2H offshore

Composite Riser Engineering

an ACTEON company

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2H is an independent, technology driven engineering contractor that has been at the forefront of riser technology development since its formation in 1993. 2H has been responsible for the implementation of many advances in deepwater risers, as we aim to continually deliver the best technical solutions. Composite pipes offer a number of potential advantages in the offshore industry and 2H is committed to supporting its clients in the introduction, understanding and use of this new technology. Their improved fatigue and corrosion resistance performance and reduced cross-sectional weight may help to overcome technical challenges especially in deeper water and harsh environments.

2H has experience with a range of composite structures including both thermoplastic composite pipe and composite un-bonded flexible pipe. 2H has established good working relationships with key composite pipe suppliers whilst remaining independent to ensure our sole focus is to deliver the optimal technical and commercial solutions to our clients.

Services

2H has developed the capability and experience required to provide holistic composite riser engineering on both a global and cross-sectional level.

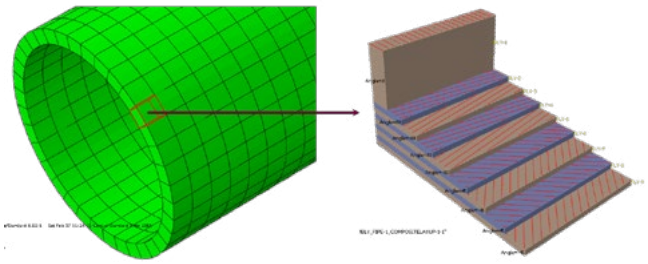
System Configuration and Global Analysis

Based on over 20 years of shallow and deep-water riser engineering experience, 2H can develop the optimal riser configuration for each application ensuring the enhanced properties of composite pipe are fully utilised. Evaluation is made of both the in-place strength and fatigue response while also considering installation.

Global analysis of a composite riser system can be performed using either Orcaflex or Flexcom specialist finite element packages.

Cross-section Assessment

Using in-house software in conjunction with ANSYS and Abaqus 2H can support detailed design and verification engineering of the composite layup configuration to assist in the design process and third party verification. Analysis can be performed for both the pipe cross section and the complex end termination assemblies. In addition to considering the short term response of composites, such as strength, impact toughness and delamination; the time dependent properties of the matrix, wear and product migration are considered.



Product Specification

2H can work with clients to produce detailed product specifications incorporating all relevant design, qualification and manufacturing requirements.

Procurement and Manufacturing Support

2H engineers have experience overseeing the fabrication, inspection and testing of a variety of riser systems and can help clients ensure successful delivery of their project.

Image credits: Airborne Oil & Gas and Magma Global

Key Projects

Subsea 7 - Composite Riser Evaluation

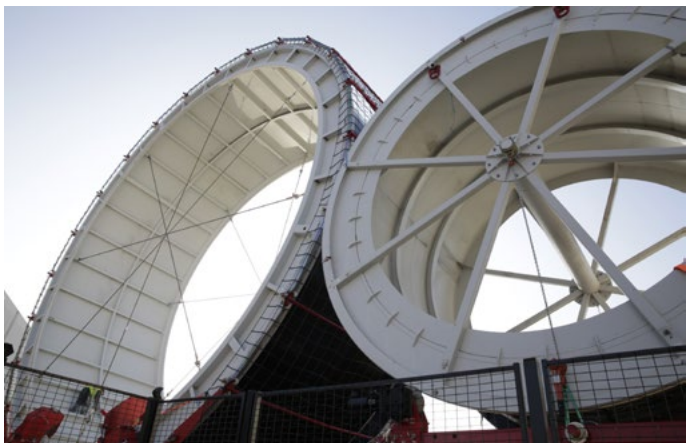
2H has completed a concept study to assess the benefits of replacing the steel catenary risers in a Buoyancy Supported Riser (BSR) System with a carbon fibre PEEK composite riser. A number of advantages were identified during the project including a reduction in the steel weight of the whole system, the elimination of flex-joints due to use of taper joints incorporated into the composite pipe and improved corrosion resistance.

Major Operator - Composite Production Riser Field Development Concept Study

2H was responsible for the concept design of a novel production field solution which made use of the properties of composite materials to enable a new approach to riser configuration. 2H identified the design drivers and constraints of the riser system and then designed and optimised the system for the required production field. The scope of work included initial design configuration, static and dynamic analysis and a connector fatigue assessment.

DNV GL JIP on Thermoplastic Composite Pipe Design Guideline

2H is committed to being at the forefront in the use of composite pipe for riser applications and has teamed up with other oil and gas industry leaders to develop the new design guidelines for thermoplastic composite pipes (TCP) to advance the understanding and use of composite materials in the offshore industry.



Freeport-McMoRan - Gas Lift System Concept Study

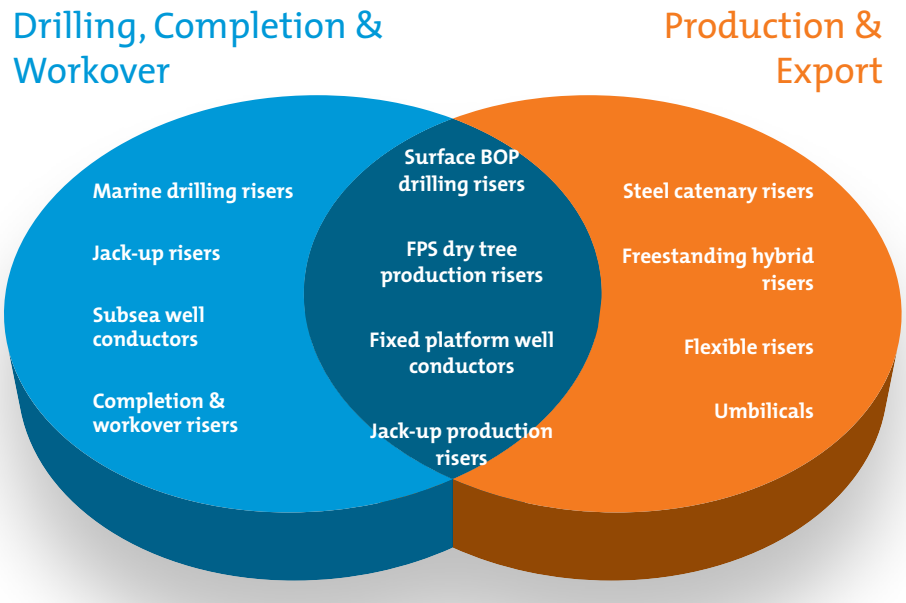
In order to provide Freeport McMoRan with options for enhanced oil recovery from its Marlin TLP in the Gulf of Mexico, 2H was responsible for investigating a number of gas lift concepts. This involved both spool design for a number of configurations and installation engineering for running and retrieving the gas lift tubing. Concepts utilising both composite and coiled tubing pipe were considered.

About 2H Offshore

2H Offshore is a global engineering contractor specialising in the design, structural analysis and integrity management of riser and conductor systems used in the drilling and production of offshore oil and gas. Our capability and experience covers all types of risers, from shallow water fixed platform conductors, to drilling and production risers used in ultra-deep water.

Areas of Expertise

Our business falls into two primary categories, Drilling, Completion & Workover and Production & Export. Engineering of the risers used in each area of activity has many similarities in terms of the skill sets and experience required to conduct the work, but each area has many unique characteristics requiring specific experience and knowledge of the equipment and operations involved. The scope of each area of activity and overlaps that occur are illustrated below.



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