

A MINUTE SAVED, A MINUTE GAINED?

# WHY ANALYSIS IS KEY FOR YOUR NEXT DRILLING PROJECT

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It's mid-January, 150 miles from land, with the temperature around zero degrees Celsius. The waves are 50 feet high, with many large vessels having chosen to shelter closer towards the coast. It's not worth the risk.

Such conditions are not uncommon in the North Sea, and strong winds and currents along with large waves can occur in many areas of the world. At all locations, long-term offshore oil and gas installations must remain intact and in position. Their critical infrastructure must withstand the most extreme conditions Mother Nature can throw at them, or environmental disaster could be around the corner.

The design, maintenance and monitoring of key components such as risers and conductors has developed significantly as the industry has matured. Today, highly developed technology has to be carefully balanced against efficiency and cost, and advanced analysis is playing a huge part in striking the right balance between safety, efficiency, capability and cost.



# RISER AND CONDUCTOR ANALYSIS HAS EVOLVED INTO A SPECIALISM IN ITS OWN RIGHT

## THE ANALYSIS MODEL

Riser and conductor analysis, often used to validate a proposed riser or conductor design before it is installed, has evolved into a specialism in its own right. Making sure these components are fit for standard, in whatever conditions they are operating in, is fundamental to the success of any offshore installation.

A typical platform conductor used on a production well will be supported by guides spaced carefully to ensure the conductor remains stable. The conductor must support the surface wellhead equipment and internal casing weights of the well while withstanding all environmental loads for the planned production life.

A typical high-pressure drilling riser configuration consists of the subsea wellhead connector assembly, tapered stress joint, high-pressure drilling riser, tensioning joint, hydraulic tensioning system and a surface blow-out preventer. Similar to the conductor, the drilling riser must withstand all potential environmental conditions, but will also need to be designed to contain the maximum pressure expected during drilling. As shown by these examples, the design of conductors and risers can vary significantly from one field to the next.

Analysts can now utilise advanced computer software to build model representations of these systems and predict the forces and stresses that they face whilst offshore. The obvious, but huge, benefit being that it can be simulated safely and quickly onshore rather than trying it out in the North Sea, waiting, and dealing with disaster. Almost any conductor and riser system can be modelled in the virtual world, with nobody in harm's way.

## UNDERSTANDING, PLANNING AND PRACTICE

Although it can have a positive influence on project CAPEX as close as two weeks before operations commence, the earlier this analysis is completed the more impactful the optimisation and the bigger the savings can be. By the time key decisions have been made regarding equipment like conductors and risers, its impact can still be important but limited.

Companies like Aquaterra Energy are at the forefront of utilising this new digital technology. In one recent platform and conductor design example in Vietnam, our in-house team of riser analysis experts conducted a series of sensitivity modelling, which looked at maximising drilling uptime on a new platform. The results successfully increased the rig operation window from less than the one-year storm up to a 50-year storm, with only minor modifications to the platform design. A small number of tweaks to the pre-build design prevented huge headaches during drilling and when the installation entered production.

# THE EARLIER ANALYSIS IS COMPLETED, THE BIGGER THE SAVINGS CAN BE



Put simply, this means that operators can choose the right specification of equipment for each situation. For example, making an educated choice between high quality but expensive equipment and a much cheaper alternative that can still perform the required role effectively.

Although this kind of data modelling has been used before, it is advances in the software and processing power that have allowed a huge leap in its capabilities of late. Tens of thousands of numbers can be input, and millions of calculations can be conducted, varying loads, conditions, materials and so on, producing far more accurate and less conservative results than ever before.

This process, once seen as more of a last-minute tick box exercise to satisfy health and safety requirements, is now being harnessed to influence a project early in the FEED stage in order to reduce costs and streamline the design, years before drilling starts.



## MILLIONS IN SAVINGS

Riser analysis in practice has achieved some staggering results in recent times. A recent collaboration with Aquaterra Energy and a Norwegian operator is notable in its results.

The operator was looking to drill a further two wells in the final slots of an existing platform. However, unlike the other wells, these two slots did not have all conductor guide supports installed. The initial plan was to retrofit a further guide to support the two new conductors, a complex operation with many safety concerns.

Using the data modelling, a thicker-walled conductor was found to work without the need for a retrofit guide. The result? Less complex and significantly safer operations and a saving of around US\$4 million on project CAPEX, with future savings likely throughout the life of the well.

## CONFIDENCE IN SAFETY

The full potential of riser analysis is beginning to be understood by the industry. All solutions, of course, must make sense from a feasibility and engineering point of view, and that is what this process, conducted well, will do.

It has the potential to offer significant cost savings that far outweigh the investment of the work itself, sometimes hundreds of times. Validating systems for use in specific locations is now not just best practice, but an obvious element to include at an early design stage. Confidence in safety and efficiencies doesn't always come easy, but analysis makes it achievable for all, even when the next North Sea storm hits.



**FIND OUT HOW WE CAN HELP YOU REDUCE COST BY USING CONDUCTOR AND RISER ANALYSIS PRIOR TO YOUR NEXT DRILLING PROJECT**

**Contact us to learn more**

## ABOUT AQUATERRA ENERGY

Aquaterra Energy is a provider of equipment and solutions to the global oil and gas industry. The company provides services across the seabed-to-surface value chain, and specialises in riser systems and design analysis, tools and products needed during the first days of a well's operation. In addition they provide components for offshore structures, including the Sea Swift platform, which provides a technologically superior and more cost-effective alternative for subsea wells in shallow waters. Many of Aquaterra Energy's most popular tools and products are available on either a rental or purchase basis.

**Find out more: [www.aquaterraenergy.com](http://www.aquaterraenergy.com)**