

MECHANICAL EQUIPMENT AND RCA IN OIL AND GAS INDUSTRY

MCE066

COURSE DESCRIPTION

This is an intensive 5-day course providing a comprehensive overview of mechanical equipment and Root cause analysis in oil and gas industry as pumps and compressor systems.

The focus will be on equipment selection; type, unit, and station configuration; and integration of these units in the process scheme and control strategy in upstream and midstream oil and gas facilities. Selecting the appropriate integrated pump and compressors units (drivers, pumps, compressors, and auxiliary systems). Also, the course will cover the integration of pump or compressor units with the upstream and downstream piping and process equipment, evaluating pump and compressor units and their drivers in multiple train configurations, parallel and series identifying the key local and remote-control elements of pumps and compressors as well as their drivers.

The course will cover the definition of major life-cycle events, such as changes in flows, fluid composition, and operating conditions that can affect equipment selection and operating strategies, assessing the key pump hydraulics and compressor thermodynamics, and their effect on selection and operations identifying significant operating conditioning monitoring parameters and troubleshooting techniques.

COURSE GOAL

To enhance the participants' knowledge, skills, and ability necessary to deal with mechanical equipment and apply root cause analysis in oil and gas industry.

COURSE OBJECTIVES

By the end of this course, participant will have covered:

- Identify the different types of pumps & compressors, & learn about selection, operation & maintenance strategies.
- Operate pumps & compressors as close as possible to the design efficiency & monitor their availability & reliability.
- Identify & learn about associated components such as mechanical seals & bearings & identify their failure mechanisms.
- Condition, monitor and troubleshoot pump and compressor problems.
- Specify, operate and maintain fluid movers (Motors) and drivers (Variable Speed Drives).
- Understand the integration of pump or compressor units with upstream and downstream process equipment, local and remote-control systems, and facilities utilities.

- Understand all major considerations of design, installation, operating, troubleshooting, and maintenance.
- Understand the key performance indicators (KPI's).
- Apply root cause analysis (RCA).
- Be familiar with the key auxiliary systems including monitoring equipment, heat exchangers, lube and seal systems, and fuel/power systems.

WHO SHOULD ATTEND

- Engineers
- Senior Technicians
- System Operators

COURSE DURATION

5 Working Days

COURSE OUTLINES

- 1. Mechanical Equipment and RCA in Oil and Gas Industry: An Overview.**
- 2. Introduction & Fundamentals of Materials Selection, Types & Failures**
 - Engineering Material Properties and Selection
 - Materials Testing
 - Types of Metals
 - Static Strength and Fitness For Service
 - Materials Failure Mechanisms
 - Mechanical Design, Standards and Codes
- 3. Static Equipment, Valves, Piping & Fitness for Service**
 - Valves Types and Characteristics
 - Valve Selection
 - Valve Actuators
 - Piping Systems and Pipe Supports
 - Overview of API 570 - Inspection & repair of Pipelines & Piping
 - Fitness for Service, API 579 overview
- 4. Rotating Equipment, Pumps & Compressors**
 - Pump Types, Positive Displacement and Dynamic
 - Pump curves

- Pump Selection
- Types of Compressors
- Compressor Performance Curves

5. Integration of Pump or Compressor units with Upstream and Downstream Process Equipment, Local and Remote-Control Systems, and Facilities Utilities

- Major Considerations of:
 - Design
 - Installation
 - Operating
 - Troubleshooting and Maintenance.

6. KPI's:

- An Overview
- Case studies

7. Root Cause Analysis (RCA) Methodologies

- Root Cause Analysis Introduction
- What is RCA? Why Use It?
- Levels of Causes of Accidents
- RCA Methodology (Define – Analyze – Solve)
- RCA Tools (Brainstorming – Pareto – 5-WHY – Fish-bone)
- RCA Follow Up
- High Potential Incidents
- Mine the Diamond
- Behavior and Culture
- The HSE Culture Ladder

8. Key Auxiliary Systems

- Monitoring Equipment
- Heat Exchangers
- Lube and Seal Systems
- Fuel/Power Systems

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