

**Training Title**

**ARTIFICIAL LIFT: DESIGN & FAILURE ANALYSIS**

**Training Duration**

5 days

**Training Venue and Dates**

DE013	ARTIFICIAL LIFT: DESIGN & FAILURE ANALYSIS	5	17-21 Feb 2025	\$6,500	Amsterdam, Netherlands
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In any of the 4 or 5-star hotels. The exact venue will be informed once finalized.

**Training Fees**

- \$6,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch.

**Training Certificate**

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

**TRAINING DESCRIPTION**

Discussion on entire gamut of various artificial lift techniques deployed in onshore as well as offshore oil fields for optimum exploitation of hydrocarbons. Each mode of lift would be discussed in detail about its designing criteria, selection, equipment description, techniques for the installation, their operations and trouble shooting.

**TRAINING OBJECTIVES**

The participants would be made adequately aware of the technology inherent in each mode of artificial lift and they would be made fully conversant with their operational details. The working executives would be encouraged to get those doubts clarified during the course period. Adequate value would be added to each participant and their performance would enhance when they go their jobs in oil fields.

**WHO SHOULD ATTEND?**

The course has been designed in such a way that participants either working in the oil field or new entrants would get adequate benefits. Executives already on the job would refresh their memory and add new technology to their knowledge. It is therefore suggested that every oil field worker / Executive having basic knowledge of oil industries derive immense knowledge and confidence after attending the course. This would enable the freshers to work with these units in the fields with total confidence.

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**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 to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on a daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.

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

**DAILY OUTLINE**

**Day 1:**

- Introduction to Oil and Gas industry
  1. Overall scenario of oil & gas industries, Part – 1 & Part-2.
  2. Nodal analysis

**Part – 2:**

- Inflow performance relationship (IPR)
- Multiphase flow
- Fluid flows through rocks.
- Darcy's equation
- Petrophysical properties of rocks.
- Productivity index - PI
- Pressure stabilization
- Pressure drawdown.
- Evolution of IPR curve.
- IPR curves for different reservoir drives.
- Change of PI with Cumulative recovery
- Vogel's work of a reference curve
- Standing extension of Vogel's method
- Petkovic's method for calculating IPR
- Stratified formations
- Conducting inflow performance test.
- Flow efficiency & Skin effect
- Bean performance
- Tubing intake curves
- Integrating the IPR, TIC & Bean performance

- Ros's formula
- Aching's correlation
- Conclusion & recommendations

## Day: 2

### Part – 1:

- Introduction to Artificial lift – Why Artificial lift?
- Different modes of Artificial lift
- Selection criteria for different modes of artificial lifts.
- What is a gas lift?
- Types of Gas lift
- Understanding gas lift
- Design criteria of gas lift
- Operating design of continuous gas lift.

### Part – 2

- Operating design of intermittent gas lift
- Operating design of plunger lift
- Operating design of microbic tubing with chamber lift
- Equipment selection
- Installation of Gas lift
- Two pen recording
- Trouble shooting
- Maintenance of gas lift installation

## Day – 3:

### Sucker rod pumps (SRP), (PCP)and ESP

- 1- Introduction to Sucker rod pumps (SRP)
- Surface equipment
- Prime movers
  - Electric motor
  - Internal combustion engines
- Devices to protect oil field motors.
- Gear reducer
- Pumping unit
  - Conventional crank balance units
  - Beam – Balance units.
  - Air Balance units.
- Pumping units API designations.
- Sub Surface equipment
- Sucker rods
  - Steel sucker rods

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- Fiber glass sucker rods
- Continuous sucker rods
- Sub surface pumps
- Tubing pumps
- Rod pumps
- Working barrel
- Standing valve
- Traveling valves
- Plungers.
- API pump classification
- Standard designation for a complete pump
- Pump displacement requirements
- Stroke efficiency
- An actual example for class work
- Pump sizing
- Plunger sizing
- Stroke length
- Pump speed
- Rod string design
- Materials
- Rod stress calculations
- Tapered rod strings
- Rod loads during pumping
- API system design procedure
- Dimension less variables
- Design example
- Plunger stroke correlations
- Peak polished rod load correlations
- Minimum Polished rod load correlations
- Selection of counterweights
- Peak torque correlations
- Polished rod horsepower correlations
- Rod stress correlations
- Video film Artificial lift CD/-DVD

#### **Day: 4**

##### **Part – 1:**

##### **Polished rod dynamometer**

- Mechanical dynamometer
- Hydraulic dynamometer

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- Electronic dynamometer
- Dynamometer card interpretation
- Rod load versus displacement
- Un anchored tubing
- Anchored tubing
- Testing the standing valve
- Testing the travelling valve
- Measuring the counterbalance effect

System monitoring: Diagraph

Synthetic diagraph:

Part – 2:

2- An overview of progressive cavity pump (PCP)

- Selection criteria
- Pump Component
- Design of the pump (PCP)
- Operational procedures
- Maintenance care
- Trouble shooting

**Day: 5**

Part- 1:

3-Electrical submersible pump (ESP)

- Introductions
- Selection criteria
- Pump component
- Design of the pump
- Operational details
- Factors affecting smooth operations.
- Troubleshooting

Part- 2:

Hydraulic Jet Pump:

- Introductions
- Selection criteria
- Design of the pump
- Applicability
- Operational details
- Factors affecting operations.
- Trouble shooting

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Part – 3:

- Group Discussion
- Case History

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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