Training Title

PROCESS AND HYDRAULIC SIMULATIONS

Training Duration

5 days

Training Venue and Dates

Ref ME017	Process and Hydraulic Simulations	5	18-22 February 2024	$5,500	Cairo, Egypt

In any of the 5 star hotel. Exact venue will be informed later.

Training Fees

- **$5,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch**

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

TRAINING OVERVIEW

TRAINING DESCRIPTION

The hydraulic system equipment consists of a hydraulic pump station, hydraulic cylinders each equipped with built-on accumulators, tanks, pistons and set of hydraulic connections, including different types of valves between pump station and cylinders. Including suitable hydraulic fluid and lubrication system, manage by advance control system and solenoid valves.

This course will cover all the components for hydraulic system in general and apply this information on the Emirates cement system, to give a good knowledge for the technician when operate, maintain and troubleshooting the systems

TRAINING OBJECTIVES

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

- **Explain basic hydraulic fundamental principles (pressure x area = force).**
- **Explain the effects of flow through an orifice.**
- **Explain the operation of the gear pump, vane pump and the piston pump.**
- **Disassemble, identify and assemble the components of the gear pump, vane pump and the piston pump.**
- **Identify the components and explain the operation of the simple**

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relief valve, the pilot operated relief valve, the flow control
- valve, the pressure reducing valve, the pressure differential
- valve, the check valve, the make-up valve, the sequence valve and the directional control valve.
- Identify the components and explain the operation of single acting cylinders and double acting cylinders.
- Identify and explain ISO hydraulic symbols.
- Trace oil flow through ISO hydraulic schematics.
- Trace oil flow and explain the operation of the pilot operated implement system.

WHO SHOULD ATTEND?

- Operation, maintenance, inspection & repair managers, supervisors & engineers
- Plant engineers
- Plant operations and maintenance personnel
- Mechanical engineers and technicians
- Design engineers, Consulting engineers
- Process technicians

TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. The delegates will also be encouraged to raise their own questions and to share in the development of the right answers using their own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Booklet, Power-Point presentations, Handouts, Videos, User group discussions and practices on case study

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

COURSE OUTLINE:

Following Topics will be covered in 3 days

Part 1 Safety and health

- Introduction
- Objectives

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- Basic Safety procedures
- Additional Safety procedures

Part 2 Hydraulic Principles

- Objectives
- Using Liquids
- Liquid Conform To Shape
- Practical Compressible liquids
- Compressible gases
- Hydraulics doing works
- Mechanical Advantages
- Orifice Effect & restriction to flow
- Oil flow to blocked tank
- Restrictions in series & parallel

Part 3 Basic Hydraulic Systems (Hydraulic Tanks):

- Objectives
- Tanks main functions
- Tanks components
- Tanks Types (pressurized , vented)
- ISO symbols

Part 4 Hydraulic Fluids

- Introduction
- Objectives
- Functions of hydraulic fluids
- Power transmission
- Lubrication
- Sealing
- Cooling
- Viscosity
- SayboltsViscosimeter
- Viscosity index
- Petroleum oil
- Synthetic oils
- Fire Resistant fluids
- Oil life

Part 5 Hydraulic System Components

- Cement factory
- Operation and maintenance

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- Hydraulic fluids (mineral base)
- Cylinders assembly and maintenance
- Industrial valves
- Pistons units
- Assembly hydraulic system (piping, hoses and fittings
- Flushing of the hydraulic drive
- Actuators : cylinder for hydraulic
- Tanks breather filter
- Gauges and switches
- Check valves, ball valves
- Valves Relief valves
- Water cooler / dirt trap
- Filters
- Anti-vibration
- Electrical motor
- Baldder accumulators
- Displacement pump

Part 6 Hydraulic Pumps and Motors

- Introduction
- Objectives
- Hydraulic pump functions & description
- Hydraulic motor functions & Applications
- Positive displacement pumps
- Volumetric Efficiency
- Fixed displacement versus variable displacement
- Gear pumps (flow , factors , parts)
- Vane pups (parts , operation , types)
- Piston pumps (Types , operation & parts)
- Internal gear pumps (parts , operation)
- Conjugate curve pump (parts , operation)
- ISO symbols for pumps & motors

Part 7 Pressure Control Valves

- Objectives
- Relief Valves (simple / cracking pressure , simple pressure relief valve , relief pressure setting , pilot operated relief valve open / close positions & relief valves ISO symbols)
- Sequence valves (open/close position , ISO symbols)
- Pressure reducing valve (operation ,ISO symbols)
- Pressure differential valve (operation , ISO symbols)

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Part 8 Directional Control Valves

- Objectives
- Directional control valves (basic design, open center D.C.V hold position & raise position , D.C.V ISO symbols)
- Three positions valve (types , ISO symbols)
- Rotary D.C.V.
- Check valves (types , operation , ISO symbols)
- Make up valve (operation , ISO symbols)
- Solenoid actuated control valves (solenoid actuator types , solenoid actuated valves types , operation ,solenoid failures ,ISO symbols)

Part 9 Flow Control Valves

- Introduction
- Objectives
- Orifice Affecting Factors
- Orifice Types (systems , operation)
- Non compensated flow control valve (Conditions)
- Compensated flow control valve (conditions)
- Combine orifice & Dump valve
- Restrictor type pressure compensated flow control valve
- Quick Drop Valve
- ISO symbols

Part 10 Cylinders

- Introduction
- Objectives
- Cylinders' Acting types
- Effective Area
- Seals
- Cylinders Dampers

Part 11 Hydraulic Troubleshooting

- General
- Hydraulic Pump Station
- gear lubrication system
- Insufficient fluid level.
- The presence of air in the system.
- Contamination by foreign material.
- Incorrect adjustment of components.
- Internal or external fluid leakage.
- Mechanical damage to components.

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- **Wrong fluid type or viscosity.**
- **Excessive temperatures.**
- **case study :hydraulic for CBS Stacker**

NOTE:

Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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