Back to the Future of Subsea

22nd November 2018
HG Wells Conference Centre, Woking
09:00  Registration

09:30  Welcome

Neil Gordon, CEO, Subsea UK

09:40  There is nothing new under the sun

The subsea sector has always been interested in and excited by ‘the next big thing’, ie the latest bit of technology that will change the way fields are developed and maintained. It is a bit like the ubiquitous sign in pubs – ‘free beers tomorrow’. Not only has the next big thing never appeared, but the industry has often found itself proposing technology that has been suggested before, but either never adopted or simply has its title altered. So let’s take a little stroll down memory lane, that is the subsea memory lane of the last 35 years or so, and have a look what the industry desired or hoped for, but which has not appeared nor become the panacea expected.

Steve Sasanow (67) was associated with Subsea Engineering News, the only industry newsletter dedicated to subsea production, deepwater technology and underwater engineering, for 31 years. He was founding editor in 1984 before acquiring the newsletter and becoming publisher as well in 1987. He continued in the dual roles until 2013 when SEN was sold to Hart Energy and continued as editor until 2015. In addition to his journalism which included specialist technical writing for most major oilfield magazine plus several British daily newspapers, Steve has done extensive consultancy work for major operators and contractors in the offshore industry and run technical conferences and seminars and subsea engineering training courses. Most recently he served on one of the technology review committees for the Oil & Gas Technology Centre. He has a Master’s in journalism from Boston University’s School of Public Communication – but that was a long time ago!

10:00  UK thoughts from the beginning of this millennium reviewed and newthink for the next 20 years

This presentation will provide a retrospective UK view on how offshore/subsea technology has actually progressed compared with what was considered as possible at the turn of the millennium. It will also consider where we could go subject to a range of technological/economic and political drivers.

The lessons learned from the past will be reviewed – including accidents and safety and how these continue to affect our design and operation philosophies. The impact of new materials; instrumentation; automation; data handling (including big data); and extension away from traditional hydrocarbons will be considered.

Steve Sasanow
Managing Director
Knighton Enterprises

Geoff Lyons
Director
BPP-TECH
Plainly there are many possible exciting developments which can be addressed, hence the precise balance will need to be determined as other presenters’ likely material becomes known.

It is anticipated that these other presentations will include The Fourth Industrial Revolution; other historical and future developments and considerations; as well as some current developments in detail which are due to see deployment in the near future.

**Geoff** is a co-founder of BPP-TECH. As a Chartered Engineer, he is a Fellow of The Institution of Mechanical Engineers, and also of the Royal Institution of Naval Architects.

He has been active in the offshore sector since 1979 previously working with Brown & Root, and as a member of research and academic staff (senior lecturer) at University College London until 2002.

Geoff’s experience covers a wide range of complementary activities including in the field offshore as well as in the office, although a significant part of his time is spent abroad (including Aberdeen) supporting his company’s business.

Geoff is very familiar with the professional and training needs of the Subsea industry as an ex-academic and currently as a mentor for prospective Chartered and Incorporated Engineers with the various professional engineering institutions.

Based in principally London he provides improved communications with other relevant organisations including the Society for Underwater Technology. He is currently acting as the Board Member for the South East chairing the local committee.

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**Digitalisation, The Oil Field and the 4th Industrial Revolution**

What does the 4th Industrial Revolution mean? It’s a grand title often brandished but without much practical insight on what to do.

Many presentations have been made around the globe that refer to Amazon, the biggest retailer, having no shops; Uber, the largest taxi company, having no cars; and AirBnB, the largest provider of rooms, having no hotels. But in most cases executives in the oil industry are left scratching their heads wondering how any of this applies to them.

First of all, there are five digital vectors to consider. These set out the primary purpose of any digitalisation initiative. Ideally your programs should help all five to align, but it’s important to identify what the main driver is and act accordingly.

Second there is one overriding principle that sets the 4th Industrial Revolution (and digitalisation) apart from IT projects and the flim-flam we all know from the past. Digitalisation is operations, it’s not an adjunct to it. To be successful we must reduce the time it takes between four steps: “knowing what’s going on”; “understanding the implications”; “deciding among alternatives”; and “taking action”. Crucially, though, to become really efficient we must also know when it’s safe to take no action at all.
Gareth is executive Director leading strategy and business development at Eigen. He has 26 years' experience in the oil and gas sector gained through senior positions in industry (Schlumberger, BG Group) and management consultancy (Deloitte).

In 2002, he co-founded one of the first companies to launch services on the Salesforce.com cloud-computing platform.

He is the founder and owner of Bestem, a network of entrepreneurs, financiers, managers and consultants who are active in the European energy industry. Bestem creates strong, informal networks leading to high-quality opportunity identification and execution. Together with other leaders in industry he recently formed V4 Associates. This group has tasked itself with generating thought leadership and picking winners from the changes that digitalization and the fourth industrial revolution will bring.

Gareth graduated with First Class Honours in Electronic and Information Engineering from Robert Gordon University in Aberdeen and holds an MBA degree from London Business School.

10:40 Coffee Break

11:00 The Evolution of Offshore Construction Contracts: Where are we now and what does the future hold

There are a number of standard forms of contract associated with the subsea/offshore construction sector.

This presentation will review the historical context of these contracts and their evolution up to the present landscape. The presentation will take into account some of the most commonly used forms applicable to subsea/offshore construction projects in the present day including the FIDIC, Logic, Supplytime and SAJ forms.

The presentation will consider the future trends for subsea/offshore construction contracts including in particular the context of the decommissioning sector and the advent of smart contracts working in blockchain.

Andreas Dracoulis helps clients resolve problems in the offshore construction, energy and shipbuilding sectors. Andreas mostly advises on international projects ranging between the construction of marine assets, upstream exploration and production and major infrastructure works. He has represented clients in international arbitrations conducted under many of the commonly used rules and in the English courts. He holds a postgraduate Master’s degree in construction law and dispute resolution and is also a co-author of the chapter on Offshore Vessel Construction Disputes within Global Arbitration Review’s Guide to Energy Arbitrations (Second Edition). Andreas is a recommended lawyer in the 2017 UK edition of The Legal 500, Legalease, which reports that he is a ‘key name’ in international arbitration and ‘excellent’ in shipping.
11:20  Simpler, Leaner, Smarter – The Subsea2.0™ Product Platform for iEPCI™ Project Execution

Subsea 2.0™, a revolutionary product platform that makes subsea projects simpler, leaner and smarter. When combined with iEPCI™, the company’s powerful integrated approach to field architecture and project execution, Subsea 2.0 improves project economics and unlocks first oil and gas faster.

TechnipFMC introduced iEPCI™ to transform subsea projects throughout the entire process of full field development. The value proposition integrates front-end design and life of field to streamline project execution. Now TechnipFMC has gone one step further by bringing together expert teams to rethink how subsea production could be even more efficient.

The result is Subsea 2.0™, a product platform made up of six core products designed by combining field-proven and new technologies. The core products include the compact tree, compact manifold, flexible jumpers, distribution, controls and horizontal connectors. The smaller, lighter products achieve up to a 50% reduction in size, weight and part count, while maintaining the same or better functionality.

TechnipFMC has invested heavily in the research and development of Subsea 2.0™ and designed it specifically to accommodate iEPCI™ using LEAN product and process engineering. Further, the product platform has been standardised at the component level for configuration to client needs and optimised to improve performance over the life of the field. This new “configure to order” model means there is a 70%-90% reduction in manual activities during the production process, reducing hardware delivery time for clients. With Subsea 2.0™, it is possible to achieve zero hours of product engineering after the contract has been formalised.

11:40  Pipeline Design Engineering – Past & Future

The last 20 years has seen advances in the design and analysis of subsea pipelines that has enabled substantial cost reductions. During the late 1990’s the pipeline engineering industry was beginning to recognise the problems of managing upheaval buckling and pipeline walking, spurred on by the coming of deepwater oil and gas production. Methods were developed for the prediction of upheaval buckling that offered significant savings in the rock protection required for subsea pipelines.

Over the subsequent years, up to the present day, the development of finite element analysis techniques and computer power has enabled progression from two to three dimensions to deliver optimised buckling mitigation measures. This has been supported by improvements in the input data, with better route surveying and understanding of pipe-soil interaction and evolution of pipeline codes.

There is now little margin left in a well-designed pipeline, so in the future advances are likely to be made in pipeline materials. Because of the number of ageing pipelines there will be a large emphasis on life extension and improved reliability; the latest techniques will be applied to existing pipelines, using survey data combined with advanced analysis to justify ongoing use of the pipeline. Environmental concerns are becoming more important, with rock dumping and mattress placement considered to
be detrimental in near-shore locations, requiring a greater understanding of the processes involved in free-span development.

**12:00 The Past, Present and Future (?) of Subsea Pipe-in-Pipe Technology**

The continued exploration and development of deepwater offshore oil and gas field present greater technical challenges to the pipeline engineer. Such wells tend to produce very corrosive wellstream fluids at high wellhead flowing temperatures and pressures. Often, there is a need to provide thermal insulation to subsea pipelines to mitigate against hydrate and/or wax formation. One of the most cost-effective methods for achieving a subsea pipeline design solution is to adopt a pipe-in-pipe approach.

This presentation will cover a brief history of pipe-in-pipe technology from its early origins in domestic heating systems, the pioneering use to enable high-pressure, high-temperature field developments in the 1990’s, the development of reel-laid pipe-in-pipe solutions and current and future possible developments in the available technology.

The presentation will include case studies of systems installed to date, a description of some of the challenges faced, and examples of both success and failure.

The presentation will conclude with examples of the latest technology being employed for pipe-in-pipe in current projects such as mechanically lined pipe and electrical trace heating, and with some “blue-sky” thinking and challenges for the industry to consider for the future.

Dem Demetriou has worked in the oil and gas industry for twenty-eight years and has experience in conceptual and front-end engineering studies, detailed design, procurement, construction and supervision of oil and gas projects in the North Sea, Mediterranean, South East Asia and the Caribbean. Dem is an SUT accredited Subsea Engineer with a wide ranging background working with operators, contractors and consultancy companies in the UK and overseas. He first discovered pipe-in-pipe in the mid-1990’s, presenting a paper on the subject at the Offshore Technology Conference (OTC) in 1997. Dem is the Subsea Engineering Manager for Genesis, based in their London office and is currently project manager for the detailed design of the Fenja project, which involves, you guessed it, pipe-in-pipe technology.
Pipelines that Walk

The earliest recorded occurrence of a failure due to pipeline walking was in the North Sea during the 1990’s. Now, over 20 years later, in 2018, pipelines are still observed to be walking and mitigation has been necessary on a few operating pipelines in recent years. So, this walking challenge has not been an easy on to resolve.

Meanwhile, mitigation to prevent walking is now considered in the design of most on-bottom pipelines. However, there is still much uncertainty over walking rate predictions, leading to increased design costs and schedule overruns. In some cases, these uncertainties are resolved by installing large suction anchors as a pre-emptive mitigation measure, which has proven to be extremely costly, not entirely successful and, in some cases, wholly unnecessary.

These costs can be reduced by investing in intelligent application of modern analysis techniques and by developing a more flexible approach to uncertain behaviour. To this end, smarter strategies to simplify the design process and provide projects with an approach to manage and mitigate the walking challenge over the project cycle are now being developed. This includes the ‘wait and see’ approach based on effective monitoring of pipeline walking and applying mitigative measures only when and where they are required. To this end, the APT (Anchoring Pipeline Technology) JIP is embarking on a research programme to provide better design guidance and to develop simpler anchoring systems that can easily be retrofitted at low cost, supplemented by a step change in monitoring systems based on minor advances to current technology.

In the coming decades our industry should start to accept these ideas of improved monitoring and better control of uncertain behaviour in operation, with the realisation of the benefits this approach will bring to lifecycle costs.

David is a chartered engineer with over 35 years of experience as a specialist in pipelines and associated facilities in the oil and gas industry, working within design consultancies and operating companies. His roles have included design (concept through execute), bid preparation, specification, procurement, installation and commissioning of submarine pipelines.

David managed the design of several subsea pipeline design projects and has provided specialist project support on high temperature, deepwater pipeline design and installation for numerous international projects, including the direction of specialist test programmes. He also made a number of design innovations that have now passed into common usage.

David has co-authored thirty-six technical papers on pipeline related topics. He was responsible for the SAFEBUCK joint industry project, which addressed the safe design of hot on-bottom pipelines by providing research and design guidance to the industry. The Design Guideline is now used on oil and gas projects around the world and has been adopted by DNVGL into their Recommended Practices. David is now responsible for the APT (Anchoring Pipeline Technology) joint industry project.

12:40 Lunch
13:30  Acoustic Disconnect Latest Technological Improvements for Mooring Systems

Johnny Shield
Managing Director
Subsea Riser Products (SRP)

As the oil and gas industry continues to change and adapt to market conditions, there are fewer drilling vessels available in the market and the vessels that are still working tend to be outfitted with thrusters and dynamic positioning (DP) systems to keep them on location in deep water drilling locations. It is often beneficial to augment a DP rig with mooring lines in shallow water locations. Since many of these shallow water locations experience harsh conditions, it is important to be able to quickly disconnect from the mooring system to avoid these environmental hazards or emulate the operational advantages of DP station keeping.

A review of existing quick disconnect devices will be presented.

A lighter acoustically operated mooring connector has been developed that can release under tension loads as high as 900 MT. At a quarter of the weight of previous connectors, it is also easier and safer to install, saving an average of seven hours per rig.

The battery life has been improved from eighteen months to five years. The implementation of domain key authorisation, network relay and frequency hopping techniques strongly improves the reliability and availability of the system, especially in case of conflicting noise or power issues.

This technology provides a significantly safer way to disconnect the rig quickly in case of emergencies (blowout, storms, icebergs…) and can also be used to optimise drilling efficiency by allowing faster rig moves from one location to the next.

The presentation will cover its potential uses including rig moving and weather avoidance; product development and qualification program; and the integration of data and communication in an ABS & DNV qualified mooring device.

13:50  The Challenges (and Opportunities) of Decommissioning Future Offshore Systems

Glen Jewell
Senior Consultant
Frazer-Nash Consultancy Ltd

We often discuss how new technology will advance the development of future offshore facilities. The upcoming multi-£bn requirements to decommission existing offshore facilities is also understood. Further ahead lies the requirement to decommission the offshore facilities of the future. With increasing use of through-life costing assessments to validate concept selection, could high decommissioning costs exclude a particular developmental approach?

This presentation will provide a high level overview considering how new offshore What new challenges will be faced when decommissioning the offshore facilities of the future? How will decommissioning requirements need to adapt and evolve as a result of new offshore technology currently being developed? How can the design of new facilities be optimised to minimise through-life costs and ensure that safe and cost-effective decommissioning will be feasible? Continued innovation in the decommissioning industry is necessary to meet these new demands.

Examples of these topics include:
- The future decommissioning challenges associated with facilities that are planned for installation in increasingly deep water and/or harsh environments.
- The increasing use of lightweight materials and structures should simplify offshore handling requirements, enabling the use of smaller, less costly vessels for decommissioning activities. However, increased use of non-metallic materials will change how the recovered materials are handled, and present different opportunities for re-use and recycling.
- Increased digitalisation, and use of concepts such as the ‘digital twin’, will provide greater understanding of system behaviour, including dynamic response and degradation. This, together with increased use of autonomous operations, will make removal of the asset safer and more predictable.
- Evolving regulations – increasing safety and environmental controls may result in more onerous legislation. However greater understanding and experience, together with greater standardisation across regions, may enable areas of over-conservatism to be identified and relaxed.

Glen Jewell has worked in the offshore oil & gas sector since 2005. Glen spent 12 years working for 2H Offshore Engineering Ltd, including 3.5 years as director of their Woking office. He has significant experience in subsea riser engineering, and has led a number of engineering projects considering subsea riser systems, working with many major operators for offshore developments at locations around the world.

In 2017 Glen joined Frazer-Nash Consultancy Ltd as a specialist in subsea engineering. Frazer-Nash offers a broad spectrum of technical services to the subsea industry, ranging from complex structural, flow and thermal analysis, to cost estimation, safety and reliability assessments, and the application of systems engineering principles to enhance performance. Glen’s project experience includes many years of supporting clients in the offshore oil & gas industry and providing technical assistance to help solve diverse engineering challenges. He has worked on many class-leading subsea projects, often involving novel technology and significant engineering challenges.

Glen is a Chartered Engineer and Fellow of the IMechE, and a Chartered Manager with the CMI. He is also a member of the IMechE’s Upstream Oil & Gas Committee. He graduated from the University of Surrey and still lives locally, near Woking.

14:10  Closing Remarks

14:30  Close