



RIG EQUIPMENT INSPECTION - ADVANCED **(Jack-Up, Floaters and Land Rigs) Accredited by IADC** **Virtual Instructor-Led Training (VILT)**

Course Overview:

In order to ensure optimum performance for your rig, reduce downtime and maintain safety of your personnel, planned maintenance and accurate inspections are essential.

OCS Training Institute is pleased to co-operate with a Global provider of Rig Inspection/ Audits, Commissioning, Compliance & Acceptance as well as & Engineering for Offshore Drilling Rigs, to deliver Drilling Rig Equipment Inspection (REI) which teaches the inspection & maintenance procedures required to ensure equipment integrity. Candidates learn to implement the relevant standards & understand industry requirements so that they can verify the condition of a rig's equipment & improve safety, thus reducing the number of accidents and protecting the asset.

The Rig Equipment Inspection (REI) training course deals with the most common equipment deficiencies and recurring problems. It describes & explains the working principles of major drilling equipment using detailed examples from our technical inspection database. The REI consists of five days of interactive classroom sessions with ample time for group participation and discussion.

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.



Who Should Attend :

This course is specifically designed for, but not limited to employees in the oil and gas industry who holds the following roles:

- Drilling Engineers
- Drilling Managers
- HSE Consultants
- Toolpushers
- Mechanics and Electricians
- Rig Managers
- Maintenance Supervisors
- Drillers



Course Agenda :

DAY 1

Chapter 01 - Drilling Equipment

Derrick / Mast

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. Some smaller land rigs pull two drill pipes (called doubles).

Crown and Travelling Block, Heave Compensation Systems

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.

RamRig

It is a hoisting system consisting of two or more cylinders arranged within a ram guide instead of the conventional drawworks and derrick. The RamRig consists of the proprietary ram-guide, rams, traveling yoke, and hoisting wires. The ram-guide replaces the mast of conventional rigs. The rams are two hydraulic cylinders used for hoisting and drill string compensation. Compensation is applicable in active and passive modes

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 (elmag-co), Friction disc, Universal disc and Hydromatic brakes. The eddy current and friction disc brakes are coupled to the drawworks main shaft.

The universal disc brakes are a series of hydraulic callipers that latch onto a disc coupled to the shaft of the drawworks drum. The hydromatic brake is a hydro-dynamic device that absorbs power by converting mechanical energy into heat in its working fluid normally water.

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. The advantage of a top drive over a rotary table is that it allows the rig to drill longer sections of drill pipe. A rotary table can only drill a single drill pipe at one time.

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

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 desilters 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.

Course Agenda :

DAY 2

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 operate.

Chapter 05 - Safety Equipment

Safety Equipment

When talking about safety equipment one should split it up into five (5) main categories.

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

Drilling Safety

Drilling and safety equipment include fire pumps, fire extinguishing systems (both permanent and portable), PPE (personal protective equipment), hand rails, toe boards, escape routes, life-rafts and lifeboats for MODUs, helicopter decks. They protect personnel and provide equipment for fighting fires or abandoning the rig (MODUs).

DAY 3

Chapter 06 - Marine Equipment

Jacking System

The jacking system lifts and lowers the entire rig in and out of the water on support legs. It comprises a large number of electrically-driven gears with gear boxes to control the legs (three or four) of the jack-up system.

Associated Systems for Jacking

Associated systems for jacking, including a seawater system, help ensure the leg footings will be maintained in a secure position for a number of factors including sea conditions, the weather window for jacking and a Site-Specific Assessment (SSA), for instance soil analysis.

Deep-Well Pump

Deep-well pumps supply cooling water so that the engines can be cooled even if the engines are working on maximum load for a prolonged period. It is important to find out how many pump strokes the mud pumps are allowed to make while pumping seawater, so that the deep-well pumps can keep up with the demand.

Mooring Equipment

An anchor windlass is a machine used on vessels to let-out and heave-up equipment such as the vessel's anchor. On some vessels, it may be located in a specific room called the anchor windlass / winch room. An anchor windlass is a machine that restrains and manipulates the anchor chain on a vessel, allowing the anchor to be raised, lowered or tensioned by means of chain and / or wire rope cable. A notched wheel engages the links of the chain.

Bilge and Ballast Systems

A bilge and ballast systems is an interconnected network of valve manifold; pipelines, ballast tanks, dedicated valves with bilge and ballast pumps. The ballast system is used for rig stability by filling, emptying and transferring water from one tank to another. The bilge system helps prevent the possible accumulation of water in pump rooms and / or machinery space by discharging overboard via a dedicated oily water separator.

Pollution Control

The pollution control checklist includes equipment present at the rig site that prevent 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.



Course Agenda :

DAY 3

Watertight Integrity

Watertight integrity is defined as closures or fittings that prevent the ingress of water to certain compartments. Watertight doors, hatches, tank vents, compartment ventilators and air pipes limit the spread of water inside the vessel. They are used in areas where chances of flooding are high, such as pump and machinery room spaces.

DAY 4

Chapter 07 - 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 and Kill 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.

DAY 4

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.

Subsea Control Systems

Controls for the BOP operation using hose / cable umbilicals to transfer hydraulic / electrical and fibre-optic supply and pilot signals to the subsea accumulators and control pods.

The BOP control system's main purpose is to exercise efficient and reliable control over the BOP stack in the event of a well influx (Kick), when the primary well control barrier of the hydrostatic column of drilling fluids in the well has not contained the well influx in the hole. The BOP is the very last mechanical barrier, known as 'secondary well control'.

Riser and Tensioner Equipment

The riser tensioner system provides a near constant upward force on the drilling riser independent of the movement of the drilling rig. The primary functions of the marine riser system are; to assist in controlling wellbore

Course Agenda :

DAY 5

Chapter 08 - Mechanical Handling Equipment **Hydraulic Power and Pipe Handling Equipment**

Equipment that provides power to electro hydraulic tools on the drill floor, mast / derrick and moonpool / cellar deck, especially equipment that can handle drill pipes and other types of tubulars. These tools include hydraulic power units, iron roughnecks, pipe racking systems and overhead cranes.

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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