

Advanced Casing Design Principles & Theory



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1st floor, Incubator Building, Masdar
City, Abu Dhabi, UAE



00971-2-6452630



00971-50-6652671



info@btsconsultant.com



www.btsconsultant.com

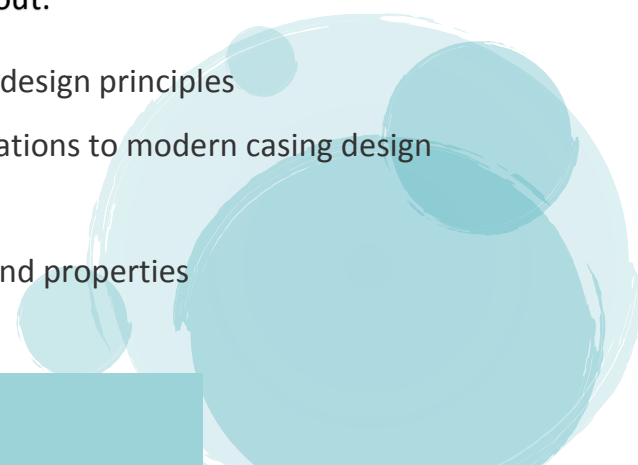
Introduction:

The course emphasizes the practical application of casing design principles and theory from a basic level through to advance. It examines the nomenclature of casing design, the manufacturing processes, materials and properties, the theory of burst, collapse and axial loadings, design policies and procedures, API specifications with review of the theory behind these and their limitations, connections and special cases such as HP/HT and sour service.

The course examines the non-API principles of tri-axial design and how this improves upon the limitations of API. Kick tolerance and its impact on casing seat selection is considered in detail along with the processes of documentation and audit. Substantial emphasis is placed on worked examples beginning with basic practical problems and culminating in a full casing design for a typical well. This is approached from first principles and demands extensive use of mathematics.

Objectives:

By the end of this course, delegates will be able to know about:

- The objectives of casing design and the fundamental design principles
 - The key API specifications, their origin and their limitations to modern casing design
 - Definitions of Performance properties
 - Casing manufacturing processes, material selection and properties
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- Special requirements including HPHT and sour service
 - Stress / strain theory and the application to thick-walled cylinders
 - Casing seat selection and the importance of kick tolerance
 - Pressure testing
 - Documentation and audit of the casing design process
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- Casing connections
 - Mechanical design and design safety factors - burst, collapse and axial loading and integrated triaxial stress analysis
 - Commercial principles of casing procurement and their impact on casing design
 - Casing design examples and practice


Who should attend?

Drilling Engineers, Senior Drilling Engineers, Drilling Supervisors, Drilling Superintendents, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Reservoir Engineers, Geologists, Production and Completion Engineers, Foremen, Work over Engineers, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Industry Personnel, Lifting Personnel, Maintenance Engineers, Technologists, Mud Engineers, Well Site Supervisors, Drilling Contractors, Drilling Supervisors, Completion Engineers, Completion Supervisors, Drilling Managers, Drilling Technical Support Personnel, Trainee Drillers, Rig

Engineers, Industry Personnel, Completion engineers, Production staff, Petroleum engineers, Other technical staff that need an understanding and an appreciation of HSE aspects of well drilling, completion, work-over and well intervention, Roustabouts, Roughnecks, Derrickmen,

Assistant Drillers and leading drilling personnel offshore, Employees and managers in drilling service Companies, Management of drilling rigs and drilling installations, Engineering personnel for design and modification of drilling facilities, Drilling and completion engineers and service company personnel with a basic knowledge of well design principles through to experienced drilling engineers who desire a more theoretical, detailed knowledge of the subject

Course Outline:

- Introduction to casing design
 - Casing nomenclature, materials and properties, carbon and non-carbon steels
 - API Specifications - their origin and limitations
 - Non-API casing grades and specifications
 - Engineering definitions - stress, strain, elasticity, yield etc.
 - Metallurgy and the manufacturing process
 - Inspection and NDT
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- Objectives of casing design - casing and well types
 - Casing design concepts - stress analysis
 - Tri-axial design principles
 - Additional design factors - temperature, sour service, fatigue, buckling
 - Casing connections - premium versus API
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- The design process - offset well data, hole size considerations, testing and completion factors, company policies
 - Casing design - external, internal and axial loading
 - Special load design considerations
 - Casing seat selection - principal criteria and design factors
 - Kick tolerance
 - Leak-off tests
 - Pressure testing
 - Computer modelling and the application to advanced casing design
 - Casing procurement and the impact on the casing design process

- Tenders and contracts
- Specifications
- Inspection
- Casing transportation, storage and running procedures
- Casing design project - designing a complete well casing program