

CONDUCTOR ANALYSIS

String Loads, Tensioning Programmes & Simplified Vortex-Induced Vibration Review Customised and Tailored to Client's Drilling Programme

Conductor tensioning is often a necessary part of drilling operations in order to avoid casing instability during exploration and in-situ operations.

ICON Engineering offers clients an advanced design and analysis capability for conductor tensioning and related equipment. This service has assisted many clients in safely achieving their drilling results.



Typical conductor installation

Background

For fixed platforms and jack-ups, the conductor between the structure and the seabed forms a critical part of any well yet commonly receives less design emphasis than the subsurface components of the well.

In addition to the thermal and pressure loads the casings may experience, the conductor is also subjected to flexural loads from waves and currents and, under certain conditions, vortex induced vibrations (VIV).

The present trend to use smaller diameter conductors for offshore drilling is being driven by economic considerations. Smaller diameter conductors often

require the additional stiffness provided by tensioning in order to limit lateral deflections and vibrations to accepted safe levels. Clearly, a systematic approach to the prediction of tensioned conductor behaviour is necessary in order to ensure safe operational requirements are met.

Conductor Analysis

ICON Engineering has developed an in-house capability for advanced design and analysis of conductor tensioning and related equipment. Among the outcomes are;

- Documentation of all string loads at the various stages of well construction.
- Determination of the required minimum tension needed to avoid compression buckling and maintain acceptable levels of stresses and deflection.
- A recommended tensioning programme which avoids multiple tensioning requirements. Accumulator pre-charge levels are specified.
- Completion of a VIV assessment in order to determine if the conductor is in the critical VIV range as defined by classification society criteria.

The process of calculating the appropriate tension to apply at each stage of the operation requires a step by step approach as each string is landed out, cemented and then retensioned. Key principles to be followed during the analysis include;

- Determining the actual buoyant weight of the string by allowing for the effect of external fluids.
- Allowance for the effect of internal drill string forces on buckling stability.
- Determining the lateral response of a tensioned conductor, accounting for the effect of tension stiffness on the natural frequency.

ICON understands the challenges clients face and we are happy to discuss your specific drilling needs. Please feel free to discuss with our staff any queries you may have regarding conductor analysis.