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COURSE BROCHURE

# Advanced Casing Design and Drilling Best Practices Training Course

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Registered in the United Kingdom and Saudi Arabia

# Advanced Casing Design and Drilling Best Practices Training Course

Casing Design and Drilling Best Practices is a 2-week training course for drilling engineers, well designers and drilling supervisors who build a casing and drilling practice plan for a live well. Casing strings, cement sheaths and drilling choices now decide how long a well stays productive and safe, as wells reach deeper, hotter and more depleted zones. Jupiter Prime Training delivers this course on casing design and drilling best practices.

## Why Casing Design and Drilling Best Practices Matters Now

Three forces shape well construction today: deeper and higher-pressure targets, depleted reservoirs with narrow mud-weight windows, and longer well life expectations from asset owners and partners. A casing string chosen well carries every load from running to abandonment; one chosen badly invites collapse, leaks, sustained casing pressure and costly sidetracks. The course rests on Working Stress Design WSD, which compares each load with a derated tubular rating through design factors, and on Load and Resistance Factor Design LRFD, which treats loads and strengths as distributions. Both are applied to oil wells, gas wells and geothermal wells.

## Who Gains Most from Casing Design and Drilling Best Practices

- Engineers who select casing setting depths, grades and weights for new wells
- Specialists who model burst, collapse, tension and triaxial loads on tubulars
- Supervisors who run casing, place cement and direct rig-site drilling decisions
- Engineers who plan hole cleaning, mud weights and stuck-pipe prevention
- Integrity staff who track barriers and annular pressure across the well life

The greatest gain comes when a well delivery group sends its office designers and rig-site supervisors together, so the casing assumptions and the drilling practices behind them are agreed in one room.

## Casing Design and Drilling Best Practices Capabilities

Participants move from pore pressure and fracture gradient curves to a casing scheme they can defend, then to the drilling practices that let that scheme be run to depth.

- Specify casing setting depths from pore pressure, fracture gradient and kick tolerance — well architecture approval
- Calculate burst, collapse and axial loads for each string and load case — tubular selection
- Weigh premium and API-style connections against sealing and fatigue demands — procurement and running crews
- Design cement slurry placement, centraliser spacing and zonal isolation checks — barrier verification
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Apply hole cleaning, torque and drag, and stuck-pipe indicators to drilling parameters — rig-site supervisors
- Build a well integrity barrier schematic covering production and abandonment — asset owners

## Key Casing Design and Drilling Best Practices Terms

- Burst load — internal pressure exceeding external pressure on a casing string, checked against its internal yield rating with a design factor.
- Collapse load — external pressure exceeding internal pressure, which can flatten a casing string, especially when the string is evacuated or under tension.
- Kick tolerance — the largest influx volume a well can circulate out without fracturing the weakest exposed formation below the casing shoe.
- Triaxial stress — the combined von Mises equivalent stress from axial, radial and hoop loads, compared with the casing yield strength.
- Equivalent circulating density — the effective mud density at a depth while circulating, including annular friction pressure.
- Differential sticking — pipe held against a permeable wall by the overbalance between mud pressure and formation pressure.

## Casing Design and Drilling Best Practices Day by Day

## Day 1: Pressure Regimes and Well Architecture

- Pore Pressure Prediction Methods — Setting Depth Assumptions
- Fracture Gradient and Leak-Off Test Interpretation — Shoe Strength
- Mud Weight Window Construction — Number of Casing Strings
- Kick Tolerance Calculation — Maximum Open-Hole Section Length
- Casing Scheme Sketch for Depleted Reservoirs — Contingency Liner Choice

## Day 2: Tubular Properties and Ratings

- Steel Grades and Sour Service Limits — Material Selection
- Pipe Body Yield and Internal Yield Ratings — Burst Margins
- Collapse Regimes From Yield to Elastic — Wall Thickness Choice
- Temperature Derating of Yield Strength — Deep and Geothermal Wells
- Wear Allowance From Rotating Drill Pipe — Remaining Wall Estimate

## Day 3: Burst and Collapse Load Cases

- Gas-To-Surface Burst Case — Surface and Intermediate Strings
- Tubing Leak Burst Case — Production Casing Sizing
- Full and Partial Evacuation Collapse — Lost Circulation Scenarios
- Cementing Collapse Case — Differential During Displacement
- Design Factor Selection Under WSD — Corporate Standard Alignment

## Day 4: Axial, Biaxial and Triaxial Checks

- Hanging Weight and Buoyancy — Tension Design Factor
- Overpull and Shock Loads During Running — Slip Crushing Risk
- Biaxial Collapse Reduction Under Tension — String Combinations
- Von Mises Ellipse Plotting — Triaxial Safety Margins
- Thermal Loads and Annular Pressure Build-Up — Trapped Annulus Mitigation

## Day 5: Connections and Running Practice

- Thread Types and Metal-To-Metal Seals — Gas-Tight Requirements
- Connection Efficiency and Compression Ratings — Bending in Build Sections
- Make-Up Torque Charts and Shoulder Monitoring — Running Acceptance
- Casing Running Speed and Surge Pressure — Losses Prevention
- Casing While Drilling and Reaming Shoes — Troublesome Interval Options

## Day 6: Cementing and Zonal Isolation

- Slurry Design and Thickening Time — Placement Window
- Centraliser Placement and Standoff Modelling — Mud Removal Efficiency
- Spacer Hierarchy and Displacement Rates — Channel Prevention
- Cement Bond and Ultrasonic Logs — Barrier Acceptance Criteria
- Remedial Squeeze Planning — Microannulus and Gas Migration

## Day 7: Hole Cleaning and Drilling Hydraulics

- Cuttings Transport in High-Angle Sections — Flow Rate and Rotation
- Rheology Control and Low-Shear Properties — Cuttings Bed Removal
- Equivalent Circulating Density Management — Narrow Window Drilling
- Torque and Drag Modelling — Friction Factor Calibration
- Bit and Bottomhole Assembly Selection — Vibration and Rate of Penetration

## Day 8: Stuck Pipe and Wellbore Stability

- Differential Sticking Indicators — Overbalance Reduction
- Pack-Off and Bridging Mechanisms — Tripping Practices
- Shale Instability and Inhibitive Fluids — Mud Chemistry Selection
- Jarring and Spotting Fluid Decisions — Free-Point Response
- Drilling Parameter Roadmap Reviews — Early Warning Thresholds

## Day 9: Well Integrity Across the Well Life

- Two-Barrier Philosophy and Barrier Envelopes — Well Handover
- Sustained Casing Pressure Diagnosis — Annulus Bleed Decisions
- Corrosion and Wear Logging of Casing — Workover Triggers
- Plug and Abandonment Barrier Placement — Casing Removal Choices
- Lessons From Failure Investigations — Design Standard Updates

## Day 10: Practising the Casing and Drilling Practice Plan

- Setting Depth Selection for a Case Well — Architecture Defence
- Load Case Calculation for Each String — Tubular Specification
- Cement Placement and Centralisation Plan — Isolation Verification
- Hole Cleaning and Stuck-Pipe Roadmap — Rig Instruction Sheet
- Casing and Drilling Practice Plan Assembly — Peer Challenge Panel

## Applying Casing Design and Drilling Best Practices After the Course

- Re-run the burst, collapse and triaxial checks for an upcoming well using the Day 3 and Day 4 load cases and share the margins with the well delivery group
- Introduce a drilling parameter roadmap with torque, drag and equivalent circulating density thresholds for the next high-angle section

## Casing Design and Drilling Best Practices Questions FAQ

### What is casing design and drilling best practices, and why does it matter now?

Casing design and drilling best practices is the discipline of sizing tubulars for every load and drilling the hole so they can be run and cemented. Deeper, depleted and hotter wells leave smaller margins, so each design choice now carries more weight.

### Which roles gain most from casing design and drilling best practices training?

Drilling engineers, well designers and drilling supervisors gain most. Designers sharpen load case work, while supervisors connect running, cementing and hole cleaning practice to the assumptions behind the casing scheme.

### How does casing design and drilling best practices differ from a well control course?

It focuses on tubular selection, cement isolation and drilling practice rather than kick detection and shut-in procedures. Kick tolerance appears only as an input to setting depths, while well control drills belong to a separate course.

### What do you bring back from casing design and drilling best practices training?

You bring back a casing and drilling practice plan for a case well: setting depths, load case results, connection and cement choices, and a hole cleaning and stuck-pipe roadmap ready for peer review.

## Casing Design and Drilling Best Practices: The Way Forward

The casing and drilling practice plan first informs the well architecture decision at the design review, where drilling engineers and asset owners agree setting depths and contingency strings. Rig supervisors then use its roadmap during execution. After the first well is cased and cemented, the load case assumptions deserve a second look against measured pressures, temperatures and running records.