A combination of detailed analysis and design expertise with a true understanding of the behaviour of well conductor and drilling riser systems results in efficient and economical design where the cost of drilling operations is minimised by maximising the vessel uptime.

Precise analytical techniques and software are used to model Mobile Offshore Drilling Units (MODUs) and platform deployed marine drilling risers and conductors. Models are used to determine the strength and fatigue life of all critical components through the application of dynamic environmental loading and corresponding vessel response. Our engineers are highly qualified and experienced in delivering complex design and analysis underpinned by sound engineering judgement.

Drilling, completion and intervention risers
A full design and analysis service for drilling riser and completion workover or intervention systems for global locations is provided. Every well has different design parameters, such as water depth, environmental conditions, rig type and Blowout Preventer (BOP) stack-up size, and analysis determines the response of the riser system at the specific well site.

At concept design stage, we assist in obtaining and interpreting site-specific environmental and geotechnical data, calculating minimum tensions based on preliminary stack-ups and mud weights.

In-service assessments include:
- Top tension optimisation
- Selection of optimum riser configuration
- Calculation of latched drilling and non-drilling limits
- Riser disconnect, recoil, hang off, drift off and drive off analysis
- Vortex Induced Vibration (VIV) and wave induced fatigue life assessment
- Installation of riser, conductor, surface casing and trees
- Drill pipe, landing joints and test string interaction with marine riser
- Weak point analysis.
Assessments allow us to make recommendations for optimum riser operability, to maximise vessel up-time and to develop detailed operating envelopes.

Subsea wellheads and conductors
Xodus Group provides a full suite of analysis to determine the response of any subsea well system. Analysis determines the conductor size and length, conductor connector selection, location of swages, minimum weld quality, wellhead performance and tree connector selection.

Analysis includes:
- Axial load capacity during well construction
- Extreme load and overturning assessments from storm events and vessel excursion
- Current induced VIV fatigue
- Wave induced fatigue
- Snag loading from trawling gear
- Cement shortfall assessment
- Stick-up length sensitivity assessment and effects of scour depth.

Wellhead fatigue is a growing concern with the introduction of increasingly larger BOP stacks on MODUs that result in larger loads on the wellhead and conductor system. We offer fully integrated analysis to predict wellhead response. Crucially, our approach captures the interactions from the drilling rig to the riser, wellhead, conductor and seabed.

Jack-up and jacket conductors
Assessment of the strength and fatigue performance of conductor systems is highly dependent upon their dynamic behaviour – a feature that we assess rigorously as part of the design process. Through integration with dedicated wells and subsurface teams in Xodus Group, our understanding of the interaction of the drilling riser / conductor with the well design results in a holistic solution.

The ability to predict casing loads for different well design conditions, and to understand the interaction between inner strings and the conductor, is essential for the effective design and analysis of conductor systems. Once analysis is complete, our clear and concise reporting provides the operator, drilling contractor and well management company with confidence in the safe completion of the drilling or intervention operations.

Conductor capabilities include:
- Static and dynamic response to wave and current loading
- Lateral and buckling stability calculations
- VIV assessment
- Wave induced and VIV fatigue life analysis.

Analysis aids jack-up selection, selection of axial load support policy, tensioning or centralisation requirements, determination of rig movement limits, slim-hole or conventional drilling, work-over or production for jack-up conductors.

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Codes, regulations and references
- API RP2A-WSD
- API RP16Q
- API Spec 6A
- DNV-RP-C205
- DNV-RP-C203
- DNV CN 30.4
- ISO-13628-7
- Barltrop and Adams, Dynamics of Fixed Marine Structures.