ANALYSIS, DESIGN & VERIFICATION

- OIL & GAS
- RENEWABLES
- OFFSHORE SERVICES

ENGINEERING ANALYSIS AND EXPERT ASSESSMENT OF SUBSEA CABLES, UMBILICALS AND IWOCS

In the world's harshest environments and deepest waters, quality and reliability are essential. JDR's world-leading analysis, design and verification services bring insight and control to offshore oil, gas, and renewable energy systems.

TRUSTED PARTNERS TO THE GLOBAL OFFSHORE ENERGY INDUSTRY

JDR is committed to serving customers at every stage of their project. From design and engineering to maintenance, termination and load out, we provide expert insight at every step. Our service also includes analysis, design and verification, which provides expert engineering assessment at the FEED, R&D, and design stages of a project. This combination of knowledge, skills and expertise means JDR can offer a cost-effective, practical and executable advantage at each stage of every project, validated by extensive testing techniques.

However complex, and wherever the project is located in the world, our comprehensive range of analysis, design and verification services are designed to:

- Identify and mitigate environmental, regulatory and technical risks
- Reduce unnecessary costs, delays and over-runs
- Develop innovative new solutions with confidence
- Extend the life and reliability of subsea installations
- Achieve expected results

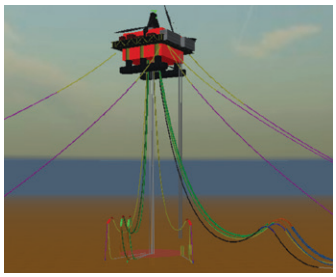
Working with JDR gives our clients worldwide access to dedicated problem solvers with more than 20 years' experience in analysis and subsea electrical cable design for the offshore energy industry.

Our technical experts and sector specialists work closely with clients, assessing and analysing the location and environmental conditions and technical requirements for every project. They ensure the design, manufacture and installation of subsea umbilicals, cables and IWOCs meet the specific demands of each project.

Every market we enter, every customer we serve, and every project we deliver is built on a dedication to technical quality, service, and support.

ANALYSIS

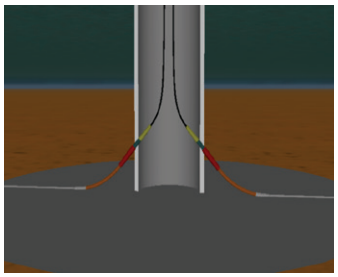
Dynamic System Analysis



Our engineers and analysts can perform dynamic system analysis for any cable or umbilical system, to calculate overall product response to loading from vessel motion, waves and current. This expert analysis enables clients to:

- Optimise system configuration
- Assess the impacts of extreme environmental events based on location
- Evaluate the possibility of interference from nearby installations
- Determine the effects of component fatigue over time
- Specify and verify ancillary hardware requirements
- Calculate pull-in loads for installation
- Design optimal installation for umbilical systems and terminations

Quasi-Static Analysis

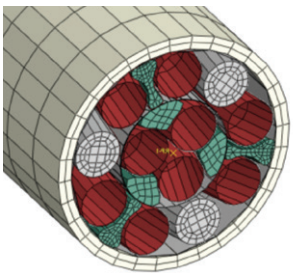


Our team of experts can perform a range of quasi-static analyses in a broad range of scenarios and situations. These analysis services enable our clients to:

- Ensure products remain seabed stable in the predefined location
- Screen for and quantify the impact of Vortex Induced Vibration (VIV)
- Prevent MBR and SWL violations
- Calculate optimal configurations for free-hanging spans, such as J-tube to seabed
- Determine pull-in and installation loads for cables and umbilicals
- Avoid interference with subsea infrastructure

DESIGN

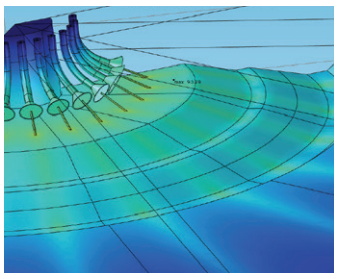
Mechanical design and analysis



In the design of subsea power cables and their installation, JDR engineers can perform a series of analyses and assessments to ensure optimal performance.
In particular, our services:

- Define optimal cross section design incorporating an accurate assessment of losses arising from the armour package
- Determine the maximum current ratings including considerations of dynamic thermal loading in cable protection systems and substations
- Identify and evaluate sources of heat and their impact on individual cable, fibre optic, hose and steel tube components
- Assess impacts of electromagnetic interference on crossing, proximal or networked lines
- Verify optimal burial depths to comply with BSH 2K requirements in German waters
- Calculate the magnetic flux density to comply with renewable energy cable regulations
- Model the effects of variable frequencies on resistance, impedance and other electrical parameters

Electromagnetic and thermal analysis



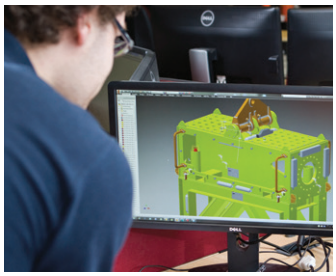
Expert analysts work closely with our experienced subsea cable, umbilical and termination designers, together with our established manufacturing teams.
This ensures that products meet the challenges of each and every project to deliver cost-effective, practical and executable design solutions.
We also work with third parties when required.
Our design analysis enables clients to:

- Optimise electrical conductor, hydraulic hose, steel tube and cross section design to meet system requirements
- Design field layouts and arrangements of components to ensure system stability
- Meet requirements for hardware, repair joints or subsea termination assemblies
- Ensure optimal transmission of power and control to and from offshore infrastructure
- Evaluate the cost benefits and mechanical constraints of alternative designs and configurations
- Quantify the accumulated plastic strain for steel tube products
- Understand component level structural responses to the applied loads

ANALYSIS, DESIGN & VERIFICATION

VERIFICATION

Automation scripting



JDR use the latest automated analytical techniques to ensure and enhance the analysis and design outcomes. Automated scripting and control enables cost effective solutions to be evaluated using multiple software platforms that allows our clients to:

- Optimise the efficiency and coverage in dynamic analysis
- Capture every combination and permutation of extreme loading in sensitivity studies
- Streamline the processes to expedite and improve accuracy and control for all analyses

Our automated scripting is supported by:

- Sophisticated Python-driven feedback loops that enable optimum design solutions based on a set of site-specific inputs
- Fully controlled Vault storage system that enable effective data storage and recovery
- Dedicated analysis servers with significant multi-core parallel processing

Testing and validation

To validate our numerical models and confirm the outputs of analytical work, JDR also performs extensive in-house testing.

Our experts have an unrivalled track record in the specification and execution of electrical, mechanical and process testing for product qualification and technology development.

Utilising our expertise, experience and continuously evolving technical knowledge ensures that we are best positioned to support the development of next-generation cable and umbilical products.

We also have close links to academic leaders and specialist facilities for advanced testing.

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JDR is a leading provider of technology connecting the global offshore energy industry. Our products and services enable vital control and power delivery to offshore oil, gas and renewable energy systems.

The world's major energy companies and subsea service providers depend on high performance subsea control umbilicals and subsea power cables that operate in the world's harshest offshore environments. JDR invests in state-of-the-art manufacturing facilities, technology and people to deliver these world-class subsea products.

We have a proven track record of delivering client expectations and are totally committed to lifecycle customer service. We achieve this through our specialist engineering teams, experienced project management, integrated safety systems and a global service network that ensures 24/7 aftermarket support.

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2014

PROVIDING THE **VITAL** CONNECTION

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