PIGGING PRODUCTS & SERVICES ASSOCIATION

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Pigging Industry News

the newsletter of the Pigging Products & Services Association

THE PRESIDENT'S LETTER

By Michael Rapp, ROSEN Group, Germany

I'd like to take this opportunity to welcome the new members of our PPSA community and thank the over 120 existing members for their ongoing support. The updated PPSA Buyers' Guide & Directory of Members 2018/19 has been published on our website and mailed to pigging industry representatives across the globe. If you haven't received your complimentary copy or would like to order additional copies for business partners, please contact Diane Cordell at ppsa@ppsa-online.com. A new useful addition to our website is a reference list of key regulatory bodies and industry standards: https://www.ppsa-online.com/regulatory-authorities

Let's briefly look back at the recent IPC and IPE exposition in Calgary, at which PPSA exhibited, along with over 1300 attendees and over 250 exhibiting companies. Our booth was a great opportunity to spread the word about the products and services that our members and our Association provide. As for IPC, the world-class selection of papers and poster sessions has been very inspirational, providing a glimpse into the future of pipeline integrity management.

Next on our agenda is the annual PPSA seminar on 'Pipeline Pigging', that will be taking place in Aberdeen, Scotland on November 6th and 7th 2018. A tutorial on 'Flow Modelling & Assurance' will be run on the first day, followed by a networking dinner. The second day features eight papers on the advances in Pigging technologies alongside an exhibition. Please see www.ppsa-online.com/seminar for details on the program and how to book your attendance.

Further dates to mark in your diary include our annual PPSA golf tournament in Houston, Texas on Monday 18th February. Registration for players and hole sponsorship will open soon. This will be followed by our Annual General Meeting on Tuesday 19th February.

Looking further ahead, there seems to be a feeling of optimism across the pipeline pigging industry, as the volume of work appears to be rising, as well as the recognition of our sector's contribution to securing energy supply. Furthermore, regulatory authorities in the U.S. have indicated the upcoming implementation of more stringent regulations, such as the requirement to inspect Medium Consequence Areas (MCA), the assessment of Combined Threats, an increasing scrutiny on Distribution Networks and the necessity of Traceable, Verifiable and Complete (TVC) Pipeline Records, including material properties. As we have seen in the past, some of these might over time be adapted by regulatory authorities in other countries. Adding to the above is a rise in unconventional oil and gas production, combined with the constrained public energy infrastructure that has already led to temporary shortages in gas supplies in some regions. These trends are visible all across the world, driven by the increased utilization of gas to produce electricity, and will lead to further new pipeline construction. All together this indicates a growing demand in pipeline pigging products and services, especially rewarding companies that bring technology innovation to pipeline integrity.

NEW Members

Full

Majestic Offshore Sdn Bhd, Malaysia

Associate

Linalog Pipeline Inspection Pte Ltd, Singapore

Individual

Peter Connery, USA

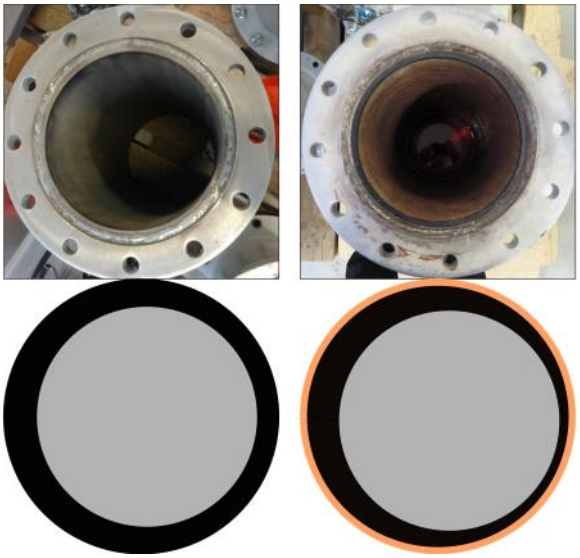
Ammar Elfatih Mohamed Ali, Sudan

Rocsole's smart deposition in-line inspection tool

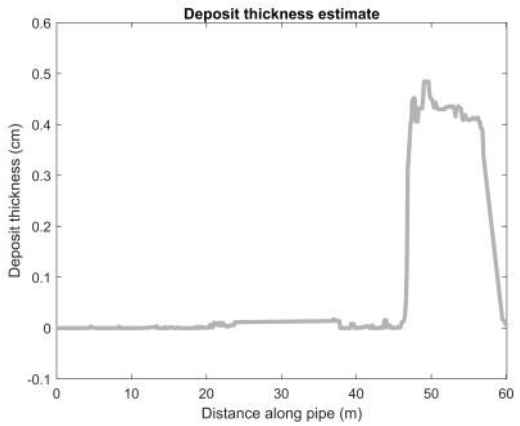
Rocsole has been developing a deposition in-line inspection (DILI) tool based on electrical tomography. This tool quantifies and characterizes solid deposits in piggable flow lines and pipelines. The tool can be used to maximize production throughput, optimizing cleaning pig programs from the number of runs needed to the sizes used as well as detecting possible blockages and build-up locations of the pipeline in the early phase. Integrity campaigns can be made more efficient by identifying what deposits are present and where by using the tool before the pipe cleaning process and by ensuring cleanliness before integrity measurements takes place.

The risk of the tool becoming stuck in the pipe is minimized since the sensor diameter is significantly smaller than the pipe diameter (tool is non-aggressive). The tool uses safe and cost-effective non-nuclear technology to measure the solid deposit thickness and type while traveling through the pipeline along with the flow without production shut-downs. The performance of the tool was validated in a 10" pipeline including both clean pipe and a 10 m long test section with 4.5 mm paraffin wax deposit.

Rocsole's 8" DILI tool for 10" pipelines



Clean pipe segment (left) and pipe with 4.5 mm paraffin wax deposit (right). Corresponding tomographic images are shown below. Gray area is the measured position of the DILI tool.



Measured deposit thickness along the pipe. Test section with 4.5 mm paraffin wax is clearly visible.

Double block isolation allows tie-in points to be installed on pressurised gas pipeline

STATS Group has successfully carried out a double block isolation of a 24" gas pipeline operating at a pressure of 121 bar in the Gulf of Thailand.

STATS used a DNV-GL type approved Remote Tecno Plug® to provide a fully monitored leak-tight isolation allowing two 4" cold taps to be conducted, providing future tie-in points as part of a larger modification project.

In advance of the workscope, STATS conducted a site survey on the platform to gather critical information and complete a noise survey to confirm there would be no interference with the plug communication system. The site survey information allowed STATS to produce a detailed engineering and piggability assessment. This confirmed the specification of the Remote Tecno Plug and identified a suitable isolation location.

STATS also conducted a full Factory Acceptance Test at their headquarters in Aberdeenshire, in a purpose-built test-fixture with all testing witnessed by client representatives.

Once the Remote Tecno Plug arrived on the platform it was loaded into the pipeline launcher. The isolation plug was then pigged with nitrogen through the pressurised pipeline and tracked a distance of 70 metres, through six 3D bends to the desired set location. Communication with the Tecno Plug is achieved using an extremely low frequency inductive system for reliable tracking and accurate positioning.

At location, the Tecno Plug was hydraulically set to activate the locks and dual seals. The dual seals of the Tecno Plug were then independently tested with full pipeline pressure in the correct direction to confirm leak-tight isolation and allow the pipeline to be bled down to ambient from the platform launcher to the rear of the Tecno Plug. The annulus between the Tecno Plug seals is then vented to ambient to create a zero-energy zone. This was then subject to a 12 hour isolation stability hold period before the 'Isolation Certificate' was issued.

With the isolation in place and the double block and bleed isolation verified the STATS technicians then safely conducted two 4" cold taps on the 24" pipeline. Due to the thickness of the pipe wall a significant volume of swarf would be produced during the tapping operation. In order to minimise the volume entering the pipeline the cold tapping was conducted in stages to allow the cutter to be retracted to allow the swarf to be cleared prior to completing the cut and removing the pipe coupon.

Throughout the workscope the Tecno Plug was constantly monitored and remained stable for the full nine day isolation period. With the workscope successfully completed, the pipeline pressure was equalised and the Remote Tecno Plug was unset and pigged back to the launcher for demobilisation.

24" Remote Tecno Plug during its Factory Acceptance Test

ROSEN Group's combined evaluations More than just the math

The benefit of combining technologies for the inspection of pipelines lies primarily in the combination of data sets when analyzing features. With more information, and different perspectives, the personal interpretation that is often needed with identifying features becomes less necessary as the data becomes clearer. This unique method of combined technologies allows for more accurate and reliable integrity assessments.

Various industrial assets present a wide range of potential damage mechanisms. In pipelines, for example, while single threats may compromise operational safety, combined threats such as corrosion within dents or cracking in corrosion pose an even higher risk to the asset's overall integrity. To guarantee the most accurate picture of a pipeline's integrity, one technology is sometimes not sufficient. Combined Diagnostics Solutions combines the individually strong technologies to produce multiple data sets that can deliver the full picture of an asset.

The classic proven method to overcome non-negligible risks of one control system in critical cases is using two, which is called the "four-eyes principle." The mathematical calculation of the Probability of Detection makes this plausible and seemingly straightforward:

Having two systems, a and b, with independent Probability of Detection, P, results in a "combined" value:

$$P_{combined} = 1 - (1 - P_a)(1 - P_b)$$

Using an ILI system with a detection probability of 92% may not be tolerable, but combining it with another with a POD as low as 88% provides more than 99% performance.

In reality, ILI data analysis benefits even more from independent measurements than mathematical formulas suggest, because a significant component in understanding the information is data interpretation based on gained experience. Even neural networks do the same. Machine learning systems have similar procedures: they collect various data sets from different sources and interpret the entire picture to get the ideal result. Oftentimes, even non-ideal data sets can lead to unexpected success.

One theoretical example for two such data sets would be a standalone Ultrasonic (UT) measurement looking like a missing signal that may not be interpreted as an anomaly. Equally, a small-scale spot in standalone Magnetic Flux Leakage (MFL) data may be interpreted as a pinhole of 4 mm in diameter at 40% depth. Combining these two observations at the same location will result in the identification of a 2-mm pinhole with more than 80% depth. This change is made possible because the MFL signal was reinterpreted based on the very small extent visible in UT. This demonstrates that combined interpretative differentiation is more than number crunching. Averaging results is not sufficient; in this case, 80% maximum depth was identified instead of the original 40%.

Two or more measurements of the same asset dramatically improve the detection and classification of features. The combination overcomes single-system methodological restrictions and improves interpretative sizing. Probability of detection, Identification and sizing accuracy are significantly increased when complimentary ILI systems are combined. This leads to more accurate and reliable integrity assessments, reducing both operational risk and field verification cost.

Enbridge and BHGE partner to drive enhanced pipeline safety

In July 2018 **Enbridge Inc.** and **Baker Hughes, a GE company** launched testing of new, next-generation ultrasonic phased array pipeline inspection tool sensors designed to enhance accuracy and identification of crack features and to deliver greater detail on the condition of a pipeline. The testing phase follows 14 months of development of a multi-year research and development project to advance pipeline inspection tool sensor technology and, ultimately, pipeline safety.

"At Enbridge, nothing matters more to us than safety, and investing in projects like this helps drive safety and reliability performance to new levels," said Walter Kresic, Enbridge's Vice President Pipeline Integrity. "Proactive investments in innovation and technology like this are intended to add another layer of safety to our pipeline networks and ultimately, benefit the industry as whole."

Similar to MRI or ultrasound technology used in the medical industry, pipeline inspection tool sensors provide the ability to detect and accurately characterize anomalies that could affect the health of a pipeline. The next generation of inspection tools will provide more accuracy and higher resolution, enabling better maintenance and an overall improvement on the assurance of pipeline safety.

"Partnering with BHGE on this project demonstrates Enbridge's commitment to investing in leading technology solutions to drive enhanced pipeline safety," says Michael Bellamy, Vice President of Process & Pipeline Services at Baker Hughes, a GE company. "BHGE has a strong track record of partnership with our customers to help support their safety, technology and productivity goals, and this joint project is no different. Next-generation sensor technologies will make a significant contribution to Enbridge's pipeline integrity objectives. "

The next generation of phased array sensor technology will represent a significant step change in pipeline inline inspection, enabling a more comprehensive assessment of the threats to pipeline integrity. The sensors are mounted on a robotic inspection device, commonly referred to as a "Smart Pig," which travels along the inside of a pipeline, measuring the condition of the pipe wall as it goes. BHGE and Enbridge have been working successfully together on developing and deploying solutions for pipeline safety for more than 20 years.

CPPI carries out in-line inspection in Pakistan

China Petroleum Pipeline Inspection Technologies Co., Ltd.(CPPI) successfully completed the cleaning, geometric and high resolution in-line inspection of a 380 km pipeline in Pakistan.

This is the first time that CPPI has entered the Pakistan market. The client has a reputation for strict requirements on related technology, personnel qualification and performance. In addition to in-line inspection with unbiased technical and commercial vendor selection, CPPI's team also provided project management, planning, scheduling, coordination and in-field technical support.

The client was obviously concerned with the theft points, altogether 5 drilling oil theft points and 13 metal losses were located in the following site excavation. Further unexpected loss has been avoided, and the safe and stable operation of the pipeline is ensured.

The site condition is known to be unsafe, harsh and extremely hot, however, CPPI's team ultimately overcame all these difficulties and achieved satisfactory inspection result and got the recognition from the client as well.

Pig launching at worksite

Case study: Hazardous waste decommissioning pigs

iNPIPE PRODUCTS™ was approached by the client who required assistance with a pigging programme to clean out a 24" phosphorus pipeline.

The pipeline had been used for the transportation of phosphorus in suspension for a number of decades and had never been pigged.

Phosphorus is highly flammable. It emits a weak green light and gives off white acidic fumes of phosphorus oxides when exposed to air. It also ignites at 30°C in moist air. Higher temperatures are required for ignition in dry air. It also readily ignites in air if warmed, finely divided or if held under conditions in which the heat of reaction can build up.

Risk assessments conducted indicated that it was imperative that the line be cleaned before decommissioning of the pipeline began.

The pipeline required cleaning in a number of stages with debris which included:

- hard scale debris in deposits
- hard scale on the pipe wall
- sticky phosphorus deposits over 360 degrees of the pipe wall
- deeper sticky pools of phosphorus
- harder solidified deposits of phosphorus

The pipeline also featured 1D bends; some consecutively placed at a number of points to further complicate the geometry of the pipeline in terms of pigging design. The client also confirmed that there was considerable build-up of phosphorus silt located close in the radius of the 1D bends.

Initial attempts by the client to clean the pipeline had limited success hence iNPIPE PRODUCTS™ was approached to assist in developing an achievable solution in a very tight timescale.

iNPIPE PRODUCTS™ used a temporary in-line 24" pig launching station incorporating a simple bolted

Internal views of the pipeline before cleaning

iNPIPE PRODUCTS™ used a bespoke polyurethane toothed high density foam pig to successfully remove both loose scale from the pipe wall and sticky phosphorous deposits. Pigging runs using the bespoke foam tool also proved very successful in removing phosphorus deposit from the short radius bends.

iNPIPE PRODUCTS™' bespoke polyurethane toothed high density foam pig

Following pigging the pipeline was clean and ready for decommissoning and removal.

Cleaned pipe after progressive pigging regime

Pigs Unlimited International pigging case study: Clean the city's water line

City planning, especially in the home building industry is constantly evolving. Within the last few years the water lines have been moved from ground to service water lines. The team had to remove decades of buildup due to iron and magnesium and other substances in the lines.

The first step in the pigging process was to verify the key fire-hydrants to use for launching and receiving of the pig.

Verifying key fire hydrants

Once this key step was accomplished, the team was ready to tackle the dirty work.

The team removed the cap of the fire hydrant and inserted the pig by hand. A light density bare foam swab was used since it can reduce to up to 50% and the poly coating on the back helped to push it through the line.

Inserting the foam pig into a fire hydrant

Once the pig was inserted, the cap was then reapplied on the fire hydrant and the team hooked up a hose to a water truck and a pressure gauge. Pressure was then created behind the pig and the water moved the pig through the line.

Water moved the pig through the line

Success! Multiple swab pigs were run (no stuck pigs!) until the line was successfully cleared of excess debris.

Multiple swab pigs were run

Inline Services introduces new product innovations in 2018

As leaders in the pipeline pigging industry, **Inline Services'** pigging experts are always looking for opportunities to solve complex problems for our customers through the innovation of new products. Two of the stand-out innovations this year were our MULTI-CAST™ Pig and our PIGMITTER.

MULTI-CAST™ Urethane Shaft Pig
Inline introduced the MULTI-CAST™ Pig in July 2018 with great reviews. This innovative new pig design offers a urethane shaft providing both durability and flexibility for passing through pipeline elbows, as well as the advantage of configuring the pig with any combination of accessories such as cups, disc's, magnets and brushes. The urethane shaft is threaded and uses a large nut to hold the accessories in place. After a run, accessories can be replaced in any combination.

This designs unique ability to include brushes makes it effective for removing mill scale, black powder and other hard to remove scale. The reusable urethane shaft flexes and cleans better while offering customization options and efficiency not available from traditional steel mandrel or solid cast urethane pigs.

MULTI-CAST™ Urethane Shaft Pig

PIGMITTER Transmitter Body Pig
Inline introduced the new PIGMITTER Pig in August 2018. This small pig is a BIG solution for tracking challenges in 2" and 3" lines.

The PIGMITTER design is simple, yet effective using either the TX-1AA or TX-1AAW transmitter as the pig body. Although any of Inline's TX Transmitters can be used as a pig body, these two models are best suited due to their length and ability to manage short radius bends. If longer battery life is needed, or there are no bend issues, any transmitter can serve as a PIGMITTER body.

Mounting flanges are used to customize the PIGMITTER with any combination of cups and discs. Since the transmitter is reusable, additional accessories can be purchased and swapped-out easily in the field using a few basic tools. The unit can be tracked with an electromagnetic antenna, such as our RX-101 Receiver.

PIGMITTER Transmitter Body Pig

Oblique magnetization in MFL minimizes effect of speed on data-gathering

Tool velocity is a longstanding constraint on the reliability of in-line inspection (ILI) data, including that gathered by magnetic flux leakage (MFL) technology. Slower optimal tool velocity typically means more accurate, robust and actionable data (1).

However, research by global pipeline solutions provider T.D. Williamson indicates that speed range does not affect data quality in MFL-equipped inspection tools that use oblique, rather than axial or circumferential, magnetizers to identify axial planar anomalies (2).

MFL is used to detect and size reduction in wall thickness, which typically occurs when external or internal corrosion causes metal loss. When a pipe loses metal, pipe wall thickness decreases—and so does the amount of pressure the pipeline can contain.

The basic principle of MFL inspection is this: Constructed steel pipelines are magnetized close to saturation by a specially equipped smart pig. If there are no defects in the pipe wall, most magnetic flux lines will pass through it. However, where there is corrosion or missing metal, magnetic resistance will increase, or "leak" into the surrounding air, forming a magnetic leakage field at the defect area that the smart pig can measure.

The evolution of magnetizers
Smart pigs have incorporated MFL technology for decades. MFL's evolution has included the use of different types of magnetizers with various capabilities.

For example, because of pipeline geometry, early MFL tools depended on axial magnetizers, which were considered the most stable platform for magnetization and operation. However, they limited the tool's ability to detect and size axially oriented anomalies in the pipeline wall such as grooving, preferential long seam corrosion and cracking—the very defects that pose the greatest threat to integrity.

In the 1990s ILI technology companies overcame those limitations by commercializing tools with magnetizers that saturate the pipe in the circumferential (transverse) direction. That approach improved the detection and sizing of axially oriented anomalies.

Despite those advances, the pipeline industry still had to wrestle with ILI data-gathering problems related to tool speed. For example, a study of velocity effects on circumferential magnetization indicated a reduction of magnetic flux in the outer regions of the pipe wall (3). This suggested that tool speed may make it more difficult to identify metal loss anomalies there than closer to the inner pipe wall. Other studies indicated that velocity effects are more significant and easier to detect at lower speeds in circumferential MFL compared to axial MFL (4).

Oblique magnetizers avoid velocity concerns
In 2009, TDW introduced the next advance in MFL-equipped technology: an oblique (or helical) magnetizer design that addresses velocity concerns.

By magnetizing the pipe in a spiral manner, the technology characterizes axially oriented anomalies that disrupt lines of flux to produce measurable amounts of flux leakage. Using digital analysis and pull tests, TDW researchers found that the oblique magnetizer's speed performance has a negligible effect on its ability to size axial planar anomalies. The reason is that the helical structure shields most of the magnetic field from the effect of eddy currents, which diminish magnetizing force and increase as tool speed increases.

As a result, when the helical and axial MFL designs are combined in a single tool such as multiple dataset technology, they can ensure a complete inspection in the same speed range.

1. Harris, Chuck. 2013. "When Faster Doesn't Mean Better: Optimizing Inline Inspection Tool Velocity." *Pipeline and Gas Journal* September 2013, Vol. 24, No.9.
2. Belanger, Adrian, Burden, Dane & Simek, James. 2017. "Velocity Independent Sizing of Axial Planar Anomalies Using Oblique Magnetization." The

29th International Pipeline Pigging & Integrity Management Conference, Houston, Texas.
3. Ireland, R. C. Ireland & Torres, C. R. 2004. "Challenges in Circumferential Magnetisation: A FEA Point of View." *Proceedings of IPC2004*, IPC2004-0191, Calgary, Alberta
4. Belanger, Burden & Simek

ROSEN Group introduces revolutionary integrity management solution

In September 2018 at this year's International Pipeline Conference and Exhibition (IPC/IPE) the ROSEN Group celebrated the global launch of its brand new digital integrity management solution, NIMA. Offering customers a basis for secure decision-making by providing an accurate reflection of individual integrity management processes and easy access to all necessary data, NIMA sets a new standard in the oil and gas industry.

Every asset is unique in its mechanical characteristics, operational conditions, physical location, and applicable legislation and/or technical standards. Although the general methods and techniques of identifying and managing the various integrity threats have been normalized over the last decades, the interpretation of standards and regulations as well as their application still differs greatly between operators. A uniform approach to asset integrity management is therefore downright impossible.

Additionally, more and more regulations now require that all pipeline records be traceable, verifiable and complete. However, with the amounts of collected data steadily growing, the establishment of a system of record where all available data is readily accessible is becoming an increasingly critical issue for pipeline operators.
Fully integrated into ESRI ArcGIS Pro, and thus providing the full power of ArcGIS Pipeline Referencing, NIMA offers an intuitive and reliable way to keep pipeline records traceable, verifiable and complete.

Furthermore, it is a platform that allows for the autonomous definition and modification of integrity management processes and integrated algorithms as needed. Not restricted to a set of predefined functionalities, it offers the user unlimited options in terms of adaptation to individual requirements as new process templates can be created and existing ones altered at any point in time.

NIMA comes with a certified standard set of templates for the most common integrity management processes. These processes are developed by ROSEN's in-house integrity assessment engineers and have proven their practicability in numerous integrity assessments. Moreover, NIMA allows users to digitize their own processes and share them with colleagues and even with other operators, always allowing for individual adaptations. This way, users participate in an industry-wide knowledge exchange.

Backed by the expertise of ROSEN's specialized, multidisciplinary integrity management team, NIMA provides customers with different levels of support, ranging from instant remote execution of tasks straight on their cloud platform instance to expert advice on a specific integrity issue to the training of their personnel.

For more information go to www.nima.software.

STATS Group recognised for pipeline expertise

Ground breaking technology pioneered by pipeline technology company **STATS Group** has been recognised by industry peers.

In June 2018 the Aberdeenshire-based firm was awarded the Subsea Pipeline Projects Award by the world-wide **Pipeline Industries Guild.**

STATS have invested significant capital in developing its subsea BISEP® technology which is deployed when pressurised pipelines require to be isolated to allow repair, modification or tie-in activities.

The BISEP® technology provides fail-safe double block and bleed isolation deployed through a single hot tap fitting, which offers significant safety advantages over traditional line stop technology. The BISEP is the only hot tap installed plug to be fully certified by DNV GL to verify that the design criteria satisfy the requirements for pipeline isolation plugs to provide dual seal and isolation in accordance with offshore standards.

STATS Group chief executive officer, Leigh Howarth said: "Over recent years we have focused our activity on developing equipment suitable for the subsea hot tapping and isolation market, recognising the potential and scale of this market. During this time STATS has completed four major international subsea pipeline repair projects in a range of pipeline sizes, in the South China Sea, East China Sea, Gulf of Thailand and Gulf of Mexico. We are delighted to be recognised by the Pipeline Industries Guild for our achievements in this field and the award is recognition to the commitment of the STATS team in introducing the BISEP to the subsea pipeline market."

STATS Group sales director Ron James and business development manager Neil Mackay collected the award at a ceremony on board the HQS Wellington at London's Victoria Embankment.

Inspecting 3” pipelines – a simple low-cost solution

i2i Pipelines Ltd have successfully miniaturized the sophisticated simplicity of the Pioneer range of smart pigs down to a 3” tool. The tools have been successfully run in operational lines in Canada with no disruption to production operations.

Like all Pioneer tools the electronics and rechargeable power pack are contained in a single pressure housing acting as the mandrel body. The sensor array is contained in a urethane cast pigging disk.

I2i’s new detachable drive module is secured to the front of the pig to improve bend, valve and T passing. The tools can negotiate 1.5D bends, manage high temp (80deg C) and pressures (150bar). The tools use conventional launchers & receivers and can be launched vertically with no additional bolt ons.

The 3” Pioneer is simple to operate and can be run by onsite technicans without the need to mobilise specialist personnel.

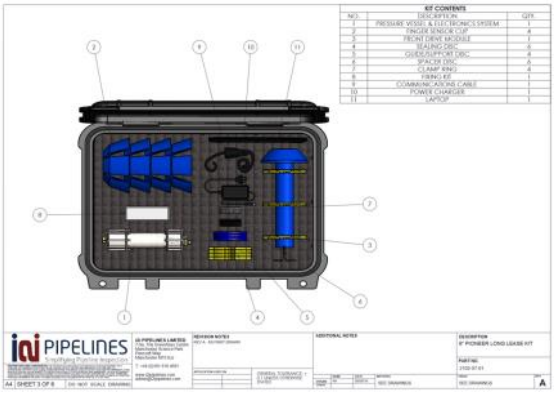
3” Pioneer post run

Vertical Launch of the 3” Pioneer

Long lease of Pioneer™ Smart Pigs

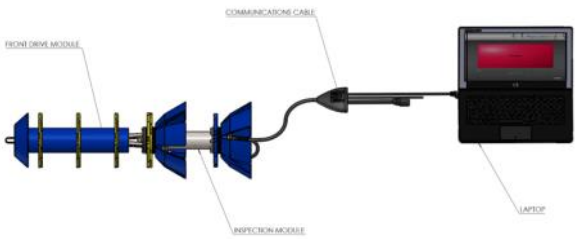
Due to increasing demand from our clients and local partners around the worlds **i2i** are now offering the long lease of the innovative Pioneer™ range of smart pigs. Pioneer pigs from 3” – 24” are now available for long lease agreements.

The minimum long lease period for a Pioneer is 6 months and with a simplified charge out model the Pioneer tools provide great value for money to pipeline operators around the world. i2i partners and distributors can service their local client base without the need for expensive mobilizations on every project. i2i can offer onsite training to local technicians or if logistics are too difficult this can be carried out remotely via the web.



Out the box and ready to run

The Pioneer tools are simple to run and simple to maintain. The Pioneer tools are ready to run straight out the box with minimal time spent in assembly and preparation.



Long lease of Pioneer™ Smart Pigs

The Pioneer tools take minimal programming prior to an inspection run and after a run the laptop and software carry out the data retrieval from the tool. Data is available for review almost immediately after the inspection run. Once the technician is back to base then the data can be uploaded to a secure ftp site for data analysis and reporting. Depending on the length of pipeline the analysis and reporting can be carried out between 5 and 15 working days.

The Pioneer long lease option empowers local pipeline service companies to carry out inline inspection activities for their clients without having to have their own proprietary smart pig technology.

3X Engineering repairs subsea gas pipeline

In May 2018 **3X ENGINEERING (3X)** and its local distributor **PETROENERTECH**, reinforced a 16" gas subsea pipe in Viet-Nam. The pipeline was suffering from internal corrosion at a 45-meter depth and had a maximum operating temperature of 45°C and an operating pressure of 125 bars.

According to ASME PCC-2 and 3X repair calculations, 70 layers of R4D-S were required to repair the defect.

Underwater, preliminary operations were performed prior to surface preparation by sandblasting to get a good surface profile (superior to 60µm).

The repair was then performed as follows:

- Preparation of the composite plate recovered with F3XSS filler and application over the defect using ratchet belts for tightening (after 2 hours of curing, the belts were removed).
- P3X32 primer application on the whole area to be repaired before wrapping to ensure a good bonding between the steel pipe and the composite.
- Kevlar® tape impregnated with R3X1050S resin and wrapped around the pipe. The tape impregnation is performed using BOBIPREG (3X specific machine allowing a quick and regular impregnation resin/fiber). Seventy layers were necessary to repair the defect (i.e. 35 passes of 50% overlap) for a total repair length of 1503mm.
- Specific subsea markers installation on the composite (to avoid any contact with the pipe), on each side of the repair. For that reason, it was necessary to increase the length of the repair of 150mm each side to be able to install these markers.
  At client's request, 3X created and installed these subsea devices to localize easily the defect at pigging inspection.
- Finalization of the repair with reference plate positioning for traceability purpose and protective cover application over the repair to protect the pipe from subsea aggressions.

The subsea reinforcement was successfully performed using REINFORCEKiT® 4D SUBSEA product. The good collaboration between 3X specialists, PETROENERTECH, PVMTC (diving company) and the client's representatives were also the key to success of this job.

Composite wrapping in progress

Europe's leading pipeline event with additional key topics

From 18-21 March 2019, the international pipeline community will meet for the **14th Pipeline Technology Conference** (ptc) in Berlin. More than 700 participants and over 80 exhibitors from 50 different nations are expected. Delegations from more than 70 different pipeline operators took part in the last ptc.

In addition to the traditional technical focus of the conference and exhibition (19-21 March 2019), the topics "Qualification & Recruitment" and "Public Perception" will be covered in complementary "ptc Side Conferences" on 18 March 2019.

The pipeline industry as an employer must continue to work to remain attractive in the competition for qualified young talent. This important issue cannot be solved at national level alone. An international exchange of experience is essential for training and further education and for a qualified comparability of the various models. The day before ptc, a separate "ptc Side Conference" will be dedicated to this complex of topics.

Pipeline projects are today more than ever the subject of public debate and will be examined more closely and critically in the near future. Previous practices in dealing - or not dealing - with the public are no longer accepted. Directly before the ptc, the various approaches towards handling criticism, protest and manipulation will be discussed in an international exchange of experiences in a "ptc Side Conference".

Further information on the overall concept of the new ptc with the described side conferences, 6 seminars, several plenary sessions and 25 technical sessions can be found at www.pipeline-conference.com.

Pipeline Technology Conference (ptc)