Drilling Fluids and Well Cementing: Mud Testing, Slurry Design and Cement Placement

13 – 17 June 2027
Jeddah - Corniche four-star



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Ref: 472_14433 **Date:** 13 – 17 June 2027 **Location:** Jeddah - Corniche four-star **Fees:** 19500 SAR

Introduction:

Drilling fluids and well cementing decide whether a hole section stays open and whether the casing behind it isolates each zone. Poorly tested mud leads to swelling shale, thick filter cake, losses and stuck pipe; a slurry mixed without lab data, centralisation or spacer design leaves channels, gas migration and costly squeeze work. This Core Concept course trains mud and cementing practitioners to formulate, test and troubleshoot both fluids against API recommended practices. Participants produce a Mud Programme and Casing Cement Job Design for a realistic well.

Course Objectives:

- Formulate water-based, oil-based and synthetic-based mud systems with additives matched to formation, temperature and hole-section targets
- Run and interpret API field and laboratory tests on drilling fluid rheology, filtration, solids and oil-water ratio and act on the results
- Specify solids control, shale inhibition and lost circulation treatments that keep mud properties within programme limits
- Design cement slurries by class and additive package and verify them with thickening time, compressive strength and fluid-loss tests
- Plan a primary cement job with centraliser placement, spacer hierarchy and displacement hydraulics that achieve zonal isolation
- Select remedial squeeze or plug methods and read CBL and VDL results to judge cement placement quality

Target Audience:

- Mud engineering functions that formulate, test and maintain drilling fluid properties at the rigsite and in the laboratory
- Cementing engineering functions that design slurries, run laboratory tests and write pumping schedules
- Drilling engineering functions that write fluid and cement sections of the well programme
- Rig-based supervision functions that check daily mud reports and oversee cement jobs
- Service company technical functions that support operators with fluid and cement products

Course Outline:

Day 1: Drilling Fluid Functions, Mud Systems and Additive Chemistry

- Drilling Fluid Functions: Hydrostatic Control, Cuttings Transport, Suspension and Bit Cooling
- Water-Based Mud Systems: Bentonite, Polymer and Inhibitive Formulations
- Oil-Based and Synthetic-Based Mud: Oil-Water Ratio, Emulsifiers and Electrical Stability
- Mud Additive Selection: Weighting Agents, Viscosifiers, Fluid-Loss Reducers and Shale Inhibitors
- Barite Material Balance for Mud Weight-Up and Dilution Calculations

Day 2: Rheology Models, API Mud Testing and Well Cement Classes

- Bingham Plastic, Power Law and Herschel-Bulkley Rheology Models with Gel Strength Profiles
- API RP 13B-1 and 13B-2 Field Tests: Mud Balance, Marsh Funnel and Six-Speed Viscometer
- API RP 13I Laboratory Tests: HPHT Filtration, Retort Analysis and Methylene Blue Capacity
- API Specification 10A Well Cement Classes with Class G and Class H Selection
- Cement Additive Families: Retarders, Accelerators, Fluid-Loss Agents and Extenders

Day 3: Wellbore Stability, Solids Control and Slurry Design

- Filter Cake Quality and Shale Hydration Control for Wellbore Stability
- Solids Control and Drilling Waste Handling: Shakers, Hydrocyclones, Centrifuges and Cuttings Disposal at Overview
- Cement Slurry Design Worksheet: Density, Yield and Mix-Water Requirement
- API RP 10B-2 Laboratory Testing: Thickening Time, Compressive Strength, Free Fluid and Fluid Loss
- Primary Cementing Job Layout: Float Equipment, Wiper Plugs and Potential Flow Zone Isolation per API RP 65-2

Day 4: Lost Circulation, Mud Removal, Placement Hydraulics and Remedial Cementing

- Lost Circulation Classification and Loss Control Material Pill Design
- Centraliser Placement and Standoff Calculation per API RP 10D-2
- Mud Removal Sequence: Spacer and Wash Rheology Hierarchy and Contact Time
- Cement Placement Hydraulics: Displacement Rate, Equivalent Circulating Density and U-Tubing Checks
- Squeeze Cementing, Balanced Cement Plugs and CBL and VDL Interpretation at Overview

Day 5: Capstone: Mud Programme and Casing Cement Job Design

- Case Exercise: Hole-Section Mud Programme with Property Targets and Test Frequency
- Case Exercise: Mud Contamination Troubleshooting from Daily Mud Check Reports
- Case Exercise: Casing Cement Job with Slurry, Spacer and Pumping Schedule
- Case Exercise: Post-Job Review of Pressure Chart and Bond Log Against Job Objectives
- Mud Programme and Casing Cement Job Design Presentation and Peer Review

Skills You Will Gain:

- Mud System Formulation
- Drilling Fluid Rheology Testing
- Solids Control Management
- Lost Circulation Treatment
- Cement Slurry Design
- Cement Laboratory Testing
- Mud Removal and Centralisation Planning
- Cement Bond Log Reading

Why Attend This Course:

- Return with a Mud Programme and Casing Cement Job Design built on a realistic well during the course
- Read a daily mud check or a lab cement report and know which property to correct and with which additive
- Reduce channelling, gas migration and squeeze repairs by linking spacer, centraliser and displacement choices
- Compare fluid and cement practice with engineers from operators, drilling contractors and service companies

Conclusion:

Mud and cement are both engineered fluids, and each only performs when its formulation, testing and placement are planned together. The course moves from mud functions, systems and additive chemistry through rheology models and API field and laboratory testing, to well cement classes, additives and slurry design, then to lost circulation, mud removal, centralisation, placement hydraulics, squeeze work and bond logs. The final day turns this into a Mud Programme and Casing Cement Job Design ready for technical review.