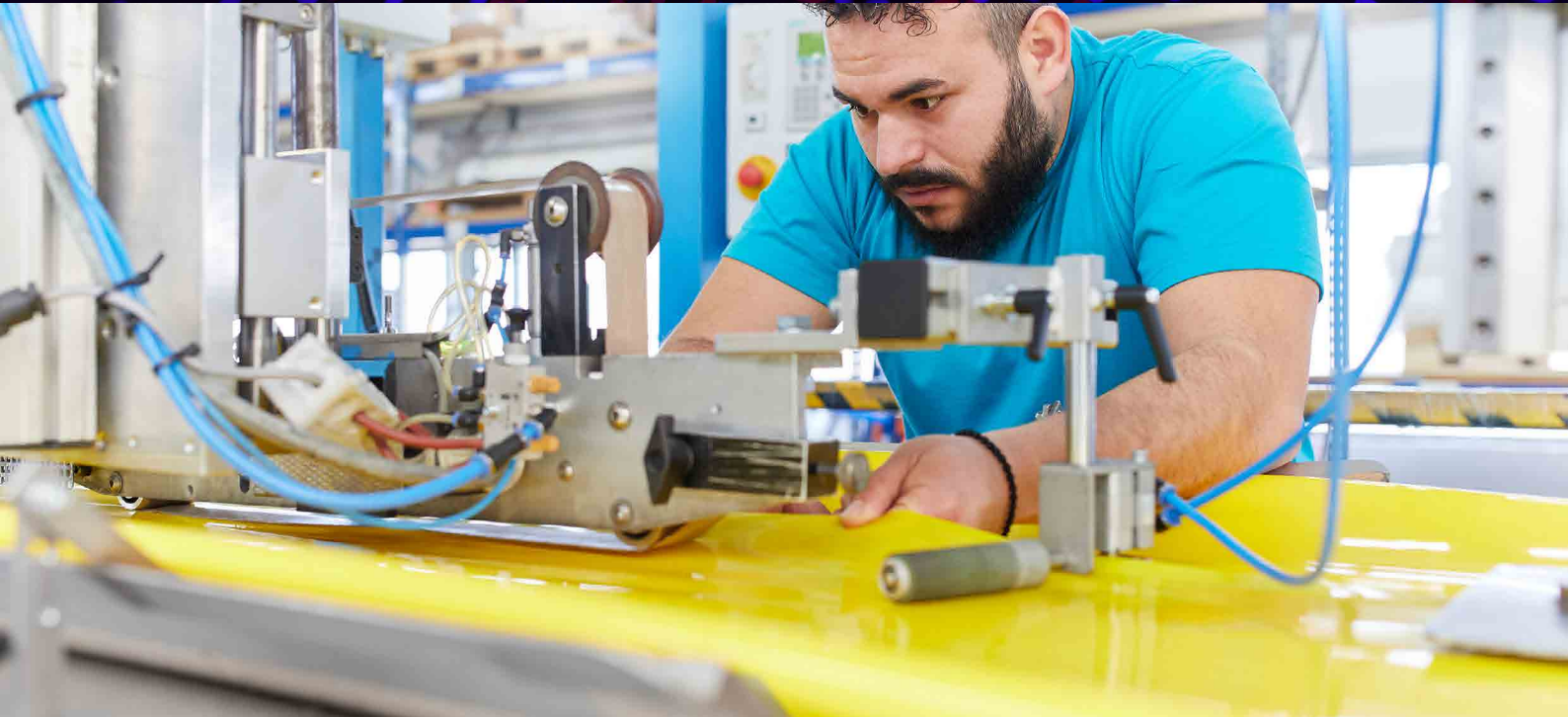


In many parts of the world rehabilitation projects are often required at relatively short notice, with contractors often not gaining access the pipeline requiring repair until quite late in the process. This often means that pipe sizes, lengths and conditions related to just how liner-friendly a site might be are not understood very early on. This can lead to significant time lag between understanding the needs of the project and delivery of the required liner, if it has to be ordered direct from the factory, made, shipped and delivered to site.

So, to support this market anomaly, IMPREG has developed its concept of local warehouses. To date warehouses, which hold a range of pre-impregnated UV cure liners in the most popular size ranges across the market, have been established in Australia, the UK and California (ahead of the new production plant to serve the US West Coast region).

Jack Talbott, Technical Sales manager for IMPREG's UK operations highlighted the advantages of such a warehouse system saying: "The warehouse system with the range of liners available 'off-the-shelf' means that we can meet the needs of what has become a very reactive market place. Being able to place a short-order for liners and get fast delivery in situations where a long lag time for delivery direct from a production facility, be it here in the UK or anywhere else in the world, would mean delays on other project operations or even the collapse of a degraded sewer that simply could not wait, means that contractors, large and small, can work more effectively."

Jack went on to say: "Having been an IMPREG customer for over 15 years as a contractor, I and others like me in our global warehouse operations are in a position to offer existing and new liner installers our expertise and product knowledge in a way that gives us a special advantage. We can advise from day one on what will be the most efficient cost-effective and environmentally-friendly product for any particular situation and we bring with us the flexibility to adapt our advice wherever and whenever necessary given the fact that we are familiar with local conditions and potential obstacles from our own range of experiences in the field." >



Precision work
on the liner in
production.

Since the establishment of the UK warehouse for example, IMPREG has seen a significant increase in enquiries from clients previously unfamiliar with the available product range. Katrin Letzgus-Danhach, IMPREG Head of Sales for the EMEA region said: "The up-turn in enquiries after establishment of our warehouses has more than justified our investment in this type of facility and allows us to offer significant flexibility within the markets they serve."

IMPREG planned to celebrate its 20th anniversary recently, but the Covid crisis meant this was not possible. So, with the company now close to celebrating its 25th year of trading and with this in mind and with the future squarely in its sights, the company has recently indicated that, whilst it continues to look at and invest in developments for its products in the larger diameter lining market, with so far DN2000 being its largest liner installed in Italy in March 2021, it is also now looking at the smaller diameter options. IMPREG is looking at how it can meet the needs of and UV cure product availability for the smaller contractor community. However, the company is saying little more than this at present – so watch this space for future developments.

IMPREG liner
onsite during
installation.

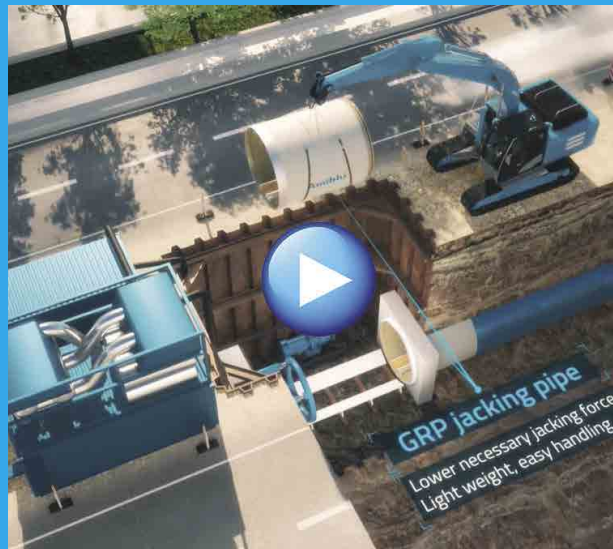


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CIPP HAS DEFINITELY NOT LEFT THE BUILDING

While industry attention is often focused on pipelines outside the building, lining technologies have been proving their worth rehabilitating the untold kilometers of pipes found inside the building envelope for decades. Rehabilitating the intricate drain pipe network inside the building, including pipe as small as 40 mm (1½ in) diameter with multiple bends, puts a spotlight on the installation processes used.

Light curing, of course, is a leap forward in CIPP lining, improving consistency in the final product, speeding installation times, lowering technician labour costs, and lowering risk by enhancing control over the lining process relative to ambient cure of a two-part epoxy. In-building lining installation techniques, whether light cured or not, utilise either an inversion process or a push- or pull-in-place (PIP) method. Precision PIP (Push or Pull-in-Place) installation methods with integrated inflation bladders have been specifically developed for the smaller diameters, inside the building, and under slab market, whereas most other CIPP installation methods were developed and optimised for the volume utility sector, with long lengths of larger diameter pipes.

The combination of push- or pull-in-place and UV curing is an especially compelling rehabilitation solution. The virtually unlimited resin pot life and the ability to wet out liners well in advance and off-site, for example, ensures that technicians utilising UV curing are not racing the clock in the way they are when working with a two-part epoxy, since curing does not start until the lights are illuminated. The critical benefit of UV lining with push- pull-in-place, said NuFlow Certified >


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NuFlow will be exhibiting a variety of systems at IFAT.

Contractor Mike Lomonaco is the precision that can be maintained and “The way you can double check your work, and verify tie-ins. There is no loud equipment, so the working environment is calm and not rushed. Pull in place is the way to go.”

Frank Rucco, from NuFlow Certified Contractor Pipe Restoration Solutions added: “The risk factor on jobs drops substantially, because we have more control over the curing process.”

In the smallest diameter pipes, robotic reinstatement at remote branch connections is not always practical or even possible, and the overlapping of connection liners at a reinstated service connection can result in an excessive reduction of the inside diameter. Precision push- or pull-in-place gives the option of ‘gapping’ (or leaving the branch connection, wye or tee, un-lined) or utilising connection profiles (connection liners) to achieve a total lining system in applications where other processes would resort to more disruptive and costly measures, including additional excavation. With time-sensitive installations, the option of gapping would allow for an immediate return to service without having to wait for the much longer process of robotic connection reinstatements. If desired, connection profiles for the branch connections can be independently installed during a separate phase of the work.

NuFlow’s Precision PIP installation methods, which allows for monitoring and precise placement with a CIPP camera, easily avoids under-shots or over-shots during liner insertion (absolutely critical when lining ‘blind shot’ branch pipes) and ensures that joints and fittings near the end of the liner are properly sealed with extremely precise and reliable placement. One advantage of NuFlow’s NuDrain and NuCure Cold Cure UV CIPP liners is that they achieve a full-length, full-area tight frictional interface seal, rather than relying upon local end-seals that can actually damage the structure of a CIPP liner. Hydrophilic seals will periodically leak unless kept continuously wet, and while small intermittent leakage may be considered acceptable for exterior buried utility work, only zero leakage is acceptable inside of a building footprint (especially above ground).

Inversion is not capable of such precision placement and is also at higher risk when installing through multiple bends. Furthermore, inversion comes with the risk of stretching during installation and a likelihood of air pressure ‘burps’ disruptively blowing out traps and releasing aerosolised contaminants into the buildings. Furthermore, liner products certified for plumbing use inside of the building envelope must also be free of VOCs and Hazardous Air Pollutants, a requirement the bulk of the CIPP products used in the exterior utility sector do not meet. NuFlow tube design permits better negotiation of bends (which tend to be more frequent in plumbing and mechanical piping) with less risk of twisting and excessive wrinkling and with a more consistent as-built structural wall thickness. >



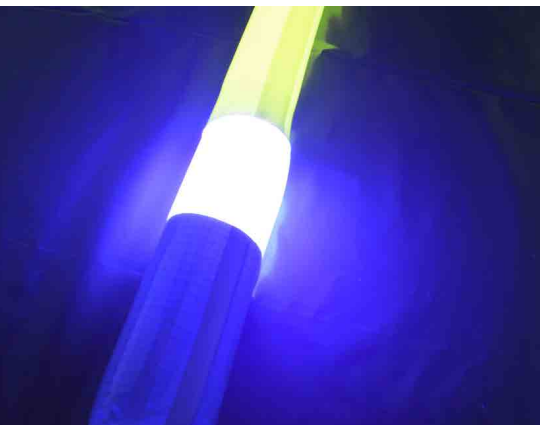
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Demonstrations will be available for NuFlow systems at IFAT...



...including light curing.

In UV curing installations, Resin Protection Systems are designed to prevent premature curing of the resin, allowing for as much time as necessary to position the liner precisely, and enables the outer thermoplastic coating to properly contain and protect the resin, helping avoid bleed-out, wash-out, and emulsification during insertion and curing. The inflation bladder also avoids resin blow out which can lead to CIPP liner wall leaks, which frequently happen when other processes experience inner film pinholes or seam failures. Containing the resin also greatly reduces the risks associated with uncured resin left within the building envelope (especially where missing host pipe sections can result in extensive resin bleed off).

In-building rehab also involves jobsite footprint considerations. A true 'cold cure' refers to a low peak exotherm and a short exotherm duration, resulting in minimal excess heat. Cold curing is energy efficient, but just as importantly, does not require additional active cooling techniques or equipment. Curing processes that require active cooling are typically more expensive than cold curing, and can depend on bulky equipment which increases the jobsite footprint and presents challenges in smaller, in-building work areas.

When exposure to light controls the cure, the variable site conditions have far less influence and crews need to make fewer site-specific method adjustments, so cold cure light curing results in a much more consistent cure across installations. Paired with a precision push- or pull in-place installation method, CIPP is very much at home inside the building.



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DUCT SURVEYS PREPARE HINKLEY POINT C FOR NATIONAL GRID LINK-UP



Duct cleaning at Hinkley Point.

Buried ducts that will hold the high voltage cables connecting the new Hinkley Point C nuclear power station to the National Grid have been surveyed and cleared of water by drainage engineering specialists from Lanes Group plc.

A team from the Lanes Bristol depot has carried out the CCTV survey and cleaning project so the 12 cable ducts are ready for 400 kV power cables to be installed.

Hinkley Point C, being built by EDF Energy on the Somerset coast, is Europe's biggest single-site building project. When completed, it will generate about 7% of the UK's total energy needs.

Lanes worked closely with engineers from the Kier BAM joint venture, working for NNB, part of EDF Energy, to devise the best methodology to clean, prove and survey the ducts.

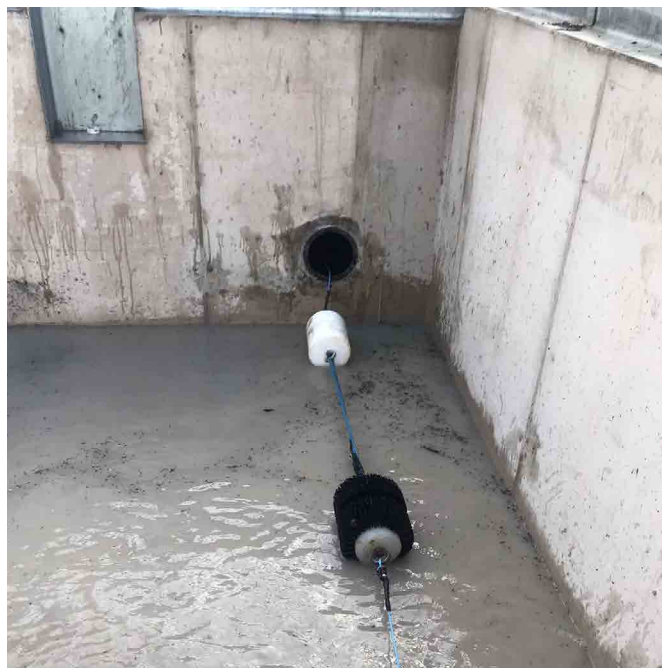
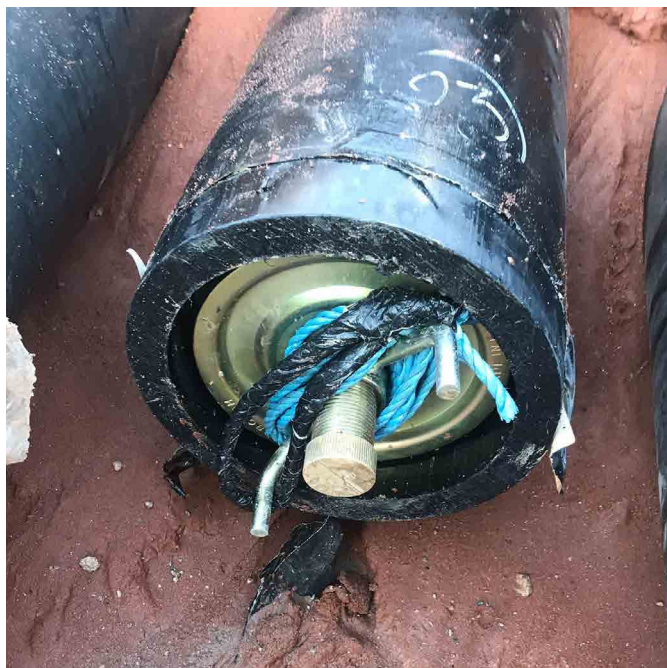
Lanes Area Development Manager Jamie Commons led a team of four drainage engineers who completed projects over six months. He said: "Our drainage expertise and equipment were ideal for the task. Working with our Kier BAM colleagues, we devised a methodology that safely met the access challenges associated with the project and completed all works in the required timescale."

Three bundles of ducting, each with four ducts, with lengths of 190 m, 300 m and 700 m, were worked on. All were circular, with an internal diameter of 185 mm.

The project involved four key tasks: removing water and debris from the ducts; prove their condition; carrying out CCTV surveys; and make them watertight. >

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The cleaning works was challenging due to the long of the ducting involved.

The biggest challenge was cleaning and survey the 700 m bundle because the ducting was so long. A key part of the solution was the creation of a novel mini-parachute, powered by compressed air.

The first task was to send a pull rope along the duct. This was needed to pull mandrils along the pipe to clean it and prove it.

This was achieved by attached a tough polythene bag to the rope, creating a parachute. A powerful pneumatic compressor was then used to inflate the bag and push it through the duct. The rope could then be attached to a plunger mandril, which was pulled through the ducting to force water and debris out of the pipe.

A 166 mm diameter proving mandril was then pulled through each duct to ensure there were no deformities that could hinder the later installation of the power cables. The proving mandril was combined with a brush mandril to remove dust from each pipe at the same time.

Another key solution for the 700 m bundles was to carry out all the work before the final 100 m of each 700 m duct was installed.

This meant the Lanes CCTV crawler camera, which has 300 m of cable, could be used to survey the 600 m pipes from each end, recording HD quality images inside each duct along its entire length.

The final 100 m sections were then installed and surveyed with the crawler camera. The Lanes team then inserted bungs at both ends to stop more water or debris getting into them.

The same methodology was used to clean, prove, survey and secure the two shorter duct bundles, but from one end only.

Enabling work for Hinkley Point C began in 2008 and construction on the 430-acre site began in earnest in 2016. Around 22,000 people across the UK are now working on the project.

The 3,200 MW nuclear power station is central to the government's strategy to meet the UK's long-term energy needs, and its commitment for Britain to be carbon neutral by 2050. It is due to start generating energy in 2026.

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PRESSURE PIPE REHABILITATION WITH SWAGELINING IN MAGDEBURG

Passing the new pipeline through the Swaging machine.

The sewer network of Magdeburg, Germany includes a 600 m long, DN700 cast-iron free-flow pressure pipeline. The functionality of this pressure pipeline, built in 1928, required rehabilitation and was restored using a trenchless reduction method without heat, Swagelining. This was carried out by sewer specialists Frisch & Faust Tiefbau GmbH on behalf of Abwassergesellschaft Magdeburg mbH (AGM) for Städtische Werke Magdeburg GmbH & Co. KG (SWM).

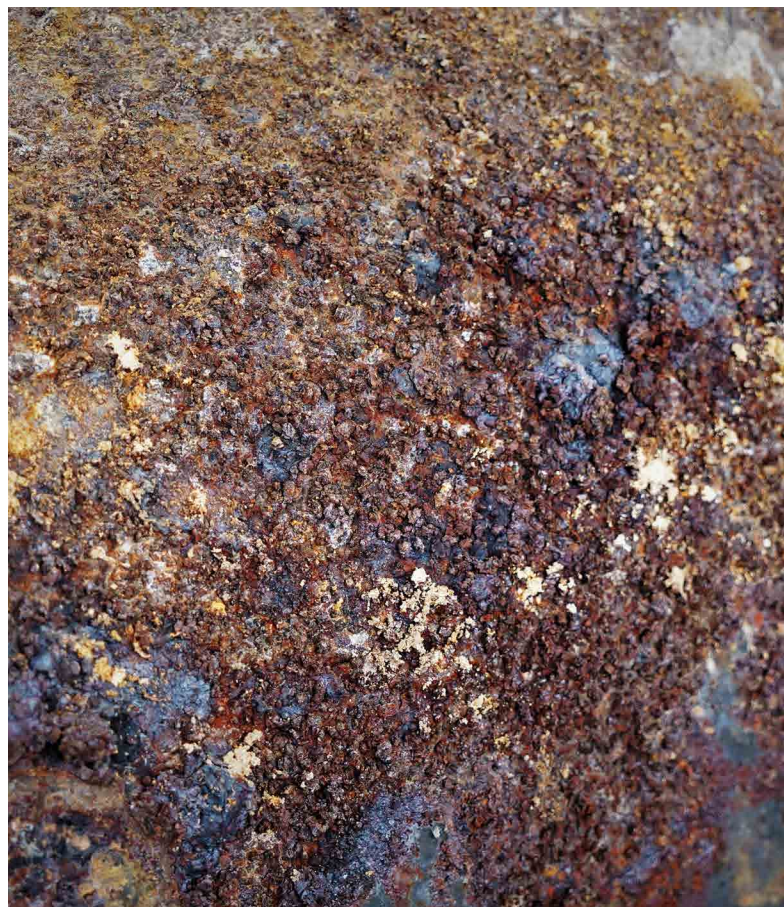
Background

With a length of approximately 1,100 km and with 90 pumping stations, the sewer network of Magdeburg transports the wastewater of approximately 240,000 inhabitants of Magdeburg and more than 100 business and industrial enterprises as well as a number of neighbouring communities to the Magdeburg/Gerwisch wastewater treatment plant. The state capital Magdeburg has granted the concession for sewage disposal to AGM. In the context of continuous rehabilitation and renewal measures, AGM commissioned Frisch & Faust Tiefbau GmbH (Frisch & Faust) with the rehabilitation of an almost 100-year-old pressure line. Planning and execution were undertaken by the sewer rehabilitation department of the company, which was founded in 1991, headed by civil engineer Timo Heidbrink.

The pressure pipeline being rehabilitated is of critical importance for the Brückfeld, Cracau and Prester drainage areas east of the Elbe and the only drainage connection to the Cracauer Anger main pumping station. The circular profile of the cast-iron DN700 pipe is 600 m long, and it runs through a residential area between one of the largest pumping stations in Magdeburg and a pressure pipe end chamber at a busy crossroads. In addition, old trees stand in the immediate vicinity of the pressure line. Accordingly, traffic and environmental aspects had to be taken into account and inconveniences for residents minimised during the project. >

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Damage: severe corrosion of the cast iron. The swagelining method is particularly suitable for the trenchless renewal of sewers which have been damaged by corrosion.

Initial assessment


To select and plan suitable measures, Frisch & Faust thoroughly inspected the old pipe. Prior to the inspection, a bypass had been built to divert the wastewater.

The CCTV inspection showed incrustation and graphitic corrosion, a material-specific type of corrosion. The damage was already fairly advanced, as the corrosive degradation had been going on for a long time. The pipe material was dissolving layer by layer and being carried away by the wastewater. The original shape of the old pipe had been retained, but the integrity of the pipe was reduced due to the selective dissolution of the iron content. This caused potential weak spots and an increased risk of breaking. The old pipe was no longer mechanically resistant.

Determination of the profile

To ensure the best possible execution of the planned rehabilitation, the actual profile of the pressure pipeline was determined over its entire length. To do so, an IBAK ORPHEUS 2 pan and tilt camera was used for continuous, laser-assisted determination of the profile. Frisch & Faust then used the measurement results as a basis for planning the rehabilitation.

Swagelining is a suitable method for trenchless rehabilitation of pressure pipelines which have been damaged by corrosion. The old pipe only serves to route the new pipe line and has no static function. The old pressure pipeline therefore remains in the ground and serves only as a sleeve for the new pipe. As the extent to which the diameter of the new pipe has to be reduced significantly depends on the inner diameter of the old pipe, exact knowledge of the actual profile along the section was important for planning rehabilitation. >



The ORPHEUS 2 was used for continuous determination of the profile and the 3D GeoSense pipe run survey over the entire length of the pressure line in Magdeburg.

The lasers integrated in the fully rotatable camera head enabled determination of the profile over the entire pipe length. For this purpose, the IBAK T 86 tractor moved at an even speed of approximately 50 to 70 mm/second. The laser points registered in this manner were analysed with the IKAS evolution software and evaluated by Frisch & Faust. The laser scan allowed for the collection of data and thus findings which exceeded those of a purely visual inspection. Among other things, the analysis of the measurement data showed that the minimum diameter measured was 692 mm. The PE pipe was then selected based on the maximum and minimum diameters determined over the entire length of the pressure line.

Pipe run measurement

The position of sewers can theoretically be determined based on the manholes. Between the manholes, a straight run of the section is assumed. Between the inspection openings, the pressure pipeline to be rehabilitated does not run straight. The exact curvature was not known, but so significant that it had to be considered in the planning of the rehabilitation operation. Because of this, the exact run of the pressure pipeline concerned was therefore determined using x, y and z coordinates. This was done by means of an IBAK 3D GeoSense pipe run survey.

The pipe run was recorded with the help of the 3D sensor integrated in the IBAK ORPHEUS 2 pan and tilt camera. The 3D GeoSense pipe run survey directly provided an accurate map of the pipe run, including width, length and height information. The geodetically exact layout survey completed the information about the pressure pipeline and was considered in the decision for the rehabilitation method. The map that was generated formed the basis for the decision on how many construction sections were needed to pull in the new pipe. >



Reduction method with mechanical diameter reduction (swagelining): view of the starting pit – inserting the PE pipe line.

The PE pipe line passed an inspection chamber while being pulled in: view of the conical full-PE swage head with deflection pulley (red) for the wire rope.

Reduction method

Based on these comprehensive preliminary surveys, AGM decided in cooperation with SWM and Frisch & Faust to use Swagelining for the rehabilitation operation in Magdeburg. The basic principle of this reduction method without heat is to evenly reduce the diameter of a PE pipe line by means of hydraulic tensioning until it can be pulled into the old pipe. This method utilises the viscoelasticity of PE. After the tension is relieved, the PE pipeline expands again due to the memory effect of PE until it rests evenly against the inside of the old pipe without any annulus gap.

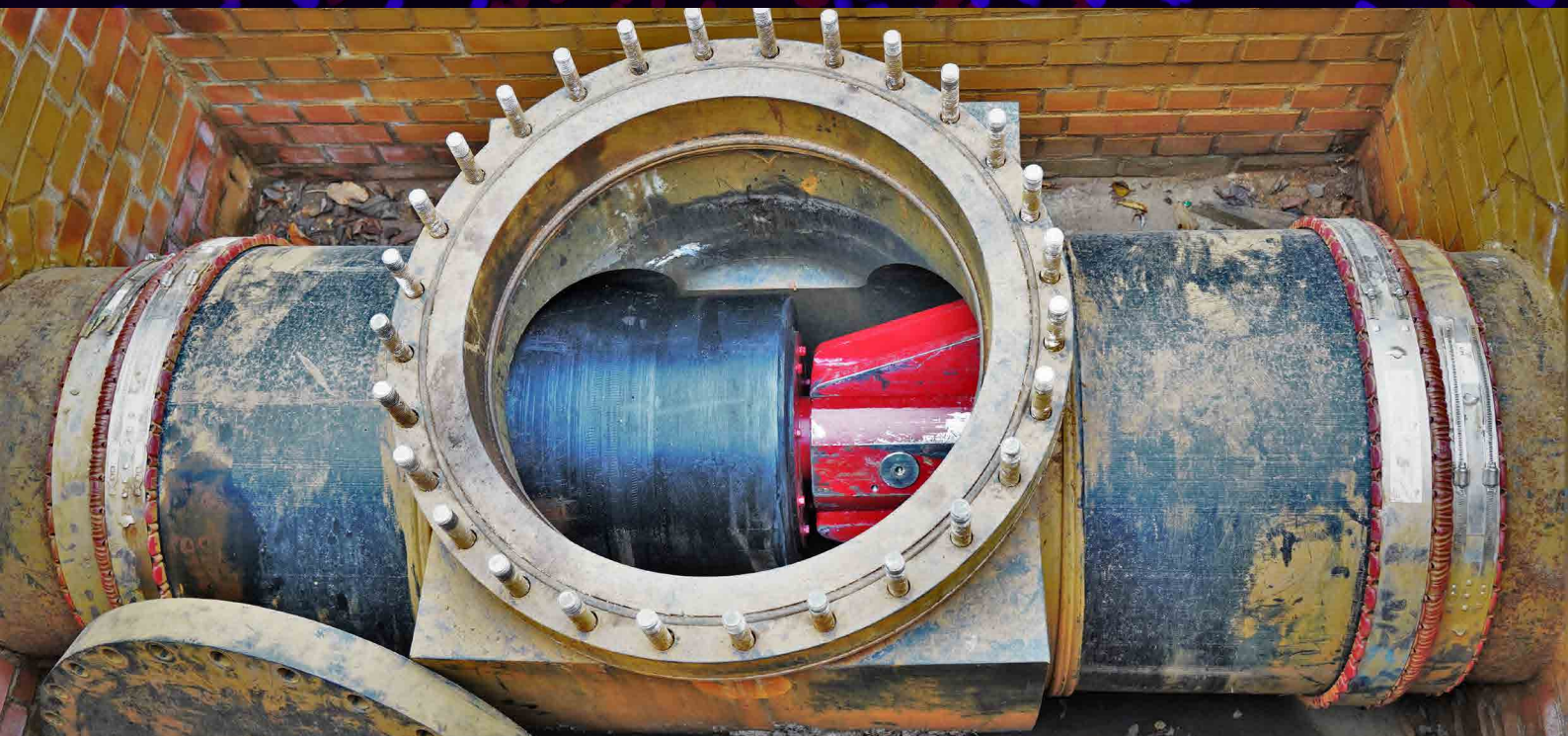
Construction

The pipe was pulled into the pressure pipeline in two stages: first, a 240 m route section with three bends of up to 15° was pulled in, and then a 320 m route section with two bends. For this purpose, four concrete supports were cast with 14 m³ of concrete each, and one starting and two destination pits were excavated. The starting pit was used to insert the new PE pipelines; the destination pits held the pipe pulling system.

For the longer of the two route sections, 21 individual PE pipes with a weight of 1.7 t and a length of 15 m each were fused together on site to form a pipeline. The elastic PE pipeline was pulled through the swage rig, to which a lubricant had been applied, by means of a winch with a constant axial tensile force of approximately 50 t. In this process, the PE pipeline was elastically stretched and the cross-section reduced by up to 10% by cold deformation. After the PE pipeline had been pulled in completely, the tensile force was relieved.

Within 24 hours, the pipeline had re-expanded to its original outer diameter and was pressed smoothly against the inner wall of the old pipe. The entire length of 600 m with a nominal pipe diameter of DN700 was lined in this manner. The pipes were connected by means of joints. The final work, such as the connection to existing pipes, was only performed after the completion of the close-fit lining process. >





Frame with hydraulic cylinder in the destination pit.

The result in Magdeburg is a new, self-supporting pressure pipe which only reduces the original hydraulic capacity of the pipe line by the wall thickness of the PE pipe line of 41 mm. The new PE pipe assumes the static functions so that the old cast-iron pipe is no longer used in its original function. The normal operating pressure of the pressure pipe is 0.17 bar, the maximum operating pressure is 0.5 bar. After the rehabilitation of the pressure line, a pressure test with 1.5 bar was completed successfully.

Sustainable final outcome

For the rehabilitation project in Magdeburg, a geodetically exact pipe run survey and profile dimension determination were performed over the entire length of the pressure line.

Both measurements were made with the IBAK ORPHEUS 2 pan and tilt camera.

The findings far exceeded those of a purely visual inspection and helped to secure the best possible execution of the rehabilitation. Due to the comprehensive preliminary surveys, a suitable method and a PE pipe with an optimum fit could be selected.

Particularly in inner-city areas, as in this case, trenchless sewer network rehabilitation is advantageous. Only the construction pits had to be excavated for Swagelining. Extensive excavation works as well as damage to the environment and the trees along the route section of the pressure line was avoided. Disadvantages for the residents and traffic obstructions were reduced to a minimum. Compared to a reduction method with heat, the energy consumption was reduced because no heating was required.

The slight reduction of the cross-section by 41 mm only had a minor impact on the hydraulic capability of the pressure pipeline, as the new PE material results in a significantly better roughness coefficient of the pipe surface than that of the old pipe. In addition, a gap between the walls of the old pipe and the new pipe, which would have to be filled in a costly process, was avoided by using the close-fit installation. Last but not least, Swagelining is more efficient than conventional rehabilitation methods. The new PE pipe guarantees a long service life in the affected drainage area east of the Elbe and is the result of a successfully completed rehabilitation project in Magdeburg.



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SOCIETY NEWS

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A MESSAGE FROM THE CHAIR



Jari Kaukonen, Chair, International Society for Trenchless Technology

Hi ISTT members!

After the great NaSTT annual show in Minneapolis, I have paid a visit to some smaller shows in Finland, my home country. First one was in the beginning of May. The Maxpo exhibition took place in a small airport in Hyvinkää where there were about 300 companies presenting their products with almost 10,000 people visiting the expo.

I had some good discussions with some potential exhibitors for our No Dig show in Helsinki. The second one was a water sector conference in the city of Vaasa with some 1,000 delegates. I had many good discussions both with potential exhibitors and many delegates. I have no doubt that our show will be remarkable for everyone taking part to our show. My estimation is that the number of delegates will increase above 300. We have received also many replies from professors round the world that they will come to the research colloquium which will be held before the conference.

The programme for the International No Dig show in Helsinki is almost ready. We received 64 papers and that shows that we will have a qualified high-level programme in 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 in the Finnish language, the second day with Scandinavian language and the third day will be a student master class conducted by first class professors from round the world. All students are more than welcome to the student masterclass which is free of charge for students.

We have received votes for the post conference tour on Thursday the 6 October what every affiliated society could vote for five different possibilities. The most voted programme and therefore the winner was the underground city of Helsinki.

An interesting day will take place on Thursday just after the conference.

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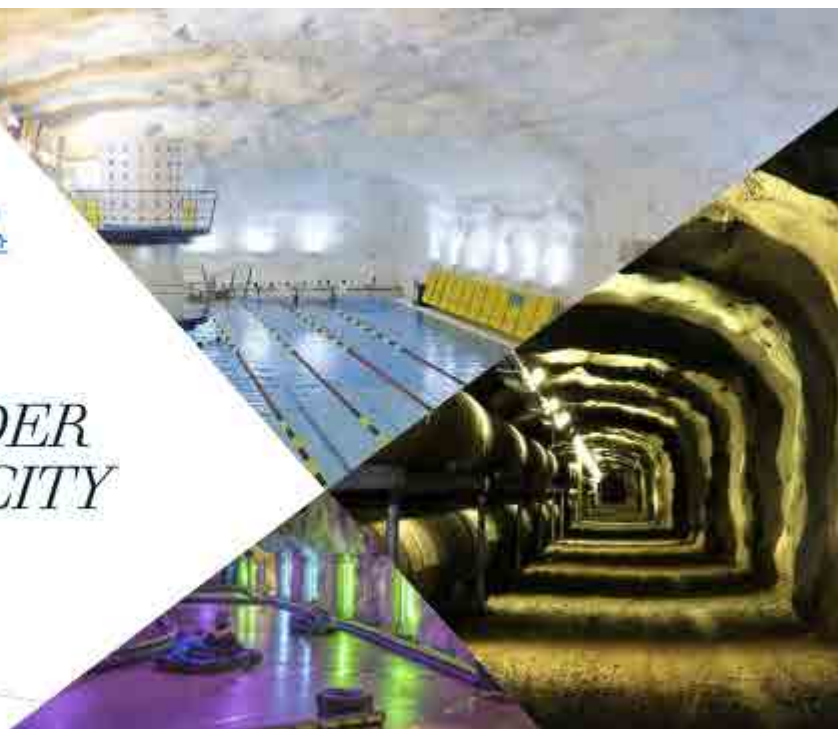
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A short description of the 400 rooms and 200 km of tunnels

<https://www.myhelsinki.fi/fi/n%C3%A4e-ja-koe/maalainen-helsinki>

5. CITY UNDER HELSINKI CITY



"The Gala dinner on Tuesday is surely something you will not forget I can promise. There will be some surprises in the programme."

The Gala dinner on Tuesday is surely something you will not forget I can promise. There will be some surprises in the programme. It would be nice to receive an ISTT award there, so it is time to search out some good proposals that can be entered for the Awards.

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. There will be a nice pre-conference tour to Tallinn before the conference on Saturday the 1 October. There is a limited number of places for that trip, so it is good to book your place early.

Before the Helsinki conference, I have planned a visit the VST in Paris in the beginning of June and Bucharest for Trenchless Romania as they will be a new Affiliated Society to ISTT. We all can welcome Trenchless Romania club to our family in Helsinki.

I wish to all of you an active trenchless summer!

With best regards,

Jari Kaukonen
Chair, ISTT

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SOCIETY NEWS

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TRC IS NOW AN AFFILIATED MEMBER OF ISTT



Trenchless Romania Club (TRC) is now the only entity in Romania affiliated to the International Society for Trenchless Technology (ISTT) and supported by the international trenchless community.

At its late April meeting, the Board of the International Society for Trenchless Technology (ISTT) approved the application of the TRC as an Affiliated Society of ISTT. TRC provides an organisational setting for professionals in the trenchless industry to meet, network, and develop business relationships. TRC also provides a forum in this part of Europe for the trenchless industry to collaborate with public authorities and official representatives.

ISTT Executive Director, Peter Smeallie commented: "The Trenchless Club of Romania has been sponsoring a very successful conference, Trenchless Romania, that has really enhanced the trenchless industry in and around Romania. We could not be happier to welcome TRC into the international marketplace with ISTT."

Trenchless Romania Club is the main supporter of Trenchless Romania Conference and Exhibition, one of the most important conferences and exhibitions in the region that focuses on trenchless technologies. This year, the 6th Edition of Trenchless Romania Conference & Exhibition takes place on 14 of June at Hotel Caro in Bucharest. The event will showcase machinery, products and services from international manufacturers and providers attracting representatives of public utility companies (water, gas, fibre optics), ministries and local authorities throughout the region.

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 organised by Affiliated Societies and/or 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.

ISTT was established in September 1986 and now comprises 28 Affiliated Societies in North and South America, Europe, Asia, Africa and Australia.

For more details concerning TRC please contact:

Maria Nae, Executive Director TRC – Email: maria.nae@trenchlessromania.ro

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WEBINAR: 30 JUNE 2022 SOIL FRICTION AND INTERACTION DURING MICROTUNNELING

Category: Microtunneling

Presenter:
Dr. Wout Broere

Organization:
Delft University of
Technology, the
Netherlands

Date: 30 June 2022

Time: 14:00 GMT
10:00 am EST, US,
22:00 Beijing, 16:00 Berlin)

The friction forces on tunnel segments during pipe jacking determine to a large extent the capacity of the jacks and the number of intermediate jacking stations. Experience shows significant differences between predicted and actual friction forces. In this presentation we will look into the different factors that contribute to the overall soil friction and lead to the differences between design approaches and actual field experiences.

One of the major contributing factors to the overall friction is the boring of curves. To better understand the behavior of the tunnel boring machine in curved alignments, a model has been developed, that takes the subgrade reaction and the stiffness of the soil into account. The subgrade reaction in the inner and outer curve of the TBM differs substantially and a reduction factor is introduced to deal with this effect. Especially in soft soils, the impact of curved drives can be significant, and this will be illustrated by detailed measurements from several pipe jacking projects in soft soil conditions.

About Dr. Wout Broere

Dr. Wout Broere is a professor of Underground Space Technology at Delft University of Technology, a board member for the Netherlands Society for Trenchless Technologies as well as a Fellow of the ISTT. His research interests range from trenchless technologies, large diameter tunnelling and the use of underground space to site investigation, physical modelling and offshore foundation engineering. He has extensively published on these topics and is currently editor-in-chief for the journal of Tunnelling and Underground Space Technology (incorporating Trenchless Technology Research).

Register Here:

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SOCIETY NEWS

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HELLO FROM THE CHAIR



Dawn Greig, Chair, UKSTT



Lynn Maclachlan – Associate Director
for UKSTT



Hello everyone! Well, what a busy few weeks it has been at UKSTT. The recent Masterclass in Leamington Spa on 'Updates in CIPP over the last 10 years' was a huge success, thanks again to all of the speakers, moderators, organisers and attendees for a thought-provoking day which resulted in great discussions, which I am sure will be continued outside of the event. What an amazing industry, there is always so much to learn and so many ideas for the future of Trenchless.

I bring good news, that the deadline for the UKSTT Annual Awards has been extended until 14 June. Please start writing down your entries now, it is only a few weeks away and we do not want you to miss out! In particular, I really want to encourage any young professionals out there to get involved, as well as companies that have bright young minds starting to make their mark in this trenchless world, to put their protégées forward for the amazing Young Professional of the Year Award. As Chair of the Society, I have the very great honour of judging this one myself. There is a £2,000 bursary at stake, which brings the opportunity to travel to learn more about Trenchless techniques in another country. Do not be shy, put yourself forward and further your career. I am happy to talk you through it, so please get in touch if you want to find out more, or better still, put pen to paper and send in your entry ASAP.

The countdown is on for the Roadshow in Belfast, a much-anticipated conference and exhibition on 15 June. Book your place now for an event which is traditionally one of the best in the trenchless calendar!

Finally, I would just like to remind everyone that if you have any queries about Trenchless technologies or how they could work for you, your company, a particular project, tender, your thesis, or just out of curiosity, please feel free to use our fantastic technical enquiry resource at www.ukstt.org.uk. All enquiries are treated confidentially and passed to relevant members to help with, only with your approval. Our technical team work hard behind the scenes to answer general enquiries and put you in touch with our excellent member database for specific needs, best of all, it is free!

Dawn x

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UKSTT AWARDS CALL FOR ENTRIES DEADLINE DATE 18 MAY 2022



Each year the UKSTT makes annual awards to promote excellence in trenchless technology, and this year the awards will be made at the Society's Gala Dinner that is being held in Peterborough on 14 of September 2022. Held during the biennial No-Dig Live conference and exhibition, the Awards recognise the outstanding contributions made by organisations and individuals to the promotion, use and development of Trenchless Technology in the previous calendar year.

The awards themselves are open to all aspects of Trenchless activity. Entries for overseas projects will be accepted provided they are submitted by UK companies who either did the work or supplied the equipment as well as entries submitted by overseas companies for work carried out in the UK.

Each project-based category is marked against the following five categories:

- 1) Innovation
- 2) Environmental Management
- 3) Community Impact & Customer Care
- 4) Project Management
- 5) Legislative Compliance/Health & Safety

New Categories for 2022

- Innovative Technology
- Detection, Location & Inspection
- Pipe Rehabilitation – Cured in Place Pipe Lining (CIPP)
- Pipe Rehabilitation – Techniques other than CIPP
- New Installation – all techniques other than Horizontal Directional Drilling (HDD)
- New Installation – Horizontal Directional Drilling (HDD)
- Young Professional
- Environmental Award

For further category information and criteria or to access the online application form please visit the UKSTT website <https://www.ukstt.org.uk/2022-award-categories-entry-forms/>

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TRENCHLESSWORKS

NOMINATIONS FOR THIS YEARS 'YOUNG PROFESSIONAL AWARD' IS NOW OPEN

Do you know anyone who fits the following criteria?

- 1) Understanding of Trenchless Technology
- 2) Contribution to the Industry/Project
- 3) Vision for the Future

Every year, the UKSTT presents the winner of the 'Young Professional' category with a £2,000 bursary to help fund their travel and accommodation to any part of the world, allowing them to undertake further research into their chosen area of Trenchless Technology.

The Society recognises the need to encourage the work that young professionals are bringing to the industry and are keen to recognise this at the awards ceremony.

Young Professionals (<30 years) are asked to submit a 1,500-word entry that best demonstrates their contribution to the field of Trenchless Technology. UKSTT will be looking for evidence of an understanding of Trenchless Technology, the individual's contribution made, the quality of the submission and the candidate's vision for the future of Trenchless Technology.

Deadline date for entries is 18 May 2022. The entry form and rules and guidelines can be found here <https://www.ukstt.org.uk/2022-award-categories-entry-forms/>



2021 UKSTT Young Professional Award Winners

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Deadline date
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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 CO₂ 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/>.

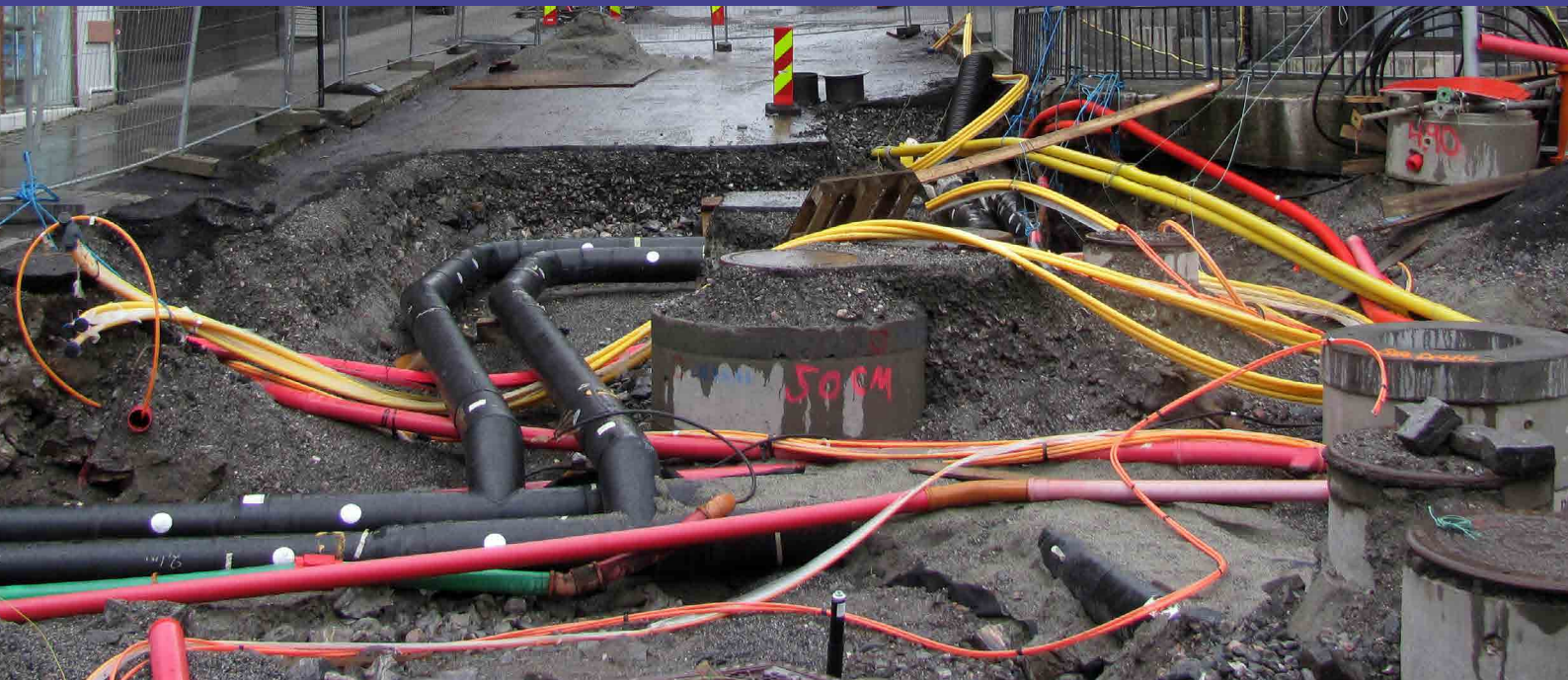
Any enquiries received are circulated to our Corporate Members and if more detailed advice is required UKSTT have a dedicated team who will advise separately. All technical enquiries are stored on the members only area of the UKSTT website. For all your trenchless solutions and latest news visit the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

#ThinkTrenchlessFirst

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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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MEMBERSHIP BENEFITS

Contractors
&
Consultants



OPPORTUNITIES



NETWORKING



DISCOUNTS



SPEAKER POOL



MARKETING



RESEARCH

To find out more please scan the QR code to go directly to the membership page of our website. Alternatively, please visit www.ukstt.org.uk. You can call us on +44 (0)1926 513 773 or email us: admin@ukstt.org.uk



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EVENTS AND MEETINGS

2022

May 30-June 1: VST 2022
French No-Dig Live Conference & Exhibition
Paris, France
Details from :
<https://www.salon-villesanstranchee.com/>

May 30-June 3: IFAT 2022
Munich, Germany.
Details from: <https://www.ifat.de/en>

June 15: No-Dig Roadshow Belfast 2022
Crowne Plaza, Belfast, Northern Ireland
Details from: www.nodigroadshows.co.uk
Register to attend:
<https://westrade.co.uk/files/NDRS22/>

June 17-24: North American Tunnelling Conference (NAT) 2022
Philadelphia, USA.
Details from: <http://natconference.com/>

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/>

2023

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

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

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