



RIG EQUIPMENT INSPECTION - LAND RIG

Accredited by IADC

Virtual Instructor - Led Training (VILT)

Course Overview:

The objective is to build and enhance the candidates' knowledge of rig equipment and maintenance through compliance with industry standards, regulatory requirements and safe working practices. Candidates will learn to apply the relevant standards and requirements to verify rig equipment condition, improve safety and potentially reduce accidents.

To ensure optimum rig performance, reduce downtime and maintain personnel safety, a robust planned maintenance and accurate inspections are essential.

The drilling Rig Equipment Inspection (REI) course focuses on the most common equipment deficiencies and explains the working principles of major drilling equipment using detailed examples from our technical inspection database. The REI course consists of interactive virtual classroom training and allows group participation and discussion.

Course inclusions:

- Text book containing the course material.
- Checklist for major equipment to assist with inspection techniques.
- Examples of good and bad practices including photos.
- Presentation of improvements and new designs of drilling equipment.

Virtual Instructor-Led Training

OCS Rig Equipment Inspection course which is accredited by IADC, is now offered as a Virtual Instructor-Led Training programme. It maintains and incorporates the qualities of Instructor-Led Classroom training, with the convenience of a Virtual Classroom.

Course Objective:

- Independently carry out a basic (visual) rig inspection
- Describe the main inspection criteria for major equipment
- Identify major items that have an impact on the safety and operation of a rig
- Recognize the indicators of the overall condition of a drilling rig
- List the relevant standards (such as API) and their implications for drilling equipment
- Understand the basics of EX equipment installed in hazardous areas
- Evaluate basic maintenance and inspection procedures on the rig to identify compliance with good working practices and industry standards





Course Agenda :

DAY 1 - Drilling Equipment

Chapter 01 - Drilling Equipment

• Mast / Derrick

A derrick is a lifting device composed of a tower or a guyed mast, such as a pole, which is hinged freely at the bottom and which is sometimes controlled by four lines to keep the derrick straight. The derrick allows the rig to pull/lower three drill pipes (called a stand) at the same time.

• Crown and Travelling Block

A crown block is a device situated at the top of an oil rig or derrick. It sits on the crown platform, which is a steel platform located along the upper portion of the rig. The crown block works in conjunction with a similar component, the traveling block, which is positioned just below the crown platform. Together, these two systems are known as the block and tackle.

• Drawworks

Drawworks are powerful electrically-driven winches that lower and lift the drill string and casing. They also raise the derrick on land rigs using special raising lines. Some drawworks on older land rigs also drive the rotary table using a heavy duty chain drive.

• Drawworks Auxiliary Brakes

Extra auxiliary braking system for better control of the drawworks. There are four types: Eddy current (elmagco), Friction disc, Universal disc and Hydromatic brakes.

The eddy current and friction disc brakes are coupled to the drawworks main shaft.

• Top Drive

A top drive is a mechanical device on a drilling rig that provides clockwise torque to the drill string to facilitate the process of drilling a borehole. It is an alternative to rotary table. It is located at the swivel place and allows a vertical movement up and down the derrick.

• Independent Swivel

An independent swivel is a rotary tool that is installed in the hook at the bottom of the travelling block and allows the drill pipe to rotate while supporting the weight of the drill string. It also allows the passage of mud through the drill pipe at the same time.

• Rotary Table

A rotating table rotates and supports the drill string when connections are to be made for the drill string or the casing. It is AC or DC electrically-driven or driven from the drawworks. Some rotary tables cannot be used to rotate the string; instead the top drive is used. Some rotary tables are hydraulically-driven to rotate with a low torque and low speed only.

DAY 2 - Drilling Equipment

Chapter 02 - Mud Processing Equipment

• Mud Pump

Mud pumps are large reciprocating piston/plunger devices that are specially designed to circulate drilling fluid (mud) under high pressure down the drill string and back up the annulus.

• Mud System

The mud system is a system of shakers, mud centrifuges, mud cleaners, mud desanders and mud esilters designed to circulate drilling fluid to the drill bit and back to the surface. A mud system has two sections. The high pressure section delivers mud from the pumps to the drill bit.

The low pressure section sends mud back to the surface for treatment and supplies mud from the mud pits back to the main pumps using a large number of centrifugal pumps. A vacuum degasser removes small particles of gas from the mud.

Chapter 03 - Diesel Engine, Air Systems, Refrigeration & Air Conditioning

• Diesel Engine

The diesel engine is a high compression internal combustion engine that drives the main AC or DC generators, which provide power for the rig.

• Air Systems, Refrigeration and Air Conditioning

Rig air compressors on the rig are used to supply compressed air to several auxiliary equipment and functions. Usually the systems build on drilling rigs are 120 psi systems fitted with several air receivers for the storage of compressed air. The air from the compressors is used for the operation of the rig floor winches, start air for the engines, operation of the air operated BOP hoist, supply air for the bulk transfer system, etc.

Chapter 04 - Electrical Safety

• Electrical Safety

Electrical equipment on drilling rigs have to comply with safety standards to protect the rigs from ignition of free flowing gas from the wells. The level of safety depends on the zone or area in which the electrical equipment operates.



Course Agenda :

DAY 3 - Safety Equipment

Chapter 05 - Safety Equipment

• Safety Equipment

When talking about safety equipment one should split it up into four (4) main categories.

- Firefighting Appliances.
- Fire and Gas Detection Systems.
- Drilling Safety.
- Hazardous Materials.

• Firefighting Appliances

Firefighting appliances consist of both fixed systems and portable equipment. In addition to fire hoses and portable fire extinguishers fire resistant protective clothing, respirators and fire doors are also included.

• Fire and Gas Detection Systems

Fire detectors sense one or more of the products resulting from fire, such as smoke, heat, infrared and / or ultraviolet light radiation, or gas. Fire detection systems include automatic fire detection, fire alarms and fire suppression activation.

• Drilling Safety

This section covers all the equipment needed to ensure that the operations involved in the process of drilling are safe. This includes anti-skid matting around the rotary table, safety lockers in areas with specific material handling, safety signs and the installation of proper guards and barriers needed in the specific areas.

To ensure the operations on the rig are conducted safe and do not interfere with other operations on the rig, the industry has incorporated the safety management system (permit to work) and other procedures to ensure all the work is done in a safely manner (PTW, isolation, risk assessment, Toolbox meetings, etc.)

• Pollution Control

The pollution control checklist includes equipment present at the rig site that prevents pollution to the environment. Maintaining pollution control depends on location and local legislation and the use of oil-based mud requires many extra pollution control measures.

• Hazardous Materials

The handling of hazardous materials is an almost daily routine on drilling rigs and therefore requires extra attention. Special PPE should be provided for handling hazardous materials and hazardous signs and MSDS sheets need to be made available for all chemicals and substances used in those areas.

DAY 3 - Well Control Equipment

Chapter 06 - Well Control Equipment

• Ram Type Preventer

A ram-type preventer is part of the well control equipment integrated into the BOP. It seals the annulus of the well, seals around the drill pipe or performs a Complete Shut Off (CSO) if no drill pipe is inside the hole. Rams can hang off the drill string and shear the drill pipe.

• Annular Preventer

An annular preventer seals the annulus of the well, seals around any pipe-casing or performs a CSO if no drill pipe is inside the hole. It is part of the well control equipment integrated into the BOP. The hydraulic closing pressure drives a piston upwards, which forces the sealing element upwards and inwards to form a seal around the pipe in the hole.

• Choke Manifold

The choke and kill manifold is a collection of pipes and valves that restricts or stops pressure/flow and form part of the BOP system.

Some land rigs have a simple choke manifold. Modern rigs and MODUs use a selection of gate valves integrated into a choke and kill manifold. Both types are accompanied by a mud/gas separator and vent lines. Upstream of the chokes, the manifold is connected to the BOPs. Downstream of the chokes, vent lines are routed to the mud/gas separator and the flare pit on land rigs or routed overboard on MODUs.

• BOP HPU

The BOP HPU (Hydraulic Power Unit) consists of three hydraulic circuits made by a set of accumulator bottles and hydraulic pumps. These are the accumulator circuit, the manifold circuit and the annular BOP circuit. Hydraulic power is stored in the accumulator bottles and this provides pump capacity to keep the accumulator system under pressure. The HPU provides control valves to select different functions of the BOP equipment.



Course Agenda :

DAY 4 - Mechanical Handling Equipment

Chapter 07 - Mechanical Handling Equipment

• Hydraulic Power and Pipe Handling Equipment

A hydraulic power unit (HPU) provides power to the pipe-handling equipment. These include HPUs, iron roughnecks, pipe-handling system and catwalk machine.

• Rig Floor Winches

Winches are air or hydraulically driven lifting devices that lift heavy equipment and sometimes personnel (man-riding winch).

• Lifting and Handling Equipment

API RP 8B gives guidelines and establishes requirements for inspection, maintenance, repair and remanufacture of items of hoisting equipment used in drilling and production operations, in order to maintain the serviceability of this equipment.

• Crane

A crane is a machine for raising, lowering and revolving heavy equipment. They are used on land rigs and MODUs (marine cranes), and may be driven electronically, hydraulically or with a diesel engine. They can also lift heavy equipment between rigs and supply boats on MODUs and assist in building up land rigs on new locations.

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