

MAINTENANCE OF CENTRIFUGAL PUMPS

MCE056

COURSE DESCRIPTION

This course is designed to provide the trainees with the fundamentals of centrifugal pumps' construction, maintenance, measurements, troubleshooting and installation of pumps in plants.

Emphasis will be placed on the application of vibration based methods of machine condition monitoring and fault diagnostics, particularly data acquisition and analysis techniques.

COURSE GOAL

To enhance the participants' knowledge, skills and abilities necessary for safe centrifugal pumps' construction, maintenance, measurements, troubleshooting and installation of pumps in plants.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Understand centrifugal pump principles and types.
- Interpret pump performance for system matching.
- Compare packing and mechanical seals, knowing their pros and cons.
- Proficiently install and align mechanical seals.
- Master packing installation, adjustment, and troubleshooting.
- Identify and analyze common pump problems.
- Gain hands-on experience in vibration analysis for diagnostics.
- Apply various diagnostic techniques for pump health assessment.
- Execute routine maintenance for optimal pump performance.
- Implement preventive maintenance with proper documentation.
- Plan and conduct pump overhaul when needed.
- Expertly disassemble, inspect, and reassemble pumps.
- Ensure post-overhaul performance through proper testing.

WHO SHOULD ATTEND

This course is recommended for mechanical, technicians, supervisors and engineers working on centrifugal pump operation and maintenance fields.

COURSE DURATION

5 Working Days

COURSE OUTLINES

1. Types of Centrifugal Pumps

- Introduction to Centrifugal Pumps
 - Overview of centrifugal pump principles and their role in various industrial applications.
 - Basic components and working mechanisms of centrifugal pumps.
- Classification of Centrifugal Pumps
 - Centrifugal pumps based on design (e.g., volute, diffuser) and specific applications (e.g., radial flow, axial flow).
 - Selection criteria for different pump types in specific scenarios.
- Performance Characteristics
 - Understanding pump performance curves, efficiency, and how to interpret manufacturer specifications.
 - Matching pump characteristics to system requirements.

2. Packing and Mechanical Seal

- Sealing Systems Overview
 - Comparison between traditional packing systems and modern mechanical seals.
 - Advantages and limitations of each sealing method.
- Mechanical Seal Components
 - Detailed examination of mechanical seal components and their functions.
 - Installation and alignment techniques for mechanical seals.
- Packing Techniques
 - Procedures for packing installation, adjustment, and maintenance.
 - Common issues and troubleshooting related to packing systems.

3. Centrifugal Pumps Troubleshooting

- Common Pump Problems
 - Identification of issues such as cavitation, impeller damage, and system-related problems.
 - Root cause analysis for common pump failures.
- Vibration Analysis
 - Introduction to vibration-based condition monitoring.
 - Hands-on experience in using vibration analysis tools for pump diagnostics.
- Other Diagnostic Techniques
 - Thermal imaging, oil analysis, and other methods for pump health assessment.
 - Integration of diagnostic data for comprehensive troubleshooting.

4. Maintenance of Centrifugal Pumps

- Routine Maintenance Tasks
 - Lubrication procedures, alignment checks, and inspection routines.
 - Importance of maintaining proper clearances and tolerances.
- Preventive Maintenance Strategies
 - Developing and implementing a preventive maintenance schedule.
 - Documentation and record-keeping for maintenance activities.

5. Overhauling of Centrifugal Pumps

- Overhaul Planning
 - Determining the optimal time for pump overhaul.
 - Assessing the extent of wear and tear through inspection.
- Disassembly and Inspection
 - Step-by-step disassembly procedures for centrifugal pumps.
 - Thorough inspection of components and determination of replacement needs.
- Reassembly and Testing
 - Proper reassembly techniques and torque specifications.
 - Testing procedures to ensure the pump meets performance standards post-overhaul.

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