



RIG EQUIPMENT INSPECTION - ADVANCED Accredited by IADC

Sharpen your skills for inspection & maintenance procedures required to ensure equipment integrity!

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OCS Training Instructor

Almost 30 years' Experience in projects include the execution of rig inspections and vessel audits in Southeast Asia and the Middle East.

He is a Senior Trainer for OCS Training Institute conducting Rig Inspection and Introduction to Drilling Workshops and for all rig equipment, Drilling, Mechanical, Marine, Well Control, Electrical Systems and HSE and Safety requirements

The Trainer is involved in the development and updating of all training rig Inspection courses for OCS Training Institute. In addition the Trainer is active Senior Rig Inspector conducting rig inspections on all types of rigs. To ensure the training knowledge is maintained.

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 Overview:

To ensure optimal performance for your rig, reduce downtime, and maintain the safety of your personnel, planned maintenance and accurate inspections are essential.

OCS Training Institute is pleased to collaborate with a global provider of rig inspections, audits, commissioning, compliance, acceptance, and engineering services for offshore drilling rigs. Together, we deliver Rig Equipment Inspection (REI), which teach the inspection and maintenance procedures required to ensure equipment integrity.

Participants will learn to implement relevant standards and understand industry requirements, enabling them to verify the condition of rig equipment, improve safety, reduce the number of accidents, and protect valuable assets.

The Rig Equipment Inspection (REI) Workshop addresses the most common equipment deficiencies and recurring problems. It describes and explains the working principles of major drilling equipment using detailed examples from our extensive technical inspection database. The REI consists of four days of interactive classroom sessions, providing ample time for group participation and discussion.

Additionally we provide the candidates with the following:

- A checklist format for major equipment to assist with correct maintenance and inspections.
- Multiple examples of good and bad practices, including photos.
- A presentation of improvements and new designs of drilling equipment.
- Further explanation of the workshop manual.

Course Objectives :

After completing this workshop, candidates will be able to:

- ▶ 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

1.0 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.

1.1 Main characteristics

1.2 DC Drawworks checklist

1.3 AC Drawworks checklist

2.0 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.

2.1 Main characteristics

2.2 Rotary table checklist

3.0 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.

3.1 Main characteristics

3.2 Top drive checklist

4.0 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.

4.1 Main characteristics

4.2 Independent swivel checklist

5.0 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.

Each crown block consists of a series of sheaves and steel cables. These cables and sheaves sit on a steel frame, which may be built into the structure of the derrick. The sheaves serve as drilling lines, and pass through the traveling block below to connect to the rig's hoisting drum. While the crown block itself is fixed and used to stabilize the sheaves, the traveling block moves up and down with the cables.

5.1 Crown block main characteristics

5.2 Travelling block main characteristics

5.3 Introduction to the crown block and travelling block

5.4 Crown block checklist

5.5 Travelling block checklist

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

6.1 Main characteristics

6.2 Derrick checklist

Course Agenda :

DAY 2 - Drilling Equipment

7.0 Winches

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

- 7.1 Main characteristics
- 7.2 Introduction air winches: man-riding winches
- 7.3 Man-riding winch
- 7.4 Winch checklist

8.0 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.

- 8.1 Main characteristics
- 8.2 Lifting and handling equipment checklist

DAY 2 - Marine Equipment

1.0 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.

- 1.1 Main characteristics
- 1.2 Pinion shaft, drive pinion and reduction gearbox
- 1.3 Jacking electric brake/motor and jacking control
- 1.4 Leg racks
- 1.5 Central control cabinet and console
- 1.6 Central control console
- 1.7 Brake operation
- 1.8 Fixation system



DAY 2 - Marine Equipment

2.0 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.

- 2.1 Seawater system
- 2.2 Seawater system: Points to identify
- 2.3 Leg-jetting operation
- 2.4 Jack-up operation
- 2.5 Foundation failure while pre-driving
- 2.6 Jacking points to consider
- 2.7 Jacking system checklist
- 2.8 Practical explanation of the jacking system
- 2.9 Corrosion protection

3.0 Deep-well pumps

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.

- 3.1 Jetting
- 3.2 Skidding
- 3.3 Spud can inspections
- 3.4 General jack-up marine equipment

IN-HOUSE SOLUTIONS

SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK

OCS Training understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact us on +65 6896 3343 or email at ayu.wulansari@ocsgroup.sg

Course Agenda :

DAY 3 - Mud Processing Equipment

1.0 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.

1.1 Main characteristics

1.2 Mud pump checklist

2.0 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.

2.1 Main characteristics

2.2 Mud system checklist

DAY 3 - Engine Room and Power Plant

1.0 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.

1.1 Main characteristics

1.2 Diesel engine checklist

1.3 Emergency generator checklist

2.0 Air Compressor

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.

2.1 Main characteristics

2.2 Air compressor checklist (more relevant for MODUs)

3.0 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.

3.1 Main characteristics

3.2 Crane checklist (relevant for MODUs)

DAY 4 - Well Control Equipment

1.0 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.

1.1 Main characteristics

1.2 Operation of the rams

1.3 Hydraulic operators

1.4 Types of rams

1.5 Ram preventer checklist

2.0 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.

2.1 Main characteristics

2.2 Principle of annular preventers

2.3 Stripping through a closed annular BOP

2.4 Hydril annular BOPs

2.5 Hydril GK annular preventers

2.6 Cameron annular BOPs

2.7 Annular preventer checklist

3.0 Gate Valve

A gate valve is part of well control equipment integrated into the choke and kill lines of the BOPs. They seal off the choke and kill valve outlets. On each outlet there is normally one remotely-operated gate valve and one manually-operated gate valve.

3.1 Main characteristics

3.2 Gate valve checklist

4.0 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.

4.1 Main characteristics

4.2 Choke and kill manifold checklist

Course Agenda :

DAY 4 - Well Control Equipment

5.0 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.

- 5.1 Main characteristics
- 5.2 BOP HPU checklist

6.0 Subsea Control Systems

Conventional subsea control systems use pod hoses to transfer the hydraulic supply and pilot signals to the subsea accumulators and pods.

- 6.1 Conventional BOP controls systems checklist
- 6.2 Conventional surface controls systems: lessons learnt

7.0 MUX

Multiplex (MUX) systems use cables to transfer electrical

and fibre-optic supply and pilot signals to the pods. Rigs conduit lines integrated into the marine risers and a hotline are used to transfer hydraulic power to the subsea accumulators.

- 7.1 MUX control systems checklist

8.0 Riser and Tensioner Equipment

Marine risers are used to provide a return flow path between the wellbore and the drill vessel, and to guide the drill string or casing to the BOP stack on the ocean floor.

- 8.1 Riser and tensioner equipment checklist
- 8.2 Riser and tensioner equipment: lessons learnt

→ Course Schedule

08:00	Registration (Day1)
08:00 – 09:45	Session I
09:45 – 10:00	Refreshment & Networking
10:00 – 12:00	Session II
12:00 – 12:30	Session II
12:30 – 14:30	Session III
14:30 – 14:45	Refreshment & Networking
14:45 – 16:45	Session IV
17:00	End of Day

DAY 5 - Electrical Equipment

1.0 Eddy Current Brake

The eddy current brake is an extra brake for the drawworks. It is connected through a coupling with the drawworks main shaft and provides extra braking force to better control the drawworks.

- 1.1 Main characteristics
- 1.2 Baylor eddy current brake checklist

2.0 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.

- 2.1 Main characteristics
- 2.2 Electrical safety equipment checklist

DAY 5 - Safety Equipment

1.0 Drilling and Safety Equipment

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).

- 1.1 Main characteristics
- 1.2 Safety equipment checklist
- 1.3 Drilling safety equipment checklist

2.0 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.

- 2.1 Main characteristics
- 2.2 Pollution control checklist

→ Contact us

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