Registration and Welcome Coffee
09:00 - 09:30

Chairman’s Welcome
09:30 - 09:50
Developments in Riser & Flexibles Design and Technology
Introduction from the Chair and ‘round the room’ introductions - meet your fellow attendees.
Brief introduction to ‘state of the art’ in riser technologies and the challenges faced today.

Participants
Pieter Swart - Subsea Pipeline Principal, Shell Projects & Technology

Chairman’s Welcome
09:30 - 09:50
Offshore Pipeline: The Bigger Picture

Participants
Asle Venås - Senior Principal Pipeline Specialist, DNV GL

Direct Electrical Heating for Flexible Pipes
09:50 - 10:30
Developments in Riser & Flexibles Design and Technology

Participants
Anders Straarup - Lead Engineer – Active Systems Development, National Oilwell Varco

Collaboration and Consolidation in the Subsea and Pipelines
09:50 - 10:30
Offshore Pipeline: The Bigger Picture

Participants
Tim Crome - Technical Manager, Global Front End Group, Subsea Projects, TechnipFMC

Networking Refreshment Break
10:30 - 11:00

Free Hanging Composite Risers for Ultra Deep Water Surf
11:00 - 11:40
Developments in Riser & Flexibles Design and Technology

Participants
Anders Straarup - Lead Engineer – Active Systems Development, National Oilwell Varco

Networking Lunch
12:20 - 13:20

Design Liability and How It Can Be Effectively Limited in a World of Technical Innovation
11:40 - 12:20
Offshore Pipeline: The Bigger Picture

Participants
Michael Sergeant - Partner, HFW

Feasibility of Standardisation
11:00 - 11:40
Offshore Pipeline: The Bigger Picture

Participants
Asle Venås - Senior Principal Pipeline Specialist, DNV GL

Critical Design Aspects of the Ormen Lange ‘Late Life’ Compression Project
11:40 - 12:20
Developments in Riser & Flexibles Design and Technology

Participants
Renate van Vliet - Offshore Structures Engineer, Shell Projects & Technology
Jeroen Frederiks - Subsea Systems Engineer, Shell Projects & Technology

Networking Lunch
12:20 - 13:20

Digitizing Annulus Testing of Flexible Pipes
13:20 - 14:00
Developments in Riser & Flexibles Design and Technology

Participants
Christoffer Nilsen-Aas - VP Digital Services, 4Subsea
Digital Solutions for Cost-Effective Pipeline Operations
13:20 - 14:00
Offshore Pipeline: The Bigger Picture
Authors: E. Stiansen, D. Adisty, G. Haug, C. Agrell, A. Hussain and K. Helle, DNV GL

The rapid progress of technology such as big data analytics and machine learning is making its mark on the oil and gas sector. This paper will elaborate how three digitalisation initiatives will benefit pipeline operators. Next generation processing of in-line inspection results provide a corrosion distribution along the pipeline. Corrosion patterns and characteristics can be revealed and correlation with other relevant data investigated. An online reliability tool aims to provide model-as-a-service by allowing the user to interact with pipeline models through a web browser, allowing the user to perform on-demand pipeline diagnostics with real-time feedback. Combination of AIS data and vessel specific trawl gear data is used to form the basis for optimised trawl design and inspection planning. These new initiatives allow less conservative results, optimisation of pipelines integrity management and potential cost reduction while maintaining safe and reliable pipeline operations.

Participants
Dian Adisty - Engineer, Pipeline Operations, DNV GL

Networking Refreshment Break
14:40 - 15:10
Offshore Pipeline: The Bigger Picture

Case Study: The World's First Deepwater Riser Repair
15:10 - 15:50
Developments in Riser & Flexibles Design and Technology
• Remote vertical installation of MORGRIP connector with flexible jumper bypassing damaged riser sections
• Deepwater coating removal utilizing new technology which only requires normal WROV hydraulic flow
• Remote installation of structural clamp onto water injection riser
• Development of remote buoyancy removal tool
Participants
André Midtun - Chief Operating Officer, Connector Subsea Solutions

Experiences in Estimating Nearbed Pipeline Currents in Regions of Complex Oceanic Flow
15:10 - 15:50
Offshore Pipeline: The Bigger Picture
• Challenges of determining current criteria for subsea pipeline design in selected regions where oceanic flow is complex and variable
• Examples of the use of a variety of model hindcast datasets, together with site-specific measurements
• Understanding in detail the dynamic phenomena that influence strongest current flows, particularly when these occur very infrequently
Participants
Robin Stephens - Metocean Group Manager, BMT

Innovative Flexible Riser Monitoring
15:50 - 16:30
Developments in Riser & Flexibles Design and Technology
Participants
Gilles Gardner - Technical Manager, 2H Offshore Engineering
Brian Taylor - Head of Sales, EMEA and APAC, Pulse Structural Monitoring

Panel Session: Offshore Pipeline Supply Chain Management
15:50 - 16:30
Offshore Pipeline: The Bigger Picture
• Strategic sourcing and demand planning
• What are the main challenges in the supply chain in today’s market?
• Effects of energy transition on policies and spending
Participants
Nol van de Haterd - Supply Chain Lead, Nederlandse Aardolie Maatschappij B.V.
Tim Crome - Technical Manager, Global Front End Group, Subsea Projects, TechnipFMC

Closing Discussion Forum
16:30 - 16:45
Offshore Pipeline: The Bigger Picture
An opportunity to ask further questions, share your observations and continue discussions.

Close of Seminar
16:45 - 16:55
Offshore Pipeline: The Bigger Picture
<table>
<thead>
<tr>
<th>TIME</th>
<th>DEVELOPMENTS IN RISER &amp; FLEXIBLES DESIGN AND TECHNOLOGY</th>
<th>OFFSHORE PIPELINE: THE BIGGER PICTURE</th>
</tr>
</thead>
</table>
| 09:00 | 09:00 - Registration and Welcome Coffee  
         09:30 - Chairman's Welcome  
         09:50 - Direct Electrical Heating for Flexible Pipes | 09:00 - Registration and Welcome Coffee  
         09:30 - Chairman's Welcome  
         09:50 - Collaboration and Consolidation in the Subsea and Pipelines |
| 10:00 | 10:30 - Networking Refreshment Break | 10:30 - Networking Refreshment Break |
| 11:00 | 11:00 - Free Hanging Composite Risers for Ultra Deep Water Surf  
         11:40 - Critical Design Aspects of the Ormen Lange 'Late Life' Compression Project | 11:00 - Feasibility of Standardisation  
         11:40 - Design Liability and How It Can Be Effectively Limited in a World of Technical Innovation |
| 12:00 | 12:20 - Networking Lunch | 12:20 - Networking Lunch |
| 14:00 | 14:00 - Sureflex JIP: Sharing Global Flexible Pipe Integrity Management Guidance & Good Practice  
         14:40 - Networking Refreshment Break | 14:00 - Artificial Intelligence in the Industry  
         14:40 - Networking Refreshment Break |
| 15:00 | 15:10 - Case Study: The World's First Deepwater Riser Repair  
         15:50 - Innovative Flexible Riser Monitoring | 15:10 - Experiences in Estimating Nearbed Pipeline Currents in Regions of Complex Oceanic Flow  
         15:50 - Panel Session: Offshore Pipeline Supply Chain Management |
| 16:00 | 16:30 - Closing Discussion Forum  
         16:45 - Close of Seminar | 16:30 - Closing Discussion Forum  
         16:45 - Close of Seminar |
Registration and Welcome Coffee
08:00 - 09:00
OPT Day 1

Opening of OPT 2018
09:00 - 09:05
OPT Day 1

Chairman's Welcome to Day 1
09:05 - 09:15
OPT Day 1

Participants
Graham Freeth - Global SME - Pipeline, Shell International

A Review of the Offshore Pipeline Landscape
09:15 - 09:45
OPT Day 1
- Market analysis and impact on contractor community
- Adapting to meet changing market conditions
- How can we become more cost efficient?
- What does the next 12-18 months have in store?

Participants
Jonathan Tame - Vice President, Offshore Resources, Subsea 7

Welded Pipelines: ALost Opportunity Enabling Reliable and Cost Efficient Offshore Pipelines
09:45 - 10:15
OPT Day 1
- Examining approaches to risk in the market from the manufacturers perspective
- Proposing potential approaches to optimise the supply chain to drive value through the chain
- What work is required to deliver such approaches
- What solutions are available to drive value though the supply chain
- Mobilising our industry

Participants
David Evans - Technical Manager, 20” Pipe Mill, Tata Steel

Learning from Pipeline Events - Key Results from Using a New Analysis Approach
10:15 - 10:45
OPT Day 1
Analysing and learning lessons from events are key elements in risk management. The objective of studying detailed information and data regarding pipeline events was to:
- Learn from previous experience when handling new pipeline events
- Prioritise and optimise inspection and maintenance activities
- Improve preparedness and planning for the unexpected

A new approach linking integrity management, QRA and barriers has been developed. A key concept is “Loss of integrity (unwanted event)” defined as any condition outside the design limit that might lead to loss of containment. The new analysis approach and results from analysing 21 events in detail will be presented. A digital portal solution for data drilldown and presentation of statistics will be demonstrated.

Authors: Karsten Harneshaug, Gassco - Finn Roar Berg, Gassco - Dian Adisty, DNV GL – Øyvin Eriksen, DNV GL

Participants
Karsten Harneshaug - Special Advisor, Gassco

Morning Break and Networking
10:45 - 11:30
OPT Day 1

Saving Seabed Intervention by Optimized Design of a Pipeline Exposed to Infrequent Trawl Interference
11:30 - 12:00
OPT Day 1
This paper presents the application of an optimised design methodology for interference between trawl gear and pipelines, and the associated savings in seabed intervention. Implementation of the optimised methodology within the time frame of the project was made possible by open and constructive collaboration between Wintershall (Client), Subsea 7 (SURF Contractor) and DNV GL (Independent Verification Body). As part of Wintershall Norge’s Maria development project, a 26 km long 14” production flowline and a 46 km long 12” water injection pipeline has been installed and left exposed on the seabed. Preliminary analysis indicated that by using the traditional approach as per DNV-RP-F111, a large number of free spans would require rock infill to limit the trawl pull-over load. In order to optimise the design and potentially reduce the requirement for free span infill, an optimized methodology based on SRA (Structural Reliability Assessment) was proposed. The optimised methodology involves FE analyses of sensitivity to various parameters and Monte Carlo simulations, in order to quantitatively assess the probability of failure. It was demonstrated that the target safety levels in DNV-OS-F101 were reached without free span infill, and hence significant savings in rock dumping could be achieved without any deviation from the DNV-OS-F101 code. The collaborative attitude exhibited by all three parties involved was a key success factor. Cost saving due to reduced rock dumping scope is estimated to ~10 mill Euro.

Authors: Kristian Norland, Subsea 7 and Sigbjørn Røneid, DNV GL; Zhengmao Yang, Subsea 7; Baard Owe Bakken, Wintershall; Gaute Kolstad, DNV GL

Participants
Sigbjørn Røneid - Principal Pipeline Engineer, DNV GL
Kristian Norland - Engineering Specialist, Subsea 7
Bård Owe Bakken - Technical Lead – Pipeline & Subsea Construction Contract, Maria Development Project, Wintershall Norge
Normalization of Pipeline Design Methodology to Automated Framework
12:00 - 12:30
OPT Day 1

Subsea pipeline design activities, in particular in-place thermo-mechanical analyses, require significant engineering hours, most of them related to data pre and post processing. Surveys show that a great share of engineers’ time is spent collecting, handling, converting & plotting data, and writing reports. This low added-value timeshare impacts project cost and schedule. Stepping into more systematic, scripted & standardized protocols allows efforts to be spent on higher value activities. This paper presents the development of a framework that automates pipeline design activities down to production of design reports. Design data is centralized and segregated to a database. Tasks are coded in unitary applications, collecting inputs from and relaying final results to the database. Applications include analytical computations as well as advanced FEA models, using software open API. Commercially available or in-house software are integrated, running on and sharing common datasets. Design reports are automatically created or updated in various file formats or templates. The development of this framework ensure consistent design on multiple pipeline instances. Thus, engineering productivity is improved drastically and impact of rework is reduced. The framework enables more advanced data analytics, modern optimization algorithms as well as machine learning techniques to be used, thus shrinking the time and effort previously required to compile a robust detailed design.

Authors: Amandine Laye, Kevin Victoire, Baptiste Fournier and Vincent Cocault-Duverger, Saipem

Participants
Amandine Laye - Flowline Design Engineer, Saipem SA

Johan Sverdrup Infield Pipelines – Ensuring Pipeline Rotation When Applying the Residual Curvature Method for Buckling Control
12:30 - 13:00
OPT Day 1

The residual curvature method (Statoil (2002), "Method for pipelaying from a coil to the seabed, controlling thermal expansion", patents US 6,910,830, WO 02/057674 A1 (EP1358420) and NO 314056) for controlling global expansion forces is gaining popularity and has now been successfully applied to three subsea pipeline projects. Short sections of residual curvature introduced to the pipeline in the vertical direction at the reel-lay vessel can introduce an instability to the system, though it depends on the lay parameters. Different outcomes are possible: the residual curvature section may rotate over into the horizontal plane on the seabed; or it may remain vertical. If it remains vertical, it is further possible that self-weight straightens the pipe out. It is preferable for the pipeline to rotate approximately 90 degrees during installation, for the purposes of reducing the critical buckling force and preventing the creation of artificial free-spans at the residual curvature sections.

Therefore, it is important to predict the rotation behaviour at the design stage. Experience from, for example Statoil’s Skuld Pipeline Project, indicates that the residual curvature sections tend to rotate but rotational fixedness at the lay-vessel and resistance from soil friction restrain the pipe. Recent analyses work on rotation during installation of the Johan Sverdrup in-field pipelines is presented. The shallower depth reduced the tendency to rotation compared to reference projects, and the analysis results were used to guide installation settings to assure a robust rotation response during lay.

Authors: Pål Foss, IKM Ocean Design; Anders Radstål, Statoil; Nicholas Vaughan and Per Nystrøm, IKM Ocean Design; Andreas Tenmoe, TechnipFMC

Participants
Pål Foss - Chief Engineer, IKM Ocean Design
Andreas Tenne - Project Lead Engineer, TechnipFMC
Anders Radstål - Senior Engineer Subsea Technology and Operation, Statoil ASA

Networking Lunch
13:00 - 14:00
OPT Day 1

MEG Swabbing Issues - A Case History
14:00 - 14:30
OPT Day 1

In February 2017 Baker Hughes had an incident during the precommissioning of a deepwater subsea pipeline, which was being conducted using monoethylene glycol (MEG) swabbing to dewater the pipeline. The incident resulted in a catastrophic failure of part of the equipment spread. A detailed investigation was conducted to determine the root cause of the incident. This paper will present details of the incident, the investigation and the findings, the conclusions of which will potentially impact pipeline precommissioning philosophies globally in the offshore pipeline industry.

Participants
Andrew Barden - Pre-Commissioning & Maintenance Applications and NPI Manager, BHGE Process & Pipeline Services

Combination of Novel Material Platforms Delivering Cost Effective Wet Insulation Solutions
14:30 - 14:50
OPT Day 1

The current oil price environment challenges the Offshore Industry to develop fields at lower costs, translating to a need of lower risk and more cost effective solutions.

Shawcor addressed this challenge by combining Shawcor’s ULTRA® best-in-class wet insulation with rapid cast-in-place NEMO®. 1.1 field joints, which proved to be the most efficient end-to-end solution for an Offshore Project in Australia.

This paper addresses the use of styrenic alloys as multi-layered solids and foams offering the lowest thermal conductivity wet insulation system available on the market. Together, with a thermally efficient epoxy-urethane hybrid solid field jointing material, offers many advantages over historically used solutions. Some of the key features to be discussed are: improved thermal efficiency of the end-to-end solution, thinner insulation systems, rapidly cast field joints, increased resistance to hot/wet environments, compliance with ISO 12736 wet ageing requirements, etc.

The industry will benefit from this paper by developing a further understanding of new technologies available in the market that could bring to relevant savings when compared to traditional wet insulation solutions.

Participants
Adam Kopystynski - Technical Solutions Manager, Shawcor
Pipeline flow assurance can be challenging; restrictions, from minor deposit buildup to full blockages, can limit or prevent production. To help ensure a pipeline remains in an optimum operational state, it is necessary to understand its contents so that any debris buildup can be managed and maintained in an efficient and cost-effective way using methods, such as routine pigging, chemical injection, or cleaning campaigns. Current methods for deposit assessment are limited to measuring small sections of the pipeline, intrusive methods, or theoretical modeling. The methodology presented is a proven, nonintrusive technology that enables operators to review deposit buildup in a safe and cost-effective way without having to stop production, risking inserting tools, or investing in costly onshore excavations or offshore vessel-based intervention campaigns, thereby maximizing production uptime and throughput quickly and safely based on intervention campaigns. Current methods for deposit assessment such as routine pigging, chemical injection, or cleaning are limited to measuring small sections of the pipeline, intrusive methods, or theoretical modeling.

**Authors:** Neil Stewart, Graham Jack and Thomas Redares, Halliburton

**Participants**

Thomas Redares - Product Champion, Halliburton Pipeline & Process Services

**Afternoon Break and Networking**

15:10 - 15:45
OPT Day 1

**Non-Intrusive Pipeline Deposit Profiling by Pressure Wave Analysis**

14:50 - 15:10
OPT Day 1

There are a number of theories related to FBE disbondment which include but are not limited to cathodic disbondment, inadequate surface preparation of the steel pipe surface during pipeline coating application, and the build-up of residual stresses within a coating system. Insulation coating systems with a high thickness, such as multi-layer polypropylene (MLPP), carry residual stresses along the longitudinal axis. The higher the coating thickness, the higher the residual stress. The stress concentration within the coating is highest at the cutback locations which are heated during the field joint coating (FJC) process.

FBE has been observed, by the author, to disbond from the steel substrate during heating of the field joint, prior to field joint coating application. Significant disbondment of pipeline coatings is not acceptable and will damage the integrity of any pipeline system. Minimising the risk of disbondment is critical to ensure the integrity of a pipeline system.

This paper will describe the authors’ experience where FBE disbondment issues were present during the FJC pre-qualification phase. The main focus of this paper is to give an insight into the causes of FBE disbondment for pipeline coatings, how it can be mitigated, and practical solutions to resolve the FBE disbondment at the FJC stage.

Stress concentrations at cutback locations are high so it is important that the effects of residual stresses are taken into consideration for high build coating systems. Also, protection of the pipe ends is critical, even more so for high build coatings where the stresses are higher. Surface preparation of the steel substrate prior to coating application is one of the most important stages in coating application to determine the integrity of a pipeline system. It is key for all parties to work together in a collaborative manner in order to minimise the risk of FBE disbondment.

**Participants**

Emma Hopson - Offshore Pipeline Engineer, McDermott Marine Contractors Ltd

**Integrity of Flowline Field Joint Coatings**

15:45 - 16:15
OPT Day 1

A novel method of pre-deforming a pipeline continuously into specific local wavelengths and deformation amplitudes prior to installation on the seabed has been studied as a method of controlling and possible eliminating lateral buckling. This paper first introduces the concept of pre-deformed pipelines and then presents the results of numerical analysis of different initial pre-deformation shapes that can influence the potential buckling behaviour of this pipeline system due to high temperatures and pressures. Several random distributions of out-of-straightness (OOS) are also considered along the pre-deformed pipeline to investigate the sensitivity of the system to post-installation out-of-straightness which is the largest uncertainty in pipeline design. Results found shows that with suitable selection of initial pre-deformed shape and dimension, the pipeline will only buckle at very high temperature and pressure that are far in excess of unrealistic realistic practical values. It is found that both the buckle initiation load, i.e. effective force due to applied pressure and temperature, and the longitudinal strains along the pipeline are not sensitive to the inherent distribution of OOS. This makes such a continuously pre-deformed pipeline a reliable, robust and safe lateral buckling management system.

**Participants**

Jayden Chee - PhD Researcher, University of Western Australia

**Effect of OOS on Pre-Deformed Pipeline for Controlling Lateral Buckling**

16:15 - 16:45
OPT Day 1

Stress concentrations at cutback locations are high so it is important that the effects of residual stresses are taken into consideration for high build coating systems. Also, protection of the pipe ends is critical, even more so for high build coatings where the stresses are higher. Surface preparation of the steel substrate prior to coating application is one of the most important stages in coating application to determine the integrity of a pipeline system. It is key for all parties to work together in a collaborative manner in order to minimise the risk of FBE disbondment.

**Participants**

Jayden Chee - PhD Researcher, University of Western Australia
Case Study – Innovative Cost Saving Design and Execution to Mitigate Flexible Flowline Buckling Using Pre-Trenching Pressurization

16:45 - 17:15
OPT Day 1

Owing to challenging installation requirements, architectural constraints and corrosive fluid compositions, the use of flexible flowlines for offshore developments has been developing substantially over the last number of years. In-place design methodologies and analysis tools for flexible flowlines, particularly for HPHT applications, are constantly improving in line with this trend. Whilst the majority of the local mechanical design is undertaken by the flexible manufacturers, it is essential to assess the global buckling behaviour of the flexible under different loading conditions. A number of design and installation advances have been made in order to reduce the buckling propensity and overburden requirements. This paper, co-authored by Xodus and Shell, presents a case study for the recent Gannet G project where pre-trenching pressurization technique was utilized to eliminate rockdumping for buckling mitigation for an oil flowline. The effects on flowline lateral and upheaval response and the associated integrity implications were modelled during installation, pressurization, trenching, and backfilling. This included non-linear FE modelling of the flexible in order to calibrate the initial pipe shape and mimic the variation in bending stiffness, temperature and pressure expansion coefficients, and driving force under pressurization. This yielded safe, on target installation and start-up, and negated the requirement for rockdumping. The paper also shares a number of lessons learned around modelling flexible pipe behaviour, analysis techniques, and the importance of engaging with manufacturers and installation contractors early in the design in order to ensure the flexible pipeline integrity throughout its design life.

Authors: Cliff Ho, Shell UK Ltd – John Melville, Shell UK Ltd – Mostafa Tantawi, Xodus Group Ltd – Mohamad Farid, Xodus Group Ltd

Participants
Cliff Ho - Pipeline Engineer, Shell UK
Mostafa Tantawi - Pipelines Engineer, Xodus Group

Champagne Roundtable Session
17:15 - 18:00
OPT Day 1

Join one of the discussion groups to explore in more depth key issues of interest to you in an informal environment.

1. Decommissioning Offshore Pipelines  Moderator: Alan Black, UK Business Unit Director, Subsea 7
2. Digitalisation in the Pipeline World  Moderator: Dian Adisty, Engineer Pipeline Operations, DNV GL - Oil & Gas
3. Flexible Pipes & Risers  Moderator: Dr Yijun Shen, Principal Engineer, ROSEN Group
4. Alternative Construction Methods for Underwater Pipelines  Moderator: Professor Andrew Palmer, BOLD Island Engineering (Singapore) Pte Ltd
5. The Future of Subsea Processing  Moderator: Pieter Swart, Principal Subsea Pipeline Engineer, Shell Projects & Technology
6. Installation Considerations  Moderator: Philip Cooper, General Manager, Heerema Marine Contractors UK Ltd

Participants
Pieter Swart - Subsea Pipeline Principal, Shell Projects & Technology
Andrew Palmer - Managing Director, Bold Island Engineering (Singapore) Pte Ltd
Dian Adisty - Engineer, Pipeline Operations, DNV GL
Yijun Shen - Principal Engineer, ROSEN Group
Alan Black - UK Business Unit Director, Subsea 7
Philip Cooper - General Manager, Heerema Marine Contractors UK Ltd

Networking Drinks Reception
18:00 - 19:00
OPT Day 1

Free Time
19:00 - 20:00
OPT Day 1

Free time ahead of the Gala Dinner

OPT Gala Dinner & Awards Ceremony
20:00 - 22:30
OPT Day 1

Take Your Seats and Enjoy the Evening

energy.knect365.com/offshore-pipeline-technology/
<table>
<thead>
<tr>
<th>TIME</th>
<th>OPT DAY 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Registration and Welcome Coffee</td>
</tr>
<tr>
<td>09:00</td>
<td>Opening of OPT 2018</td>
</tr>
<tr>
<td></td>
<td>Chairman’s Welcome to Day 1</td>
</tr>
<tr>
<td></td>
<td>A Review of the Offshore Pipeline Landscape</td>
</tr>
<tr>
<td></td>
<td>Welded Pipelines: A Lost Opportunity Enabling Reliable and Cost Efficient Offshore Pipelines</td>
</tr>
<tr>
<td>10:00</td>
<td>Learning from Pipeline Events – Key Results from Using a New Analysis Approach</td>
</tr>
<tr>
<td></td>
<td>Morning Break and Networking</td>
</tr>
<tr>
<td>11:00</td>
<td>Saving Seabed Intervention by Optimized Design of a Pipeline Exposed to Infrequent Trawl Interference</td>
</tr>
<tr>
<td>12:00</td>
<td>Normalization of Pipeline Design Methodology to Automated Framework</td>
</tr>
<tr>
<td></td>
<td>Johan Sverdrup Infield Pipelines – Ensuring Pipeline Rotation When Applying the Residual Curvature Method for Buckling Control</td>
</tr>
<tr>
<td>13:00</td>
<td>Networking Lunch</td>
</tr>
<tr>
<td>14:00</td>
<td>MEG Swabbing Issues - A Case History</td>
</tr>
<tr>
<td></td>
<td>Combination of Novel Material Platforms Delivering Cost Effective Wet Insulation Solutions</td>
</tr>
<tr>
<td></td>
<td>Non-Intrusive Pipeline Deposit Profiling by Pressure Wave Analysis</td>
</tr>
<tr>
<td>15:00</td>
<td>Afternoon Break and Networking</td>
</tr>
<tr>
<td></td>
<td>Integrity of Flowline Field Joint Coatings</td>
</tr>
<tr>
<td>16:00</td>
<td>Effect of OOS on Pre-Deformed Pipeline for Controlling Lateral Buckling</td>
</tr>
<tr>
<td></td>
<td>Case Study – Innovative Cost Saving Design and Execution to Mitigate Flexible Flowline Buckling Using Pre-Trenching Pressurization</td>
</tr>
<tr>
<td>17:00</td>
<td>Champagne Roundtable Session</td>
</tr>
<tr>
<td>18:00</td>
<td>Networking Drinks Reception</td>
</tr>
<tr>
<td>19:00</td>
<td>Free Time</td>
</tr>
<tr>
<td>20:00</td>
<td>OPT Gala Dinner &amp; Awards Ceremony</td>
</tr>
</tbody>
</table>
### Coffee and Early Bird Networking

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>OPT Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Coffee and Early Bird Networking</td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>OPT Day 2</td>
<td></td>
</tr>
</tbody>
</table>

### Chairman's Welcome to Day 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>OPT Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Chairman's Welcome to Day 2</td>
<td></td>
</tr>
<tr>
<td>09:10</td>
<td>OPT Day 2</td>
<td></td>
</tr>
</tbody>
</table>

### Participants

- Venkatapathi Tharigopula - Leading Advisor Pipeline Construction & Tie-in, Statoil ASA

### Pipeline Stability During Installation

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>OPT Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:10</td>
<td>Analytical models have been developed to establish the pipe/soil interaction once a pipeline has been laid on to the seabed but not applied to the installation process. If the pipeline design includes a snake-lay section requiring tight installation tolerances, to encourage controlled buckling, it is clearly important that the pipeline is installed in the correct configuration. This was critical for a recent project involving S-Lay installation. Historically the complex behaviour of the pipe/soil interaction are assessed with a simplified model, which can be overly conservative. The complexity arises when considering the motions and loads from the vessel and pipeline catenary transferring to the seabed soil model, in marginal environmental conditions. This paper assesses the pipe/soil interaction to develop a methodology that can be used to predict an acceptable level of movement of pipe, at its touchdown point with the seabed, to confirm the suitability of a design solution.</td>
<td></td>
</tr>
<tr>
<td>09:40</td>
<td>The Aasta Hansteen field located in the Norwegian sector of North Sea and consists of four wet insulated production flowline/riser system is transporting the product from wells to FPSO platform. This paper presents the innovative approach in the design and implementation of the CRA lined Bubi pipelines in 1300m water depth. Anchors are used to take the SCR load at one end and a spool is used to connect the flowline to the manifold at the other end. The pipelines have lateral buckling and walking tendency. Wrinkle free installation of CRA lined pipe in reel-lay mode is achieved with internal pressurisation during installation. The necessary test and analysis performed to confirm wrinkle free installation of CRA lined pipe is presented in this paper. The engineering analysis performed to demonstrate the robustness of the proposed lateral buckling initiation and post buckle behaviour using buoyancy units is also discussed in this paper.</td>
<td></td>
</tr>
</tbody>
</table>

**Authors:** Dr. Venkatapathi Tharigopula and Rolf Morten Nes, Statoil; Kjetil Moen, Dr. T. Sriskandarajah, Dr. P. Ragupathy and Dr. Alan Roy, Subsea 7

### Participants

- Venkatapathi Tharigopula - Leading Advisor Pipeline Construction & Tie-in, Statoil ASA
- Alan Roy - Senior Engineer, Subsea 7

### Design & Installation Challenges of Aasta Hansteen Reeled CRA Lined Pipelines in Deep Water

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>OPT Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:40</td>
<td>In February 2016 Heerema Marine Contractors’ Deepwater Construction Vessel (DCV) Aegir completed the installation of the infield flowlines scope for the INPEX Ichthys LNG Project in Australia. A total of 53 kilometres of 6” and 8” carbon steel MEG and 12” Corrosion Resistant Alloy (CRA) clad Condensate Flowlines was installed in reeling mode, including 14 no. of Flowline End Terminations (FLETs) and 3 no. of Inline Tees (ILTs). In addition, 85 kilometres of 18” CRA clad and lined production flowlines was installed by DCV Aegir in J-lay mode, including 12 no. of FLETs and 6 no. of ILTs.</td>
<td></td>
</tr>
</tbody>
</table>

**Key features:**
- Installation of ultra-heavy 18 inch FLETs and ILTs, including the use of a Mega Buoy for the 18 inch ILT;
- Installation of 18-inch production flowlines with MLP and CLAD (buckle zones) sections;
- Reeling of the 12-inch CLAD Condensate Transfer Lines – (which includes an ECA).

This paper addresses the success in overcoming the technical challenges encountered during this process, both in the engineering preparation and the execution phase.

**Authors:** Ewoud Bloem, Adedamola Funmi-Adeshina, Harm Siegersma and Henk Smienk, Heerema Marine Contractors SE

### Participants

- Ewoud Bloem - Lead Project Engineer, Heerema Marine Contractors SE
- Harm Siegersma - Specialist Engineer, Heerema Marine Contractors SE
Innovative Method for Double Jointing CRA Pipes to Reduce Installation Cost and Time
10:40 - 11:10
OPT Day 2

Corrosion resistant alloy (CRA) clad and lined pipes are a well-established solution for flowlines that transport corrosive multiphase fluids between wellhead and process facilities.

Recent experience has shown installation rates of lined pipe to be considerably faster than clad pipe, mainly due to improved fit up, however the installation rates of CRA flowlines remains considerably slower than carbon steel of similar dimensions.

With the continued development of HPHT fields, there is growing demand to use CRA pipes, further operators are constantly seeking to increase the length of tie-backs, hence more economical installation methods are needed.

Multi Jointing onshore reduces offshore welds, but traditionally multi-jointing has been performed by essentially replicating on shore a typical offshore firing line. This involves qualifying complex welds and field joint coatings.

Coating companies are now able to coat 24 meter joints, this paper explores the possibility to perform double jointing with a considerably less complex weld. Based on extensive experience on the process of weld overlaying the pipe bore with CRA material, Cladtek has designed and developed an innovative method to fabricate DJs for CRA clad and lined pipes. According to this method the single pipe joints shall be welded using a carbon steel girth weld technology (instead of a more sophisticated CRA girth weld) followed by reinstatement of CRA layer, internally, after the carbon steel girth weld has been accepted by NDE.

This method, will provide a girth weld capable to overmatch the strength of pipe material altogether with a better overall girth weld quality and confidence on the integrity of the CRA layer.

Participants
Paul Montague - Director for Sales & Business Development, Cladtek Holdings Pte Ltd
Silvius Popescu - Manager – Testing and Simulations, Cladtek Holdings Pte Ltd

Subsea System and Field Productivity Optimisation through Flow Assurance
11:40 - 12:10
OPT Day 2

Deep water field developments typically exhibit high pressure high temperature (HPHT) production reservoirs. However, gas reservoirs with high pressures and low temperatures are also found in deep water developments. Gas reservoirs with low temperatures (35 to 45 °C) lead to reduction in the general temperature of the whole subsea production system during normal operations. The topside arrival temperatures in this scenario can be particularly low (in sub-zero region) for all production lifetime. This paper presents a review of the flow assurance design with such a critical condition conducted in one of the first Floating Liquefied Natural Gas (FLNG) FEED projects in West Africa.

Flow assurance was instrumental in selecting a suitable riser configuration that minimised the Joule-Thomson (J-T) cooling, which in turn improved the FLNG arrival temperatures. Flow assurance also influenced the optimisation of materials selection by managing temperatures in the subsea system during transient start-up operations through adjustments of packing pressures and operating strategy.

In this project, a holistic system view was adopted with the topside limitations incorporated into the design of the subsea system. Flow assurance enabled the arrival at an optimised solution with considerable cost savings in design, installation, commissioning and operability of the subsea system.

Authors: Alaaeldin Salih PhD and Raj Ramar PhD – McDermott Marine Construction Ltd

Participants
Alaaeldin Salih - Senior Flow Assurance Engineer, McDermott Marine Construction Ltd

Case Study: Advanced Analyses Ensuring the Integrity of an Ageing Corroded Pipeline During Reverse Lay Repair
12:40 - 13:00
OPT Day 2

The latest inspection and maintenance surveys undertaken for an ageing large diameter underwater pipeline revealed evidence of isolated pitting corrosion that could have grown since the last inline inspection. Subsequent engineering assessment recommended that immediate repairs were required. The results from the surveys also identified a requirement to incorporate a flanged connection to the PLEM.

The pipeline had been in service for nearly 50 years, with little or no information on the design aspects, installation records and operational history.

This paper describes the advanced structural assessments that were undertaken, accounting for the corrosion failure modes. The analyses considered the loads arising from the pipeline recovery from the seabed, subsequent repairs and the ensuing reverse lay/lift process. Local buckling and collapse limit states were also assessed to industry standard codes.

Authors: Alex Brett, Robert Andrews, Adrian Lim and Larre Odina, ROSEN Group

Participants
Alex Brett - Senior Engineer, ROSEN Group

Networking Lunch
13:00 - 14:00
OPT Day 2

A Rational Approach to the Estimation of Concrete Strain for Concrete Coated Pipelines
14:00 - 14:10
OPT Day 2

This paper presents a rational approach to the estimation of concrete strain for concrete coated pipelines. The approach can lead to significant relaxation of the simplified concrete crushing criterion in DNV-OS-F101 (2013) and allow for potential selection from a wider range of installation vessels and widen the installation weather window. The rational approach is formulated with a numerical model, in which nonlinearities in steel and concrete material stress and strain, as well as complex adhesive behaviour of the anti-corrosion coating are considered. Concrete strain is investigated with pipeline bending strains beyond the steel elastic limit. The numerical program is performed within the scope of Phase 1 of the joint industry project called “Design of concrete coating for submarine pipelines”.

Authors: Nguyen, T.B.N, Fyrileiv, O. and Chia, C.Y., DNV GL – Oil and Gas Technology Centre

Participants
Asle Venas - Senior Principal Pipeline Specialist, DNV GL

The ART of Pipeline Inspections
12:10 - 12:40
OPT Day 2

This paper describes the advanced structural assessments that were undertaken, accounting for the corrosion failure modes. The analyses considered the loads arising from the pipeline recovery from the seabed, subsequent repairs and the ensuing reverse lay/lift process. Local buckling and collapse limit states were also assessed to industry standard codes.

Authors: Alex Brett, Robert Andrews, Adrian Lim and Larre Odina, ROSEN Group

Participants
Alex Brett - Senior Engineer, ROSEN Group

Networking Lunch
13:00 - 14:00
OPT Day 2

A Rational Approach to the Estimation of Concrete Strain for Concrete Coated Pipelines
14:00 - 14:10
OPT Day 2

This paper presents a rational approach to the estimation of concrete strain for concrete coated pipelines. The approach can lead to significant relaxation of the simplified concrete crushing criterion in DNV-OS-F101 (2013) and allow for potential selection from a wider range of installation vessels and widen the installation weather window. The rational approach is formulated with a numerical model, in which nonlinearities in steel and concrete material stress and strain, as well as complex adhesive behaviour of the anti-corrosion coating are considered. Concrete strain is investigated with pipeline bending strains beyond the steel elastic limit. The numerical program is performed within the scope of Phase 1 of the joint industry project called “Design of concrete coating for submarine pipelines”.

Authors: Nguyen, T.B.N, Fyrileiv, O. and Chia, C.Y., DNV GL – Oil and Gas Technology Centre

Participants
Asle Venas - Senior Principal Pipeline Specialist, DNV GL
Different codes applicable to design and operation of onshore and offshore process and pipeline systems provide disparate terminologies, definitions, requirement and guidance related to pipeline overpressure protection. Thus, many pipeline projects experience intensive discussions both internally, between disciplines, as well as externally between operators with respect to pressures, trigger levels, safety integrity levels (SIL), barriers and more. In a joint industry project with Gassco, Statoil and DNV GL, guidance has been developed for overpressure protection of pipelines not designed to maximum source pressure. The goal is to ensure a safe, sufficient, transparent and consistent approach to pipeline overpressure protection that is applicable through all stages of a pipeline system design and operation.

This paper will focus on how the new guidelines challenge some of the traditional methods for pressure protection, particularly on the definition of maximum allowable working pressure as function of frequency and pipeline safety class. The main principles will be presented in an intuitive and graphical way to ensure understanding and create discussions.

Authors: Leif Collberg, DNV GL; Hroar Nes, Statoil; Garil Kleppa, Gassco; Torunn Marthinsen and Lars Even Torbøl森, DNV GL

Participants
Leif Collberg - Vice President, DNV GL

---

This paper describes significant improvements gained through the pipeline lateral stability joint industry project (PILS JIP) to lateral stability design of pipelines, umbilicals and flexibles. The JIP has introduced more sophisticated geotechnical assessments, improved load models, greater design flexibility and 2nd order stochastic wave theory to reduce unnecessary conservatism for shallow water applications. The new methods provide excellent potential for cost savings on production, transportation, storage, handling and installation due to reduced weight requirements, and thereby product size and weight. In addition to the PILS JIP, recent joint industry projects StablePipe, Cability and StabUmCa have been incorporated in a new revision of DNVGL-RP-F109, further enhancing the potential for less expensive weight design while maintaining safety and reliability.

Authors: Knut Vedeld, Håvar Sollund, Jon Petter Grandal and Olav Aamlid, DNV GL

Participants
Knut Vedeld - Senior Engineer, DNV GL

---

Fibre reinforced polymers are used more and more recently in various industries from Aerospace, Wind energy to Car industry. The main motivation for these industries to use composites is to have a material system which does not show the typical weaknesses of metals i.e. corrosion/environmental degradation, weighs only a fraction of equivalent steel designs and have superior strength. In the Oil and Gas industry the introduction of thermoplastic composite pipe (TCP) has been probably the most important example of adaptation of new materials and composites to gain efficiency and cost reduction. The TCPs are typically manufactured by winding/welding pre-manufactured fibre reinforced thermoplastic tapes around an inner liner and applying an outer cover. The pipe system is fully bounded and the entire production process is automatized. TCPs can be produced in very long lengths. Compared to steel pipes, the main advantages of TCP are the absence of corrosion and their much higher stiffness/strength to weight ratio. This a remarkable advantage since these days, deep sea sour oil and gas in areas such as Brazil is more and more prevalent and is expected to be one of the major source of growth in global oil supply. Another advantage lies in relative high flexibility and spoolability of TCPs making them a tough competitor for traditional steel based solutions.

One of the main challenges in adaptation of composite materials generally and TCPs specially in the Oil and Gas industry is the risk averse nature of the industry and relative complexity of composites for an industry used to relative convenience of metals. DNV GL with its generic composite standard DNV-OS-C501 has emerged in the past decade as a leader in providing qualification schemes and technical knowledge for new composite products including composites risers and tubulars [1]. On TCPs, the new DNVGL-RP-F119 published at the end of 2015 is the only available standard and is essentially used in all of the ongoing qualification programs running at the moment in the industry.

The RP-F119’s default qualification approach is a multi-scale approach suitable for large scale manufacturing of pipes of different length and diameters. It is based on predicting full-scale performance from data obtained from measurements on the material level. Full-scale and medium scale testing on the pipe scale are required to confirm that the predictions are valid. This approach is known as the "test pyramid" in many industries such as aeronautics.

The approach to qualification of TCPs in DNVGL-RP-F119 is extensive trying to cover various risks and failure mechanisms and thus it can become time consuming and costly. To generate consistency of practices in dealing with some of the most important risks composites and TCPs may face, and to optimize the qualification process to reduce cost while maintaining reliability, a DNVGL led Joint Industry Project (JIP) started at the beginning of 2016. The JIP industrial participants include material manufacturers,
Innovative Composite Solutions for Buckling Mitigation/Support of Pipelines

**15:30 - 16:00**

**OPT Day 2**

Poor soil conditions and seismic activities are a challenge to integrity management of pipelines. This paper presents cost effective solutions in Glass Fiber Reinforced Plastic (GRP) to handle these challenges. GRP is well suited for subsea use due to unlimited design life (no corrosion) and high weight-strength ratio.

Typical use is:
- Foundations/Sleepers for soft soil areas that prevents loss of pipe
- Landing foundations for flexible risers that improves riser behavior and extend operational design life
- Sleepers with low friction for buckling mitigation/initiation
- Pipeline Crossings for easy installation in all soil conditions
- Flexible free span supports that secures predictable support conditions for the pipeline
- Anode Banks in GRP for Life Extension of Pipelines

GRP have been used since early 2000 in subsea structures and is well documented for subsea use. The use of GRP in seabed support structures offers Oil Companies and Pipeline Installation companies new tools for pipeline integrity management at a competitive cost compared to traditional materials, especially taken into consideration transportation and installation cost.

**Author:** Jon Inge Brattekås, SVP Market & Technology, CSUB AS

---

Reelable High Frequency Welded Pipe for Subsea Applications

**16:00 - 16:30**

**OPT Day 2**

High Frequency Welded (HFW) Pipe has traditionally been regarded as a product with limitations in respect to its low temperature and installation capabilities. Recent advancements in HFW manufacturing technology along with better understanding of the products characteristics have significantly enhanced the scope of use of HFW pipe, enabling it to be safely installed by reel-lay for low-temperature applications. This paper looks at the developments within the HFW pipe production route that have enabled the weld seam toughness to be improved in the final product. Additionally, this paper will also look at the work that has been done to better understand the product in terms of supplier qualification, materials characterisation testing and data analysis to ensure its suitability for reel-lay applications.

**Author:** Stephen McLellan, TechnipFMC

---

Permanent Weldless Deepwater Repair Strategies

**16:30 - 17:00**

**OPT Day 2**

As the industry pushes into ever deeper water and harsher environments, risk management remains at the forefront of operational excellence. In order to mitigate the increasing risk, technology needs to be developed, but also proven in the field. This paper will address various methods of deep-water permanent repair for subsea umbilical’s, flowlines and risers. We will focus on field proven, weldless solutions and provide two key case studies that demonstrate the mitigation of risk through project planning, technology selection and testing. The case studies will include the world’s deepest (remote) high pressure structural clamp deployment that was successfully installed December 2016 off west coast Australia, and the World’s deepest (remote) riser repair deploying mechanical connectors, successfully installed in April 2017 off West Coast Africa. These unique repairs will highlight the very latest field proven technology that is enabling the industry to develop safely in to ever harsher environments.

**Author:** James Rowley, Global Subsea Business Development Manager, Hydratight

---

**Participants**
- Ramin Moslemian, Andreas Echtermeyer, DNV GL, Høvik, Norway
- Stephen McLellan - Senior Engineer – Industrialisation & Materials Engineering, TechnipFMC
- Jon Inge Brattekås, SVP Market & Technology, CSUB AS
- James Rowley - Global Subsea Business Development Manager, Hydratight

---

**References**


---

**SESSIONS**

**DAY 2 - OPT 2018 - 01/03/2018**

Offshore Pipeline Technology Conference

27 February – 1 March 2018

Okura Hotel Amsterdam

---

pipe manufacturer, service companies, oil majors from across the world from Americas to Europe and Asia showing the global reach of the topic.

The main aim of the JIP is to introduce methodologies to move away from pure full-scale test based qualification typical in the industry and answering questions such as material aging which cannot be achieved by full-scale testing. Various failure mechanisms including the effect of aging in sweet and sour environments are considered in the JIP.

This paper gives an overview of the scope and content of the Affordable Composites JIP and how it relates to DNVGL-RP-F119 and other standards for related products. Furthermore, topics such as aging and degradation of thermoplastic composites will be discussed.

---

**Before the Session**

**Opt Day 2**

15:00 - 15:30

Afternoon Break and Networking

All speakers from this session will be available to answer your questions.

---

**OPT Day 2**

14:40 - 15:00

JIPs Q&A

15:30 - 16:00

Innovative Composite Solutions for Buckling Mitigation/Support of Pipelines

16:00 - 16:30

Reelable High Frequency Welded Pipe for Subsea Applications

16:30 - 17:00

Permanent Weldless Deepwater Repair Strategies

---

**Participants**

- Ramin Moslemian - Specialist - Materials, DNV GL Oil & Gas
- Jon Inge Brattekås - SVP Market & Technology, CSUB AS
- Stephen McLellan - Senior Engineer – Industrialisation & Materials Engineering, TechnipFMC
- Jon Inge Brattekås - SVP Market & Technology, CSUB AS
- James Rowley - Global Subsea Business Development Manager, Hydratight

---

energy.knect365.com/offshore-pipeline-technology/
Chairman’s Concluding Remarks and Close of OPT 2018

17:00 - 17:05
OPT Day 2
<table>
<thead>
<tr>
<th>TIME</th>
<th>OPT DAY 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>08:00 - Coffee and Early Bird Networking</td>
</tr>
<tr>
<td>09:00</td>
<td>09:00 - Chairman's Welcome to Day 2</td>
</tr>
<tr>
<td></td>
<td>09:10 - Pipeline Stability During Installation</td>
</tr>
<tr>
<td></td>
<td>09:40 - Design &amp; Installation Challenges of Aasta Hansteen Reeled CRA Lined Pipelines in Deep Water</td>
</tr>
<tr>
<td>10:00</td>
<td>10:10 - Successful Installation of Ichthys Flowlines: Overcoming Installation Challenges in Reeling and J-lay Mode by DCV Aegir</td>
</tr>
<tr>
<td></td>
<td>10:40 - Innovative Method for Double Jointing CRA Pipes to Reduce Installation Cost and Time</td>
</tr>
<tr>
<td>11:00</td>
<td>11:10 - Morning Break and Networking</td>
</tr>
<tr>
<td></td>
<td>11:40 - Subsea System and Field Productivity Optimisation through Flow Assurance</td>
</tr>
<tr>
<td>12:00</td>
<td>12:10 - The ART of Pipeline Inspections</td>
</tr>
<tr>
<td></td>
<td>12:40 - Case Study: Advanced Analyses Ensuring the Integrity of an Ageing Corroded Pipeline During Reverse Lay Repair</td>
</tr>
<tr>
<td>13:00</td>
<td>13:00 - Networking Lunch</td>
</tr>
<tr>
<td>14:00</td>
<td>14:00 - A Rational Approach to the Estimation of Concrete Strain for Concrete Coated Pipelines</td>
</tr>
<tr>
<td></td>
<td>14:10 - Optimisation of Pipeline Overpressure Protection Systems</td>
</tr>
<tr>
<td></td>
<td>14:20 - Improved On-Bottom Stability Design of Pipelines, Umbilicals, Cables and Flexibles</td>
</tr>
<tr>
<td></td>
<td>14:30 - Thermoplastic Composite Pipes: An Innovative Methodology for Qualification of TCPs</td>
</tr>
<tr>
<td></td>
<td>14:40 - JIPs Q&amp;A</td>
</tr>
<tr>
<td>15:00</td>
<td>15:00 - Afternoon Break and Networking</td>
</tr>
<tr>
<td></td>
<td>15:30 - Innovative Composite Solutions for Buckling Mitigation/Support of Pipelines</td>
</tr>
<tr>
<td>16:00</td>
<td>16:00 - Reelable High Frequency Welded Pipe for Subsea Applications</td>
</tr>
<tr>
<td></td>
<td>16:30 - Permanent Weldless Deepwater Repair Strategies</td>
</tr>
<tr>
<td>17:00</td>
<td>17:00 - Chairman's Concluding Remarks and Close of OPT 2018</td>
</tr>
</tbody>
</table>