



DE177

Basic Drilling Technology and Equipment

Course Introduction:

This five-day course on Basic Drilling Technology and Equipment forms a key component of continuous professional development for any employee who requires a thorough understanding of the drilling process and drilling equipment. The aim of the course is to develop awareness of the technology behind the drilling process and the drilling function within the operating company structure and across the supply chain, in order that non-drilling personnel can engage in effective, value adding conversation with their drilling colleagues.

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- ✓ Describe the differences between land, platform and mobile offshore drilling units
- ✓ Explain how oil and gas is formed and describe the key features of an economic hydrocarbon reservoir (rock characteristics, source, trap and seal)
- ✓ List and explain the function of the major components of the rotary drilling rig
- ✓ Describe the basic principles of coring, electric logging and LWD
- ✓ Describe how wellbore pressures are controlled using the drilling fluid and the BOP
- ✓ Describe the methods of drilling a deviated and horizontal well
- ✓ Describe the purpose of casing and cement and explain why casing is important in maintaining well integrity
- ✓ List the main causes of non-productive time during the drilling process
- ✓ List the main components of a well completion (safety valves, artificial lift, sand control, zone isolation)

International Centre For Training & Development

Who Should Attend?

This course is intended for all petroleum and production engineers, completion engineers, geologists, geophysicist; managers, technical supervisors, service and support personnel, entry level drilling engineers, drilling office support staff, and entry level drilling operations personnel.

Course Outline:

Day 1:

CONTEXT OF DRILLING

- As an introduction the current key issues of hydrocarbon supply and demand and the effects that this is having on the drilling industry are explored. Increasing demand and the

difficulties in accessing conventional reserves such as deepwater, HPHT and Arctic drilling are discussed.

ESSENTIALS OF GEOLOGY

- The basic principles of the rock cycle and the origin of hydrocarbons are explained leading to a description of the four key elements making up an economic hydrocarbon reservoir (reservoir rock, source, seal and trap). The concept of exploration and appraisal drilling as a means of delineating a field for economic evaluation is explained. The various means of gathering geological and geophysical information from the well is described.

Day 2:

TYPES AND FUNCTION OF THE ROTARY DRILLING RIG

- The different types of rig (land, platform, jack up, semi-submersible and drillship) are described and a comparison made of their different operating envelopes. From this an explanation is provided of the major functions and components of the rotary drilling rig are given. The evolution of the rotary drilling rig towards the automated rig is described. The function of the drillstring components from drillpipe to drill bit are described and explained.

WELLBORE PRESSURES AND PRESSURE CONTROL

- The origins of wellbore pressure are explained and the use of drilling fluids as the primary means of controlling wellbore pressure and the use of the BOP as a secondary means of control are described and explained.

Day 3:

CASING AND CEMENTING

- The functions of casing and cementing are discussed and the basic principles of casing depth selection explained. The notion of the "telescoping" casing/hole design is discussed and mention made of the use of expandable solid casing.

DIRECTIONAL AND HORIZONTAL DRILLING

- A brief history of the methods of directional drilling leads to a discussion on the differences between geometric wellbore placement and geological wellbore placement (geosteering) and the benefits that this has had on well and field productivity. An indication of the future of directional drilling through autonomous downhole tools and remote operating centres is discussed.

Day 4:

WELL COMPLETIONS

- Once the well is drilled it is made ready for production by installing a completion. The basic components of a completion are described and their function explained. The basic principles of fracking are explained in the context of shale gas production and conventional stimulation. To complete this section a brief description of the operation of the snubbing unit and coiled tubing is provided.

Day 5:

ADVANCED METHODS

- To close out the course we look at a number of more advanced techniques such as managed pressure drilling and dual gradient drilling to demonstrate the changes in operational capability of the drilling rig.

Course Certificate:

International Center for Training & Development (ICTD) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per the course location. This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session

