

Torque & Drag & Buckling Analysis

Ref: SI01

Objectives

- Ensure that the planned operations do not exceed your rig capacity (HL and Torque rating)
- Anticipate potential lockup of drilling, casing and completion strings and redesign accordingly
- Plan hookload (SOW, PUW) and surface torque vs MD for complex drilling runs to follow up on-site
- Analyse impact of tortuosity, friction factors and hole overgauge on T&D (Sensitivity analysis)
- Avoid exposure of BHA to excessive buckling or compression and ensure proper bit weight transfer

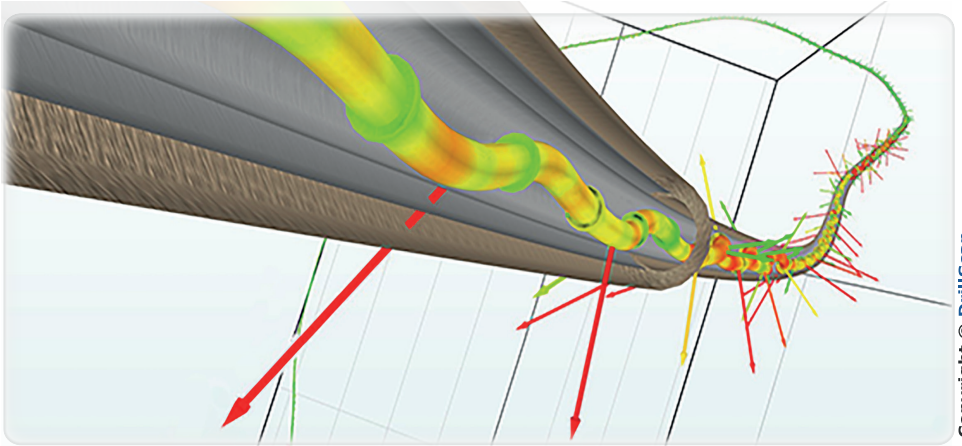
Benefits /

Pre-Well

Real Time

Post-Well

- Ensure that all operations from drilling to RIH the completion are properly planned and feasible
- Increase rig drilling envelop and extend horizontal drain limit
- Prevent lockup or twist-off of drilling, casing, and production strings and reduce NPT
- Reduce hidden lost time by avoiding buckling related issues (Tortuous hole, low sliding ROP, etc.)
- Adapt centralisation and stiffness to prevent casing and completion hang up



Bending stresses and side forces along a buckled drill-string

Includes

- Stiff-string model with unique contact point management including side force and stress calculation
- Friction factors determination (sensitivity analysis on tortuosity, drilling fluid, hole overgauge...)
- Differentiate friction caused by tortuosity (additional contact points) and hole cleaning issues
- Anticipate tortuosity using randomized distributions or detailed survey reconstruction [SM01]
- Post buckling analysis to evaluate weight transfer and lockup (accounting for pipe rotation)

Deliverables and Timing

- Earliest result delivery within 4 days after reception of full and usable set of data
- Delivery of final PowerPoint® or written report within 2 weeks, intermediate reports on demand
- Result support from our most experienced Drilling Champions, upon request
- Result presentation in client's office (optional)
- Real-time support available onsite or remotely (optional)