

Pigging Industry News

the newsletter of the Pigging Products & Services Association

THE PRESIDENT'S LETTER

By Danny Molyneux, Quest Integrity, UK

Welcome to my final President's letter! It is hard to believe my tenure is drawing to a close already. I am glad to remain on the Board for one more year and support the next President, Odd Reidar Boye. It has been a fun experience for me and definitely one that I would recommend. Every year, two new Directors are appointed and I would encourage any of our members to put themselves forward. It is not a difficult role – even I can do it! That is, of course, entirely thanks to the consistently great work of our wonderful Secretary Diane Cordell. So I do hope you will consider applying – remember, pushing yourself out of your comfort zone is a great way to continue personal and professional growth.

I would like to extend my gratitude to everyone who attended our Operational Pipeline Pigging Seminar in Aberdeen. The standard of presentations was extremely

high and showcased a wide variety of pigging activities such as cleaning, isolation, inspection, tracking, returns handling, pig design and testing. I understand our members who took spots in the exhibition were delighted with the number of potential customers in attendance.

I am always keen to seek feedback on PPSA events and was delighted by how much positivity the attendees offered. The addition of a dinner and Scottish dance to the program was well received and it was fantastic to see pigging peers from all over the world take their first ceilidh steps on the dancefloor. This is definitely something we would like to repeat in future years!

The event calendar does not stop, and February is a busy month. The PPSA

NEW Members

Full

IMENCO UK Ltd, UK

PT Elnusa Tbk, Indonesia

Golf Tournament takes place on Monday 12th at The Wildcat Golf Club in Houston, with participants raising funds for Young Pipeline Professionals projects. This is immediately followed by our annual general meeting and the Pipeline Pigging and Integrity Management (PPIM) conference. Further into the year, we will exhibit at the Pipeline Technology Conference (ptc) in Berlin and the IPC Conference in Calgary. I hope to catch you in person at one of these.

P.S. What is the strangest thing you have ever seen pigged out of a line? I heard a new one last week that a friend witnessed – a bicycle frame! The pipe can remain anonymous. ●

PPSA golf tournament—February 12, 2024 at the Wildcat Golf Course, Houston, USA

Thanks to the tournament sponsors—helping us raise money for Young Pipeline Professional (YPP) projects



GULF COAST



Prime Minister, Rishi Sunak, visits North Yorkshire pipeline pigging specialist iNPIPE PRODUCTS

One of the UK's leading manufacturers and suppliers of pigging products – North Yorkshire based **iNPIPE PRODUCTS** - welcomed MP for Richmond (Yorks) and Prime Minister Rishi Sunak, last week.

The visit comes almost 10 years since the Prime Minister last visited the iNPIPE business - before becoming an MP. It also provided an opportunity to support one of the largest single employers in his Richmond (Yorks) constituency. The company's growth has increased employment opportunities for apprentices in a successful, expanding engineering company with almost 12% of the workforce now being made up by their apprenticeship programme.

The visit comes on the back of one of the most successful periods to date for iNPIPE PRODUCTS, which has seen the company invest in a new service centre in Aberdeen, grow its global customer base.

As part of the visit, the Prime Minister met the six apprentices based at iNPIPE's Brompton-on-Swale facility, near Richmond, North Yorkshire, spoke to all members of staff and received a full tour of the company's six-acre site, including the foam shop, where the Prime Minister viewed some of the latest foam pig technology manufactured by the business and used for pipeline cleaning, de-watering and swabbing in sizes ranging from 12mm through to 3000mm in diameter.

The visit also provided the management team with the opportunity to talk through their continued strategy for growth which has seen the business export 70% of its turnover worldwide.

Speaking about the visit, Simon Bell, MD at iNPIPE PRODUCTS said: "We are very proud to have been visited by the Prime Minister and were hugely privileged to welcome him to our premises."

"Everyone at iNPIPE PRODUCTS is extremely proud of the business and the success that we have all worked so hard to achieve during what will be our 40th year of trading next year. Our consistently strong performance is coupled with a strong internal culture with many of our team having been with us for 25 years or more."

"Our success – recognised by the Prime Minister choosing iNPIPE as the company to reinforce government support for British industries exporting our products & services worldwide – is reflected in the continued commitment and loyalty of our team, all of whom have played an enormous part in making iNPIPE the successful business that it is today."

Mr Sunak said: "I welcomed the opportunity to return to iNPIPE – a world-class manufacturing and design business in my constituency.

"It's commitment to innovation and quality of manufacture has led to worldwide success anchored in the workforce here in North Yorkshire.

"I was particularly pleased to see the company's commitment to growing its own team through its longstanding commitment to an apprenticeship programme which already has seen young people develop into senior roles in the company."



UK Prime Minister Rishi Sunak visits iNPIPE PRODUCTS



UreStopper: Sealing innovation for Pipeline Integrity in the Oil and Gas Sector

In the oil and gas industry, the operational efficiency and integrity of pipeline systems are critical to ensure safe and continuous performance. In this context, the use of specialised equipment becomes crucial to address specific challenges associated with the handling and control of fluids in extremely demanding environments.

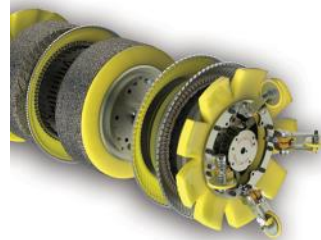
One of the essential components in this scenario is sealing equipment, designed to effectively manage fluid flow and ensure the integrity of pipelines. Its ability to seal and block becomes a critical aspect in ensuring operational safety, preventing unwanted leakage, and facilitating maintenance operations without significant disruption.

In PVM S.A.S. we are constantly working on development and innovation, in this opportunity we identified the needs that arise in the cuts and joints when it comes to integrity repairs or contingency care, some of these are:

Simultaneous repair activities that require the reception of several sealing equipment in the traps. Practical to handle and quick to install. Capacity to contain backpressure, as flammable gases or liquids can be displaced. Excellent interaction with hydrocarbons. Equipment that will not affect metering systems or filters after recovery. The accessories for the installation of the equipment should be easily removable.

Considering the above, in 2022 the first prototypes of URESTOPPER were designed and each of the simulations were analysed to achieve a high-quality product that would meet all the requirements. The first tests were carried out in the DPI (testing and research duct) space designed to test the developments in conditions similar to those presented in the field. The tests generated excellent results giving way to the adjustment for the manufacture of the products. In 2023 the product URESTOPPER was launched, providing optimal solutions to customers.

The URESTOPPER of PVM S.A.S is a polyurethane product, with mechanical resistance to a high degree of exposure to tearing, abrasion, traction, and direct contact with hydrocarbons, maintaining its physical properties, as they can be used in the hydrocarbon industry in various applications. One of the applications is for temporary plugging systems for scheduled maintenance or operational contingency systems.



Flux capacitor.

Enduro put years of engineering skill into the DFL™ Multi Tool. Using multiple data sets, our award-winning analysis team coordinates all of the data using our exclusive Pig Prog II Presenter™.



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The main characteristics of the URESTOPPER are: The URESTOPPER is manufactured in a way which allows greater flexibility and capacity to expand in a uniform and safe way, it supports counter pressures between 20 to 30 (PSI), for the inflation process air, nitrogen or water can be injected, the length of the URESTOPPER allows to make several cuts simultaneously in the same line receiving several of these in the receiving trap, they are not destroyed, they are recovered in the traps avoiding affectations to the filters or measurement systems and designed to pass through dents up to 40%.



PVM S.A.S.'s URESTOPPER

Predicting the external corrosion condition of uninspected pipelines

Author: Edmund Bennett, ROSEN Group

ROSEN has recently expanded its predictive analytics capabilities by adding a powerful new service to its portfolio. This service is specifically designed to deliver an accurate prediction of pipeline integrity with respect to external corrosion. It provides rapid, reliable screening of onshore pipeline networks, enabling targeted detailed studies and inspection. Particularly effective for unpigged or unpiggable pipelines, this service leverages a comprehensive database of corrosion features from pipelines worldwide, known as the Integrity Data Warehouse (IDW).

ROSEN's IDW is a robust repository, holding data from in-line inspections of over 26,000 pipelines, covering more than 800,000 km across various global locations. Geospatial data provides additional insight into the characteristics of the local environments of inspected pipelines in the IDW. These global geo-enrichment data is applied to each pipeline in our database and includes soil properties, land usage information, temperatures, and precipitation levels and the intersections of pipelines with relevant infrastructure such as roads, railways, powerlines, and waterways. This extensive data provides ROSEN with an unparalleled, broad picture of the condition of a significant portion of the world's piggable pipeline assets. The assets vary across multiple dimensions, including age, coating, diameter, wall thickness, and of course environment. Our expertise in machine learning, combined with this extraordinary dataset, empowers us to extrapolate trends from these inspected lines. We can then make accurate predictions about the integrity of completely unseen pipelines. Our meticulous approach to model training, testing, and validation ensures the models we use provide realistic and reliable predictions.

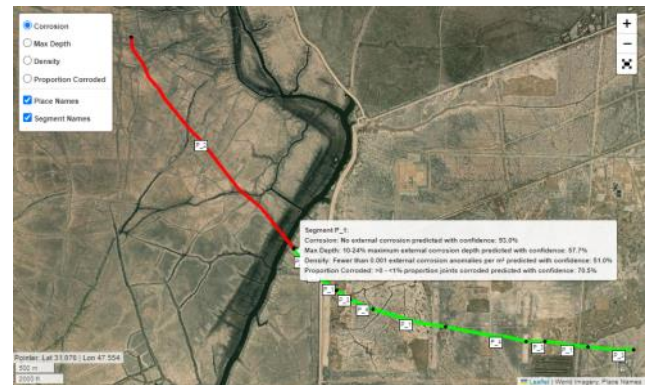
Our predictive services complement the existing pillars of inspection and monitoring, thereby emerging as the third critical pillar of pipeline integrity assessment. This innovation can help to improve safety and optimize operational expenditures. Currently, our

service offers predictions on key asset integrity parameters such as:

- Corrosion Depth: Estimating the depth of corrosion
- Corrosion Density: Quantifying the severity of corrosion within the pipeline.
- Number of Joints Corroded: Providing a count of pipeline joints affected by corrosion.

This capability is versatile and provides results either at the pipeline level – with a single set of predictions for an entire pipeline – or on a segmented basis. When operating at a segmented level, a combination of geospatial and pipeline data is employed to offer more granular predictions for specific sections of a pipeline providing insights into those segments that are in good and bad condition.

Through this external corrosion predictive analytics service, we equip operators with vital predictions about the density and severity of external corrosion. This supports critical decisions regarding repairs, deferment, mitigation, and the prioritization of inspection runs or above-ground surveys. The service is conveniently accessible via a user-friendly dashboard solution with powerful visuals. Additionally, predictive analytics is available as part of an integrated solution to enhance other integrity management decision making processes such as ECDA, remaining life assessment, integrity management planning, and risk assessment. This integrated approach has already been successfully deployed across various pipeline networks, demonstrating its effectiveness and utility in the field.



Picture 1: Map of pipeline with predicted corrosion



Innovative subsea pipeline decommissioning during ongoing production

Author: Iain Shepherd, Engineering Manager for Pipeline and Process Solutions at Halliburton.

Overview

A customer in Norway approached **Halliburton** seeking a decommissioning solution for a pipeline system where pigging was impractical. Decommissioning of tie-back fields have challenges where the main production facility is still in production.

An initial engineering study presented several possible options. The primary challenge involved managing the displacement of hydrocarbons at the platform topsides without affecting ongoing production or export quality from several other infield pipelines. Consequently, handling displaced hydrocarbons at the subsea tree was proposed.

Challenges

A crosslinked SureGL™ pipeline gel decommissioning train was chosen for its viscosity, capable of removing hydrocarbons from the pipeline without using pigs. However, the back pressure generated by the crosslinked gel risked exceeding the design pressure of the pipeline system. It was critical to break the gel before it reached the disposal well choke and formation to ensure the success of the project.

In collaboration with the customer, Halliburton conducted a series of tests to validate the timeline for breaking the gel. This was followed by yard trials, which included simulating the passage of the SureGL™ gel slug through the subsea tree choke and subsequent injection.

The trials identified two key factors: the flow rate the gel could be displaced into the well, and the required concentration and injection rate for the breaker to reduce the fluid viscosity. It was crucial for the gel to break just before reaching the tree choke, and more importantly, before entering the well. To ensure accurate breaking time, the internal volume of the pipeline had to be accurately calculated, considering the potential for wax build-up in the pipe.

Solution

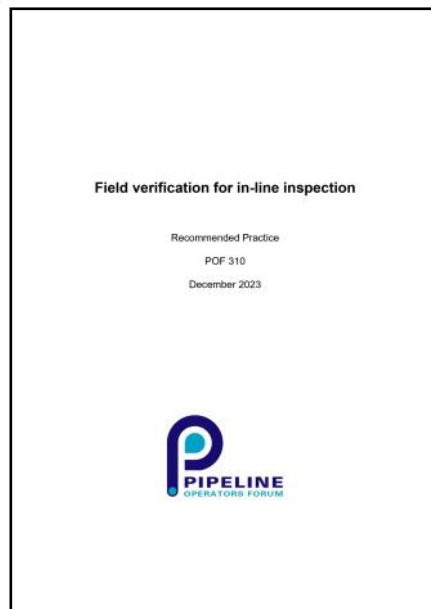
Halliburton successfully decommissioned the 8-in. pipelines using a SureGL™ gel slug from the south tree, displacing the pipeline contents and gel into the north well with a MEG/seawater mix. A high-velocity flush (1.7m³/min) with filtered seawater pushed the MEG/seawater mix into the north well. Subsea samples were collected from the pipeline and analyzed for hydrocarbon content.

A vessel provided the bulk of the pumping services at the south well with integrated onboard pumps. Halliburton managed the gel transfer, crosslinker pumping services, and gel breaker pumping services onboard a second vessel located at the south well. ●

Publication of revised guidance on ILI field verification

The Pipeline Operators Forum (POF) has published an updated edition of its recommended practice document POF 310 *Field verification for in-line inspection*.

The document provides recommendations for pipeline operators when performing verification of reported anomalies following an ILI run and was the subject of a presentation at the PPSA annual seminar in



The update was performed by a POF working group based on information provided by POF member companies, ILI providers and NDE specialists. POF 310 is available for public download at <https://pipelineoperators.org/documents> ●



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Live online monitoring of pigs and ILI smart tools using DAS technology with fiber optical

Background:

For a long time, scrapers and PIGs of different types have been used in the Oil & Gas industry as devices for internal mechanical cleaning of pipelines. Furthermore, in recent years the use of ILI (In Line Inspection) technologies through intelligent tools or instrumented scrapers has spread globally. The objective of the latter is to determine the level of general and particular integrity of the pipelines based on direct and indirect measurements of the defects present in them.

In all cases, the monitoring, detection and eventual positioning of the tools has been and is a very important task. This activity makes it possible to identify the passage of the tool through a certain point, to know approximately its speed, in order to ensure entry into the receiving traps and, finally, to identify approximately where the scraper is located in case of jamming.

To carry out tool monitoring activity, mechanical passage detectors (flag type or electric) or magnetic type AGMs (Above Ground Markers) in the case of MFL tools are normally used. On the other hand, for tool location, tracking systems are used, placing a signal emitting device in the PIG and, in the possession of the surface technician, a receiver and proximity indicator.

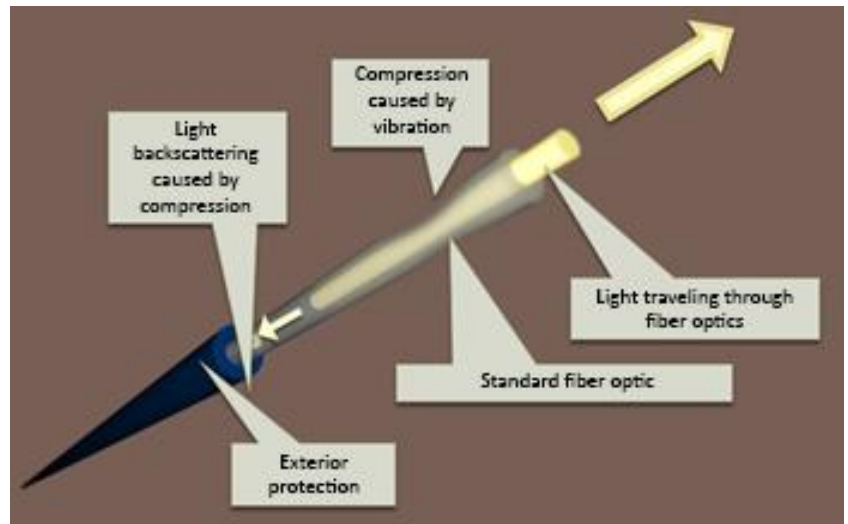
The Solution:

Morken Group, based on the use of DAS (Distributed Acoustic Sensing) technology with optical fiber used for the detection of leaks and intrusions and prevention of damage to third parties, has managed to carry out live online monitoring of an intelligent MFL-type tool, having 1-meter precision and instant speed and positioning information.

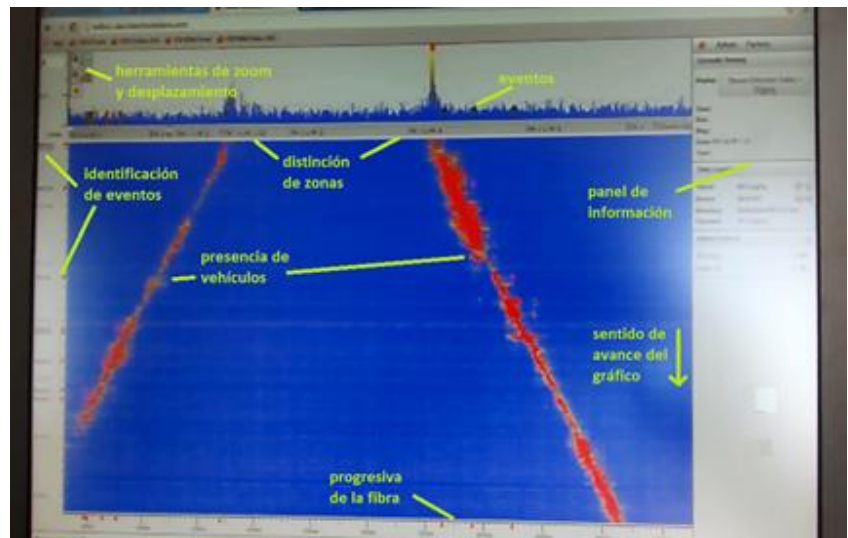
In this particular case, the monitoring was carried out on an important transportation gas pipeline with a perimeter route to the Metropolitan Area of Buenos Aires, Argentina. The system is basically made up of two parts: the optical fiber and the terminal computer equipment which contains the optical unit and the processing hardware. The technology used is called DAS (Distributed Acoustic Sensor).

The operation is as follows: One of the fibers of the fiber optic cable is connected to the terminal equipment (in general, a

standard cable has 12 fibers). The optical unit that the equipment has emits a beam of laser light at one end of the fiber optic cable. This beam is projected along the thread, within it, and throughout its extension. Now, if the fiber thread is crossed by an acoustic wave (mechanical wave produced by the sound generated, for example, by the passage of a cleaning or smart tool) in some part of its length, it is altered, compressing and decompressing transversally. This abnormal movement of the thread causes the light beam traveling within it to suffer backscatter. The DAS equipment is capable of detecting the aforementioned physical event and, in addition, processing it from a computer system. Finally, through an operating system and an its appropriate interface, the user is allowed to view an acoustic profile, in real time, of the entire length of the pipeline. This allows to detect any event that produces vibrations in the pipeline or in the area surrounding it. In one of the available interfaces of the technology, the live acoustic profile of the gas pipeline can be observed.



Fiber optic operation diagram



Tracking screen

Characteristics:

- A dynamic graph of space versus time (waterfall type) is displayed.
- On the abscissa axis (horizontal), the length (space) is found. There, the different features along the entire pipeline are identified, such as stations, roads, streams, valves, traps, etc.
- On the ordinate axis (vertical), there is time, which advances as it is a dynamic graph (waterfall type).
- The colors indicate the magnitude of the acoustic signals detected. Blue indicates “silence”, while red indicates presence of sounds. The larger the red signal on the graph, the higher the magnitude of the sound.
- The operator can zoom in on any part of the graph they want and also scroll through it. To do this, you must click on the “magnifying glass” type symbol and then “shade” the area you want to enlarge.
- In the upper sector, the so-called “events” identified by the system are shown. These events are identified with characteristic images (for example, a backhoe).
- On the right of the screen, there is a panel that indicates the characteristics of the point where the cursor is (fiber length, zone, etc.)

This same interface is what allows live monitoring of the MFL equipment, not only allowing its instantaneous location, but also getting its speed, a main factor to verify magnetization level.

Results and benefits:

By using the technology described, Morken was able to track the PIG, giving additional support and confidence to the user by being able to know at all times exactly where the MFL equipment was located.

Other advantages and features:

- Online real-time tracking of cleaning tools and ILL.
- Instant tool positioning.
- Location accuracy of 1m.
- Instant device speed.
- Possibility of making decisions on operational and flow variables based on the analysis of the PIG speed.
- Possibility of scheduling tasks and optimizing resources by knowing the exact speed and position.
- Elimination of uncertainty in the location of the PIG in the event of a potential jam. ●

STATS Group strengthens presence in Australia and wider Asia Pacific

A number of completed landmark projects, greater market recognition and a long-standing policy of localisation, has strengthened **STATS Group's** (STATS) presence in Australia and the wider Asia Pacific hydrocarbon sector.

STATS has a long-established track record in delivering industry leading repair and maintenance solutions to energy operators along with main engineering, procurement and construction (EPC) contractors globally, with proven dual sealing technology at the core of their product and service offering.

“This has been one of our busiest and most successful periods in terms of project activity and increased turnover in the Asia Pacific market,” STATS Group Regional Manager for Asia Pacific Gareth Campbell said. “We have taken a long-term view and from our initial market entry in Australia we have continually invested in infrastructure and people, starting out by setting up a base in Perth and expanding east and northwards.

A new client recently commissioned STATS to deploy its patented BISEP® double block and bleed isolation technology to isolate the 20-inch Dampier to Bunbury Pipeline in Western Australia and the company hopes this lays the foundation for winning similar worksopes. Other BISEP projects in Western Australia included two worksopes, (double and quad 6” pipeline) and a quad 14” isolation on the Parmelia Gas Pipeline, while building on an existing frame agreement with Santos, a 12-inch hot tap service on the 42-inch Gladstone Transmission Pipeline was delivered in Queensland.

In Malaysia, STATS has a track record of successful project work dating back to 2011 and earlier this year the company signed an exclusive supply arrangement for its products and services with Malaysia's **E&P O&M Services Sdn Bhd (EPOMS)**.

The strategic agreement covers STATS' innovative range of pipeline hot tapping, plugging and inline isolation services, including the market leading BISEP and Remote Tecno Plug (RTP) system, and it strengthened an existing relationship with EPOMS which saw STATS complete a workscope in 2022 which included the isolation and reinstatement leak-testing of a 12” shutdown valve on the EPOMS-operated Larut A platform.

“Malaysia is a strategically important market for STATS and following the signing of a new partnership with EPOMS we have started training their personnel to support onsite worksopes in the local market and are supporting knowledge transfer of our product range,” Campbell said. ●

The evolution of Pig signallers in pipeline control—Online Electronics Ltd

For years, Intrusive Pig Signallers have been ever-present in the oil and gas industry. Their existence in the industry signifies their once indisputable value and function. In a world of manual checks and hands-on operations, the signallers would trip, signalling a pig's passage through the system. A field technician, would relay the message and reset the device, ensuring its readiness for the next run.

However, this system isn't without its challenges. Aging internals, wear and tear, and occasional installation missteps meant that these devices sometimes fail to register a pig's passage. Recognising these inefficiencies, the industry began to adapt. Junction boxes equipped with relays became a standard feature, furnishing a direct line of communication to SCADA RTUs whenever the signaller tripped.

Non-intrusive signallers are leaps and bounds ahead of their predecessors. Flashing LEDs provide instantaneous local alerts, ensuring no pig passages go unnoticed. The advancements are not limited to visual indications. These signallers come with a variety of communication options. Relay outputs and Analog 4-20mA signals relay data to control rooms. Where relay input slots might be unavailable on RTUs, the MODBUS RS485 connection offers a reliable alternative, enabling not only real-time data monitoring but also allowing a deep dive into past events. This integration further aids in data logging, real-time information accessibility, and reprogramming capabilities.

One of the major challenges faced by older systems is their dependency on direct connectivity to the control room. Non-Intrusive Pig Signallers remove this constraint. Some models allow for Long Range Radio connections (LoRaWan), fortified with high-security protocols like chirp spread spectrum. Their capability to communicate over vast terrains and long distances sets them apart. And for those instances where LoRaWan might not be the best fit, Satellite Communication & GSM can be used.

While the basic function of a signaller remains consistent – to detect and communicate the passage of a pig – the manner and depth of this communication have undergone a huge change. Gone are the days of basic hall effect magnetic indications. 3-axis Magnetometers offer a multi-dimensional view of detected magnetic signals. Their advanced settings, sophisticated enough to discern between ILI tools and standard maintenance pigs, ensure that no detail is overlooked.

Ultrasonic Active pig detectors are proficient at filtering out background noise, ensuring that disturbances like sand and bubbles don't trigger false alarms. Meanwhile, Acoustic trackers, which zero in

on the unique sonic patterns of a pig moving through a line, providing another layer of detection accuracy. Non-Intrusive signallers present a diverse spectrum of detection options, varied signal characteristics, enhanced communication avenues, and simplified installation procedures.

As pipelines and control systems lean heavily into digitisation, these Non-Intrusive Pig Signallers prove they are more than ready for the challenge. Seamlessly integrating with digital twin models in SCADA control systems, they stand at the forefront of data input and their compatibility with modern technological frameworks ensures they remain relevant, not just today, but well into the future. Making the switch from Intrusive to Non-Intrusive Pig Signallers signifies the oil and gas industry's shift towards digitalisation and precision. Their evolution represents a move towards a smarter, more efficient industry future. ●

IP Pipeline Technology's success in low flow inspection project

By Martin Shen/Shen Zelin, IP Pipeline Technology

Leading pipeline inspection service provider, **IP Pipeline Technology**, is delighted to announce the successful completion of a pivotal In-Line inspection Project for **PipeChina**. The project, spanning approximately 45.8 kilometers from the Haiyan Distribution Station to the border of Zhejiang and Shanghai, marks a significant milestone in the company's commitment to excellence.

In close collaboration with PipeChina, IP Pipeline Technology executed operations in two distinct inspection segments. The first segment covered the Haiyan Distribution Station to the Zhejiang-Shanghai Connection Station, spanning approximately 43.6km. The second segment extended from the Zhejiang-Shanghai Connection Station to the border of Shanghai, covering a distance of approximately 2.2km. Adhering to PipeChina's management requirements, the In-Line inspection was successfully completed before the project's operational phase.

The comprehensive project included various tasks such as power source preparation, pre-inspection pipeline cleaning, deformation detection, magnetic flux leakage (MFL) detection, pipeline mapping, integrity assessment, excavation verification and reporting, nitrogen recharging, and temporary launcher and receiver cylinder installation. Despite a tight deadline of 18 days imposed by the client, the dedicated team at IP Pipeline Technology overcame challenges and completed all on-site work within an impressive 8 days.

Given that it was a baseline inspection for a new pipeline, cost-saving measures were implemented. These included the use of a specially designed detector that eliminated the need for auxiliary air compressors. Noteworthy innovations comprised a self-propelled geometry detector and a redesigned MFL detector tailored for low flow rates.

Project Manager Jia Hongfeng expressed his satisfaction, stating, "We are honored to have successfully completed this critical project, ensuring the safety and efficiency of the Zhejiang-Shanghai gas pipeline connection. The data from the detector upon our on-site verification was exceptionally clear, and this high-difficulty task served as an excellent challenge for our team."

IP Pipeline Technology places great importance on the research and development of new equipment and technologies. The design of the MFL Tool for low-velocity pipelines ensures smooth operation in pipelines with a small amount of media, solving the problems of unstable operation and improving data quality. This success lays a solid technical foundation for similar low-flow and low-velocity pipeline inspection projects in the future. In conclusion, IP

Pipeline Technology remains committed to providing high-quality and viable in-pipeline inspection solutions to pipeline operators and owners worldwide. The successful implementation of this project demonstrates the company's ability to deliver with extremely fast response speed, efficient mobilization, and engineering capabilities, even in the face of unexpected situations.



Caliper function test

Apache's Pipeline Products empower Operators with Pig Passage Detection!

With a focus on the Oil, Natural Gas, and Industrial pipeline industries, **Apache Pipeline products** has been at the forefront of innovation and technological advancements, constantly evolving to meet the changing needs of their customers. This is why they are committed to ensuring that pipeline operators are always aware when a significant point has been reached in the pipeline.

Introducing the pigPRO™ Series - their patented intrusive pig passage indicators offer reliable detection of a cleaning pig's precise location as it navigates the pipeline network.

The pigPRO™ indicator is most commonly installed on pig launchers and receivers, as well as other key locations along the pipeline.

The system is fitted with an intruding bullnose, physically penetrating the pipe bore by 5/16". When a cleaning pig passes, it actuates the plunger, which activates either a visual or electrical indicator, or both. The instant that the indicator is triggered, the pipeline cleaner's precise location is revealed.

Their pigPRO™ system can be easily customized to meet the specific needs of each pipeline. Whether you are running a large-scale oil and gas operation or a smaller industrial pipeline, Apache's pigPRO™ system is the perfect solution for ensuring that your pig is always on track and that your pipeline is operating at peak efficiency!

	Series 53	Series 55	Series 57	Series 67*
Pig Passage Indication	Visual & Electrical Indicator	Electrical Indicator Only (No Flag)	Visual Indicator	Visual Indicator
Indicator Reset	Auto/Manual Reset	Auto Reset	Manual Reset	Manual Reset
Connection Type	2" NPT Thread-o-let OR Flanged Connection	2" NPT Thread-o-let OR Flanged Connection	2" NPT Thread-o-let OR Flanged Connection	2" NPT Thread-o-let OR Flanged Connection

Series 67*
* Flange Option & Electrical Indicator Option Now Available! * Removable Under Pressure for Inspection, Maintenance or Repair.

Apache's pigPRO™ Series Models

Deepwater pipeline inline inspection – a tool box approach

Summary

To ensure continuity of hydrocarbon supply, opportunities are sought by Exploration & Production companies in continually increasing water depths. A range of pipeline technologies and manufacture methods are generally employed to increase the technical feasibility of Deepwater developments. While a combination of pipeline types facilitates high pressure and high flow production, it also brings challenges for internal inspection techniques due to an amalgamation of demanding inspection criteria such as: heavy wall thickness, high temperature and pressure, flexible riser transit, trap constraints and internal diameter reductions.

To address these challenges, ROSEN is able to provide a holistic approach to inspection, whereby a portfolio of solutions can be considered, offering maximum flexibility to pipeline designers, with an aim to deliver optimum integrity data while also mitigating risk. This paper will discuss ROSEN's toolbox approach to Deepwater pipeline inspection through presentation of case studies.

Introduction to the approach

Subsea pipeline systems pose numerous unique challenges for In Line Inspection (ILI), distinct from those encountered with onshore pipelines. These challenges stem from both the difficult access to underwater facilities and their connection to structures above the water's surface.

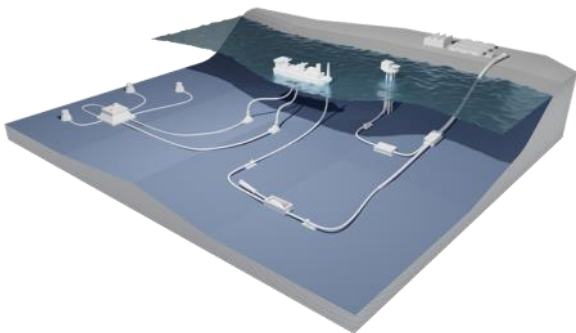


Figure 1: Example of a Deepwater Field Layout

Starting with the launching process, the inherent complexities become apparent, as the usual flow direction is from wells and production lines through manifolds and flow lines to the platform or FPSO. In most cases, pigging of the production lines is not feasible because neither the wellheads nor the manifolds are designed for such operations. For the flow lines, launchers are situated on a platform, vessel, or sometimes temporarily subsea. Given the intricacy of subsea launching operations, looped

systems are often employed. Looped layouts consist of two parallel lines of the same diameter running between the manifold and the topside facility, with the possibility of a connected loop at the manifold. This arrangement allows both lines to be inspected in a single inspection run with the launcher and receiver at the same location, minimizing subsea activities (except for valve operations). When this option is unavailable along with restricted subsea launch and receive facilities, flow lines can be inspected using bidirectional tools, self-propelled umbilical tools or tethered tools.

The transportation of the medium presents its own set of challenges. Typically, a platform gathers flow from multiple flow lines, leading to an increase in overall volume for export, necessitating larger pipeline diameters. However, larger installations are costly, and riser pipelines are limited in maximum diameter. Consequently, dual or multi-diameter pipeline systems are often used. Additionally, platforms and production vessels experience movement due to waves, wind, currents, and tides, requiring flexibility in the respective pipeline segment (riser). To address this, various solutions are available, such as flexible risers, steel catenary risers, and lazy wave rigid risers. All of these can pose additional challenges for inline inspection (ILI).

Export pipelines typically run straight for long distances until they reach an onshore facility or the next platform. However, these systems often expand due to the declining production of old wells and the addition of production from new wells and platforms. This expansion usually involves the use of tie-ins, often realized with wye pieces. Moreover, the flow from the original pipeline may be very low and only increase after the new tie-ins, which can also present challenges for ILI tool velocity. Inspecting these systems through the new tie-ins often involves different pipeline diameters and navigating the passage of a wye typically with side flow.

Typically, subsea installations (wyes, manifolds, jumpers, tie-in spools) are compatible for pigging, particularly when considered in isolation, however these geometrical complexities may assume critical significance, particularly when situated in proximity to other installations like subsea connectors, valves, and tees. All of these challenges are compounded by operational conditions characterized by high flow velocities and high pressure. Considering the potentially severe consequences of issues during an ILI inspection of a subsea pipeline, it becomes evident how crucial and complex the preparation for such projects is, and why testing is sometimes key.

In response to the challenges raised by Deepwater environments, ROSEN is able to deliver flexible and customized inspection solutions, whereby tools are

developed, manufactured and tested in-house. To identify the optimal solution the “ROSEN Toolbox” approach is employed. ROSEN is able to provide a holistic approach to inspection, whereby a portfolio of solutions can be considered, offering maximum flexibility to pipeline designers, with an aim to deliver optimum integrity data while also mitigating risk.

This technical paper examines the multifaceted challenges associated with Deepwater pipelines in the context of pigging and will discuss three case studies, highlighting the individual challenges and successful ROSEN solutions:

- Case Study 1: Safe passage of Magnetic Flux Leakage (MFL-A) tools in flexible pipes
- Case Study 2: A Deepwater Multi-diameter Gas Pipeline
- Service Overview: Deepwater high pressure riser inspection with self-propelled tethered tools

For the complete paper and/or further information contact Lauren Guest, ROSEN Europe. ●

ROSEN Group wins OCENSA’s award for Technological Innovation in Integrity Management

For the second time, OCENSA, the hydrocarbon transporter with the most extensive linear infrastructure in Colombia, has awarded **ROSEN Group** in the Technology and Innovation category at the Supply Award 2023. This prestigious award highlights ROSEN’s outstanding contribution to the implementation of innovative technologies for pipeline integrity management. The innovation presented by ROSEN specifically addresses the identification of circumferential cracks in pipelines caused by external factors, such as underwater currents and ground movement. This solution has emerged in response to the need to manage threats to the integrity of OCENSA’s hydrocarbon transportation system. For over two decades, OCENSA has relied on ROSEN as its strategic partner in integrity. Throughout this collaboration, both companies have worked on various projects ensuring the safe and efficient operation of the pipeline. ●

3X Engineering’s client seals leakages on a 14 inch pipe on a FPSO, Austral Africa

Overview

The objective of the repairs, performed early October 2023 by **3X ENGINEERING (3X)** client was to seal online 2 leakages on a 14" pipe transporting produced water located on FPSO. The leakages were due to internal corrosion. The pipeline had a pressure of 7 bars and an operating temperature of 45°C

To carry out these emergency repairs, the client decided to use a 3X emergency leak sealing system STOPKiT® Offshore that he had in stock. The client was previously trained to install this product.

Scope of Work

The pipe concerned was leaking in 2 locations. One leakage was situated on the elbow and the second leakage on a straight part of the pipe near the T. The repairs were performed according to 3X installation procedure described below using STOPKiT® OFFSHORE (specially dedicated to this environment) and referenced STOF114 (==> suitable reference for a 14" pipe in offshore area with a maximum size defect of 50mm and up to 50 bars of pressure and 150°C).

- 1/ STOPKiT® were firstly positioned next to the leakages using specific positioner device.
- 2/ STOPKiT® were then slid to perfectly center the rubber patches over the defects.
- 3/ Once positioned over the leakages, STOPKiT® right and left screws were tightened until leaks were sealed (40 Nm max).
- 4/ Finally, STOPKiT® positioner devices were removed.

Both leakages were totally controlled and sealed. STOPKiT® product is as efficient on straight line as specific geometry like elbows. To guarantee the effectiveness of the product it must be implemented by trained and certified applicators.

Results

The repairs were successfully managed by the trained client and the leakages were stopped within few minutes thanks to 3X’s patented emergency leak sealing system STOPKiT®. This product is easy to store and ready to use. ●



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The 19th Pipeline Technology Conference

The **19th Pipeline Technology Conference (ptc)** returns to Berlin, bringing together global experts and innovators in the pipeline industry. ptc 2024 promises to be a landmark event, featuring discussions on hydrogen, CO2 transport, methane emissions and pipeline construction, pivotal to the future of energy and infrastructure.

Prime keynote speaker will be Stefan Wenzel, the Parliamentary State Secretary at the German Federal Ministry for Economic Affairs and Climate Action. His insights into the interplay of economic policies and climate action are expected to provide a thought-provoking start to the conference, underlining the critical role of pipeline technology in a sustainable future.

The ptc Conference will host a series of enriching panel discussions. These sessions are carefully curated to focus on emerging trends in energy resilience, methane emissions, hydrogen technology, and digital transformation and cyber security. Attendees will gain valuable insights from industry leaders and partake in engaging debates.

A special feature of this year's event is the Global Women in Pipeline initiative. This segment is dedicated to highlighting and supporting the vital role of women in the pipeline industry. Through various activities, including networking events and focused discussions, the forum celebrates diversity and aims to empower women leaders and professionals. In addition, ptc 2024 offers a range of seminars, workshops and operator round tables. These events provide in-depth exploration of specific topics, led by experts and thought leaders. They offer a unique opportunity for hands-on learning and intimate discussions on technical challenges and advancements.

The ptc 2024 also features an extensive exhibition, showcasing the latest innovations and solutions from leading companies and emerging startups. This platform not only unveils new technologies but also fosters partnerships and collaboration across the industry. ●

Roemex and Alchemy sign strategic alliance to support Brazilian operations

Roemex, a specialty chemical company supporting the global energy sector, and **Alchemy Oilfield Services**, a global provider of Pipeline Gels and Sealing Materials, announce a strategic collaboration to support the subsea energy sector in Brazil.

Roemex have a range of proprietary pipeline cleaning chemistries that have been deployed globally and with an exemplary track record. This chemistry, used in conjunction with Alchemy's technology represents an opportunity to reduce operational costs and lower the CO2 footprint of pipeline cleaning operations.

David Halliday, Business & Commercial Manager at Roemex commented, "working collaboratively brings value, not only operationally but from an environmental and commercial cost reduction aspect. Working with Alchemy and our partners **Grupo Mares** in Sao Paulo, we can deliver a joined-up solution for cleaning, flushing, leak detection & preservation of subsea pipelines".

Speaking from their head office in Aberdeenshire, Duncan Murray, Managing Director of Alchemy said, "we have been working with the team at Roemex for some time and this alliance has been developed specifically to help our joint client base work more effectively, reducing the carbon emissions from their operations by significantly lowering the volume of bulk product shipped from the UK to Brazil by using a local partner to make the finished product".



Roemex and Alchemy Oilfield Services sign strategic alliance ●

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