
Registration and Networking Welcome Coffee

08:30 - 09:00

Chairperson's Welcome

09:00 - 09:10

Introduction to Flexibles, Design and Certification

Participants

Yannick Benedek - Business Development and Marketing Manager, Flexi France

Introduction to Flexibles

09:10 - 09:45

Introduction to Flexibles, Design and Certification

- Flexible pipe vs. rigid pipe
- Flexible riser concept selection
- Best practice, codes & standards

Participants

Hossam Ragheb - Senior Riser & Advanced Analysis Engineer, Intecsea

Flexible Risers for Operation in Ultra Deepwater Conditions

09:45 - 10:20

Introduction to Flexibles, Design and Certification

- Status on track record and capabilities for flexible pipe solutions in UDW
- Developments on key design drivers and new solutions to achieve new UDW frontiers

Participants

Guillaume Pringuay - Senior Manager Flexibles Technology, TechnipFMC

Flexible Riser Design Automation with Hybrid Optimization Strategy Based on Machine Learning and Evolutionary Computing

10:20 - 10:55

Introduction to Flexibles, Design and Certification

The objective of this study is to investigate the optimal riser configuration through a comparison of two different riser design automation frameworks based on multi-objective optimizations using a Random Forest (RF) based metamodel coupled with Evolutionary Algorithm (RF-EA) and Radial Basis Function (RBF) based metamodel coupled with Evolutionary Algorithm (RBF-EA). The hybrid framework demonstrates the multi-objective optimization for minimizing material cost and minimizing fatigue life along the riser. Lazy wave configuration is considered for the flexible riser design optimization. The configuration consists of multiple design variables such as top angle, sag bend elevation, hog bend elevation, length of the buoyancy section, the module diameter and the layback distance. The riser configuration optimization is time-consuming and exhaustive due to nonlinear time domain analysis and due to a large number of load cases for extreme load and fatigue load analysis. Metamodel for the riser is the alternative option to use in the optimization algorithm instead of Final Element (FE) model for the dynamic analysis of the riser. Two different machine learning approaches, i.e. RF and RBF are used to develop the metamodels and coupled with Evolutionary Algorithm (EA) to form hybrid optimization method. Minimizing both the riser cost and cumulative fatigue damage of the flexible riser, both the framework presents the optimal solutions characterizing how design changes impact the trade-off between these two competing objectives. RF-EA provides a comparatively better configuration compared with RBF-EA. The riser design automation strategy can save considerable computational time and require less design experience.

Participants

Subrata Bhowmik - Senior Data Scientist - Subsea Digitalisation & Innovation, McDermott International

Networking Refreshment Break

10:55 - 11:20

The Roadmap to the All TCP Riser

11:20 - 11:55

Composite Risers

- Benefits and challenges of composite risers
- What needs to change to make the All-TCP riser reality
- Hybrid risers to take us to the next phase of adoption

Participants

David Charlesworth - Head of Engineering, Magma Global

Hybrid Flexible Pipe: A Technology Step Change to Address New Deep-Water Challenges

11:55 - 12:30

Composite Risers

TechnipFMC is developing in collaboration with Magma a new generation of Hybrid Flexible Pipe (HFP), based on composite material technology combining Thermoplastic Composite Pipe (TCP) and conventional flexible layers, aiming at addressing the demanding technical requirements of new UDW developments such as pre-salt fields, as well as offering a cost-effective alternative not only to traditional flexible pipes but also to rigid pipeline solutions.

This paper will aim at presenting the HFP design concept and its benefits, the on-going qualification program according to DNV-GL standards as well as the first results obtained to date.

Participants

Laurent Decoret - Chief Product Developer, Composite, TechnipFMC

Lunch

12:30 - 13:30

Hybrid and Composite Risers for Deep Waters and Aggressive Reservoirs – Qualification and Approval of Novel Designs

13:30 - 14:05

Composite Risers

Participants

Dag McGeorge - Senior Principal Engineer, Riser Technology, DNV GL

Active Heating Technologies for Flexible Pipes

14:05 - 14:40

Flow Assurance and Installation Experiences in Flexible Pipes

- Update on the latest active heating technologies and methods for flexible pipe systems
-

Networking Refreshment Break

14:40 - 15:10

Deepwater Flexible Installation

15:10 - 15:45

Installation Experiences with Flexible Risers & Pipes

- Consideration of installation options
- Innovations in installation vessels
- Installation analysis

SESSIONS

DAY 1 - FLEXIBLE RISERS & PIPES CONFERENCE - 08/10/2019

Flexible Risers

8 - 9 October 2019

St. James' Court
London

**Technical Challenges for HPHT Deepwater
Flexible Risers**

15:45 - 16:20

Installation Experiences with Flexible Risers & Pipes

**General Discussion, Q&A and Chairperson's
Summary**

16:20 - 16:30

Installation Experiences with Flexible Risers & Pipes

Close of Day 1

16:30 - 16:40

SCHEDULE

DAY 1 - FLEXIBLE RISERS & PIPES CONFERENCE - 08/10/2019

Flexible Risers

8 - 9 October 2019

St. James' Court
London

| TIME | COMPOSITE RISERS | FLOW ASSURANCE AND INSTALLATION EXPERIENCES IN FLEXIBLE PIPES | INSTALLATION EXPERIENCES WITH FLEXIBLE RISERS & PIPES | INTRODUCTION TO FLEXIBLES, DESIGN AND CERTIFICATION |
|-------|---|--|---|---|
| 08:00 | 08:30 - Registration and Networking Welcome Coffee | 08:30 - Registration and Networking Welcome Coffee | 08:30 - Registration and Networking Welcome Coffee | 08:30 - Registration and Networking Welcome Coffee |
| 09:00 | | | | 09:00 - Chairperson's Welcome 09:10 - Introduction to Flexibles 09:45 - Flexible Risers for Operation in Ultra Deepwater Conditions |
| 10:00 | 10:55 - Networking Refreshment Break | 10:55 - Networking Refreshment Break | 10:55 - Networking Refreshment Break | 10:20 - Flexible Riser Design Automation with Hybrid Optimization Strategy Based on Machine Learning and Evolutionary Computing 10:55 - Networking Refreshment Break |
| 11:00 | 11:20 - The Roadmap to the All TCP Riser 11:55 - Hybrid Flexible Pipe: A Technology Step Change to Address New Deep-Water Challenges | | | |
| 12:00 | 12:30 - Lunch | 12:30 - Lunch | 12:30 - Lunch | 12:30 - Lunch |
| 13:00 | 13:30 - Hybrid and Composite Risers for Deep Waters and Aggressive Reservoirs – Qualification and Approval of Novel Designs | | | |
| 14:00 | 14:40 - Networking Refreshment Break | 14:05 - Active Heating Technologies for Flexible Pipes 14:40 - Networking Refreshment Break | 14:40 - Networking Refreshment Break | 14:40 - Networking Refreshment Break |
| 15:00 | | | 15:10 - Deepwater Flexible Installation 15:45 - Technical Challenges for HPHT Deep-water Flexible Risers | |

SCHEDULE

DAY 1 - FLEXIBLE RISERS & PIPES CONFERENCE - 08/10/2019

Flexible Risers

8 - 9 October 2019

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| TIME | COMPOSITE RISERS | FLOW ASSURANCE AND INSTALLATION EXPERIENCES IN FLEXIBLE PIPES | INSTALLATION EXPERIENCES WITH FLEXIBLE RISERS & PIPES | INTRODUCTION TO FLEXIBLES, DESIGN AND CERTIFICATION |
|--------------|-------------------------|--|---|--|
| 16:00 | 16:30 - Close of Day 1 | 16:30 - Close of Day 1 | 16:20 - General Discussion, Q&A and Chairperson's Summary 16:30 - Close of Day 1 | 16:30 - Close of Day 1 |

Early Bird Coffee & Networking

08:30 - 09:00

Chair's Welcome to Day 2

09:00 - 09:10

Participants

Yannick Benedek - Business Development and Marketing Manager, Flexi France

A Generic Approach on How to Operate Flexible Pipes Safer

09:10 - 09:45

- Background, management of information
- Management and use of data
- Learning from experiences and sharing of information to reduce risk

Participants

Trond Sundby - Structural Integrity, Pipelines & Subsea, Petroleum Safety Authority

Smarter Operation with Embedded Monitoring in Flexible Pipes

09:45 - 10:20

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

OptiFlex™ is a monitoring system based on embedding of fiberoptic sensors into the flexible pipe structure during manufacturing for safe operation and damage detection in flexible pipes. Focus will be on the output from the OptiFlex™ monitoring system and the benefits of an embedded and continuous condition monitoring system.

Participants

Mia Sørensen - Technical Sales Manager, Flexible Pipes, NOV

Automatic Testing and Online Monitoring of Flexible Riser Annuli

10:20 - 10:55

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

- Automation of riser annulus testing capabilities
- Reduction of OPEX over riser lifetime
- Online monitoring of annuli giving live status of annular condition
- Improvement of annular condition

Participants

Ray Duffy - Integrity Operations Manager, Wood

Networking Refreshment Break

10:55 - 11:20

Digitalising Testing and Monitoring of Flexible Risers

11:20 - 11:55

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

In this presentation, we will show that installation of field proven retrofitted riser monitoring equipment linked to digital cloud solution, provide a risk mitigating measure with short lead time, attractive cost and high reliability.

Participants

Christoffer Nilsen-Aas - VP Digital Services, 4Subsea

Case Study: Flexible Riser Integrity Management

11:55 - 12:30

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

This presentation shares a novel risk-based approach to flexible riser life extension through FlexIQ which combines inspection data with a fully simulation-based irregular wave approach to provide life extension assessments. FlexIQ combines the two proprietary technologies: MEC-FIT™ inspection technique from Innospection and FLEXAS™ numerical solver from Advisian IntecSea which allows high-resolution stochastic fatigue life to be captured based on realistic conditions. Reducing uncertainty in the design calculations enables operators to continue operating their assets safely and with improved confidence. FlexIQ has established a step change for industry technology and has been recently successfully deployed on two offloading risers in West Africa with a total inspection length of 2.5km. Field experience on how FlexIQ has been used to re-evaluate the design life and determine the suitability for life extension of the risers will be presented.

Participants

Kirsten Oliver - Global Asset Advisory Lead, Advisian

Lunch

12:30 - 13:30

Flexible Riser Life Extension Associating Machine Learning and Innovative Monitoring

13:30 - 14:05

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

A key difference between original design and life extension structural assessment is the level of detail we apply and, if we are fortunate, actual in-place data available like as-built riser configuration, operational history or historical weather data. The presentation will describe a method that allows us to convert measured dynamic riser and vessel response into real time fatigue accumulation of the riser tensile and pressure armour layers. In short, we aim to replace and confirm some of the assumptions from design with more representative information. The method associates field proven monitoring, machine learning and global & local flexible riser stress analysis.

Participants

Pedro Viana - Technical Manager, 2H Offshore

The Prediction of Fretting Fatigue in the Pressure Armours of Dynamic Flexible Pipes

14:05 - 14:40

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

Much of the focus of flexible pipe fatigue has focused on tensile armour fatigue prediction and mitigation whilst the fatigue response of the pressure armours is less well understood. This presentation outlines a combined experimental and computational framework for the design of flexible marine risers pressure armours against fretting and fatigue. The framework is based on:

1. A suite of laboratory experimental methods for fretting and fatigue tests, and
2. A global-local methodology for flexible riser analysis including dynamics and frictional contact mechanics.

The proposed framework is intended to assist in the design of pressure armour layers in flexible marine risers and assist in mitigating against fretting wear and fatigue during operation.

Participants

Dara Williams - Local Business Stream Manager – Riser Systems, Wood

Integrity Management of Jubilee Field Flexible Risers: A Case Study of Mitigation and Remediation of a Critical Riser

14:40 - 15:15

Novel Inspection and Monitoring Techniques, Integrity Management and Life Extension

Jubilee Field FPSO suffered a damaged bearing in 2016 so the turret no longer rotated as originally designed. This resulted in the vessel becoming fixed at beam-sea orientation, significantly increasing fatigue usage for the flexible risers. There are 9 flexible and 2 dynamic umbilical risers and the integrity assessment that followed identified the risk profile of each and defined a remediation plan to minimize interruption to oil production. This presentation covers the most critical risers - the high-pressure injection risers - and summarises the execution of the re-termination of the gas-injection riser.

Participants

Peter Baralett - Development Manager, Tullow Oil

Networking Refreshment Break

15:15 - 15:35

Using Advanced Inspection and Analysis Tools to Justify the Case for Life Extension

15:35 - 16:10

Corrosion, Defects and Fatigue

Participants

Stewart Duthie - Manager, Subsea Technology, Flexlife Ltd

Corrosion of Armour Wires in Annulus – When & Why

16:10 - 16:45

Corrosion, Defects and Fatigue

- Corrosion in confined environment - are low corrosion rates always achieved?
- Breaches in outer sheath - O₂ ingress and "history" effects
- H₂S permeation and H₂S consumption

Participants

Arne Dugstad - Chief Scientist - Corrosion Technology, IFE

Open Q&A and Chair's Summary

16:45 - 17:00

Corrosion, Defects and Fatigue

Close of Conference

17:00 - 17:10

SCHEDULE

DAY 2 - FLEXIBLE RISERS & PIPES CONFERENCE - 09/10/2019

Flexible Risers

8 - 9 October 2019

St. James' Court
London

| TIME | CORROSION, DEFECTS AND FATIGUE | NOVEL INSPECTION AND MONITORING TECHNIQUES, INTEGRITY MANAGEMENT AND LIFE EXTENSION |
|-------|---|--|
| 08:00 | 08:30 - Early Bird Coffee & Networking | 08:30 - Early Bird Coffee & Networking |
| 09:00 | 09:00 - Chair's Welcome to Day 2 09:10 - A Generic Approach on How to Operate Flexible Pipes Safer | 09:00 - Chair's Welcome to Day 2 09:10 - A Generic Approach on How to Operate Flexible Pipes Safer 09:45 - Smarter Operation with Embedded Monitoring in Flexible Pipes |
| 10:00 | 10:55 - Networking Refreshment Break | 10:20 - Automatic Testing and Online Monitoring of Flexible Riser Annuli 10:55 - Networking Refreshment Break |
| 11:00 | | 11:20 - Digitalising Testing and Monitoring of Flexible Risers 11:55 - Case Study: Flexible Riser Integrity Management |
| 12:00 | 12:30 - Lunch | 12:30 - Lunch |
| 13:00 | | 13:30 - Flexible Riser Life Extension Associating Machine Learning and Innovative Monitoring |
| 14:00 | | 14:05 - The Prediction of Fretting Fatigue in the Pressure Armour of Dynamic Flexible Pipes 14:40 - Integrity Management of Jubilee Field Flexible Risers: A Case Study of Mitigation and Remediation of a Critical Riser |
| 15:00 | 15:15 - Networking Refreshment Break 15:35 - Using Advanced Inspection and Analysis Tools to Justify the Case for Life Extension | 15:15 - Networking Refreshment Break |
| 16:00 | 16:10 - Corrosion of Armour Wires in Annulus – When & Why 16:45 - Open Q&A and Chair's Summary | |
| 17:00 | 17:00 - Close of Conference | 17:00 - Close of Conference |