

Drill String Behaviour and Completion Running Analysis

Course Overview

This master class introduces attendees to best practices associated with directional drilling, drill string mechanics and completion run-in-hole analysis. The aim of the course is to provide

- Information on the design and application of bottom hole assemblies that use rotary steerable and steerable motor systems to achieve the directional objectives set for the well
- Understanding of how drill string design can impact the loads applied at the drill bit, as well as how operational efficiency can be increased by reducing the risk of drill string fatigue life and casing wear
- Analysis techniques to optimize completion and running string design to ensure successful deployment of lower completions

A combination of instruction, exercises, discussion of real case histories, and hands-on access to advanced simulation software is used to engage participants and ensure improved understanding. Participants can choose to attend for 2 or 3 days according to needs.

Target Audience

This course is designed for drilling and completion engineers with 3 - 10 years' practical experience of well design and drilling/completion operations.

The course will be held in English and the participants will be required to bring a lap top computer.

Cost

Option	Cost	Who Will Benefit?
Day 1 & 2	12.000kr	Drilling Engineers with some involvement in completions
Day 2 & 3	12.000kr	Completion Engineers with no involvement in directional drilling
All 3 Days	16.500kr	Well Engineers wanting to learn everything and use the software

Course Objectives

The objective of the class is to reinforce knowledge of drill string behaviour and run-in-hole analysis by using advanced technologies and real case studies. Those attending all 3 days will be able to:

- Describe the main components used in directional drilling bottom-hole assemblies (BHA)
- Understand how to model BHA behavior and rock interaction to predict directional performance
- Determine the impact of drilling parameters on drilling performance, to understand risks and anticipate potential problems
- Perform local dog leg analysis to enable trajectory re-construction and tortuosity assessment to assure successful casing/ liner/completion deployment
- Explain the theoretical background to torque and drag modelling
- Understand causes and consequences for performance of sinusoidal and helical buckling in the drill string
- Predict the degree of casing wear generated by drilling operations
- Identify how casing centralization can be improved to ensure proper cementation without compromising the ability to reach total depth
- Anticipate potential lock-up situations and optimize landing string design
- Understand the mechanical limits while running in hole in complex wells
- Perform advanced simulations using the WellScan software

Timetable of Main Topics

Day 1

	From	To	Topic
Directional Drilling	08:00	10:00	Description of Directional Drilling BHAs: Drill bits, Rotary / RSS / Steerable motor BHAs
	10:15	12:00	Introduction to BHA Modelling: Bit & BHA Modelling, Bit/Rock/BHA/Well interaction
	12:00	13:00	<i>Lunch</i>
	13:00	15:00	Directional Sensitivity Analysis: RSS & Motor BHA case studies and User exercises
	15:15	17:00	Local Dogleg Analysis: Trajectory reconstruction, Tortuosity assessment. Case studies

Day 2

	From	To	Topic
Drillstring Mechanics	08:00	10:00	Theoretical Background: Torque & Drag models, Pipe/Fluid/Borehole interactions
	10:15	12:00	Torque & Drag & Buckling: Buckling, Weight transfer, Reaching ERD limits
	12:00	13:00	<i>Lunch</i>
	13:00	15:00	Casing Standoff: Bow-spring centralisers, Centralization program optimization
	15:15	17:00	Casing Wear: Wear models, Mitigation measures, Wear measurement challenges

Day 3

	From	To	Topic
Run-in-Hole Analysis	08:00	10:00	Case studies: RIH in 3D ERD wells, Lock-up incidents
	10:15	12:00	User-exercises: T&D graphs, Friction factors calibration, Use of mud logging data
	12:00	13:00	<i>Lunch</i>
	13:00	15:00	Case studies: ESP placement, Complex SAS completion, Packer setting procedure
	15:15	17:00	User-exercises: RIH with a swivel, Floated liner, Impact of mud circulation...