CASING DESIGN FUNDAMENTALS

COURSE LEVEL: ADVANCED TRAINING SERIES

COURSE CODE: CD-WS-ATS

COURSE DURATION: 5 days. Each day will be broken into three full sessions of around 2 hours each. 45 mins of lunch break and two tea breaks of 15 mins each will be included in the schedule.

INTRODUCTION: Casing design is a core Drilling Engineering skill set. However, with the development of software design tools, over dependence on software has taken over. This has led to lack of complete understanding of background calculations. This often leads to missing of design optimization opportunities. The 5-day course is intended to give the participants a complete understanding of the subject matter & cover principles and practices of both preliminary & detailed casing design processes. Manual calculations of several casing design exercises will be done by the participants to generate standard software type output graphs. Special design cases and software approach to design will also be discussed

MODE OF TRAINING: The course will be delivered in a class room environment. The instructor will teach via presentation slides. Lectures will be laced with class room discussions and exercises to enhance assimilation if concepts discussed. Detailed discussion of the solutions to the exercises will be done to ensure learning for all participants. Sessions will be designed to accommodate ample time for Q&A and clearing of doubts. A quick quiz will be conducted each day to ensure attentiveness and focused participation. The participants will be provided a copy of WELL SCHOOL's Casing Design Manual, capturing the subject in depth, for the course as well as future reference.

Candidates are required to carry a laptop with access to a spreadsheet software to generate load tables and graphs for practice exercises. They can opt to do it manually on a A3 graph paper (will be provided) if they so desire. They should also carry a calculator.

ABOUT THE COURSE: Participants will learn about background topics like casing metallurgy, casing manufacturing process & mechanical properties of casing. They will also learn about external factors that affect the design like corrosion & casing wear. Preliminary design (casing seat selection, hole sizes etc.) & detailed casing design (pipe grade selection, connection qualification process & selection) will be discussed in depth. Both preliminary & detailed design exercises will be solved by the class followed by detailed discussion of design approach & solutions. Detailed design will cover uniaxial, bi-axial & tri-axial design, their interplay and when to adopt which design approach. It will also include discussion special design cases in hostile environments (example HPHT wells, steam wells, horizontal wells etc.) It will also include a session on software approach to casing design.

COURSE STRUCTURE:

Day 1

- Introduction
- Casing Function
- OCTG & Connections

- Manufacturing Process
- Metallurgy
- Quiz, Q&A session

Day 2-

- Corrosion
- Casing Wear
- Mechanical Properties of Steel
- Pipe Strength & Failure Mechanisms
- Quiz, Q&A session

Day3

- Preliminary Casing Design theory
- Prelim design exercise-1
- Solutions discussion
- Prelim design exercise-2
- Solutions discussion
- Detailed Casing Design theory
- Q&A session

Day4

- Detailed Casing Design theory contd.
- Connection Selection
- Design Factors
- Detailed design exercise-1
- Solutions discussion
- Detailed design exercise-2 (homework)

Day5

- Solutions discussion
- Special Design cases
- Software approach to design
- Quiz & Q&A session
- Feedbacks

TARGET AUDIENCE: The course is meant for individuals who will be:

- supporting the casing design process by collating data (e.g., Drilling Engineers)
- designing the Casing (e.g., Lead/Senior Drilling Engineers)
- reviewing the design output (e.g., Principal Drilling Engineers)
- Approving the design (e.g., Drilling Managers/Project Managers)

- Drilling services professionals supporting the design process (directional drillers, MWD engineers, rig contractor drilling engineers etc.)

PRE-REQUISITES: Participants will need to have an understanding of wellbore geometry, well construction, and basic mechanical concepts. Since the course will involve numerous calculations so the participants will need good math skills.

Minimum 1 year work experience in the drilling industry is a pre-requisite to attend this course.