Preventive Maintenance and Troubleshooting of Pumps and Compressors

Energy Milestones Corporation

Advancing Professionals to the next level

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info@energymilestones.com

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Preventive Maintenance and Troubleshooting of Pumps and Compressors

Overview

Efficient pump and compressor operations are essential for minimizing downtime and maximizing plant productivity. This course equips engineers and technicians with the skills to identify, maintain, and troubleshoot a range of pump and compressor equipment.

Course Objectives

- **Recognize different pump types (e.g., centrifugal, positive displacement, vertical), their operation, and maintenance needs**
- **Understand hydraulic principles, energy transfer, efficiency, and installation best practices**
- **Diagnose and repair common issues—wear, lubrication, vibration, misalignment, and mechanical faults**
- **Master tools and instrumentation for precision alignment, seal replacement, and predictive maintenance**
- **Learn compressor fundamentals, including centrifugal, axial, reciprocating, screw, and helical types, covering design, thermodynamics, capacity, efficiency, and troubleshooting**
- **Develop maintenance strategies: scheduling, record-keeping, preventive programs, and repair planning**

Course Content

1 . Pump Fundamentals & Classifications

- Types of pumps: Centrifugal, Positive Displacement, Vertical, etc.
- Operating principles and selection criteria
- Hydraulic concepts: head, flow, efficiency, and cavitation

2. Pump Performance & Maintenance

- Pump curves and system analysis
- Installation, alignment, and commissioning
- Preventive maintenance strategies and troubleshooting
- Seals, bearings, and lubrication systems

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Course Content

3. Compressor Technologies & Operations

- Compressor types: Centrifugal, Reciprocating, Screw, Axial
- Compression principles and thermodynamics
- Efficiency, capacity control, and surge phenomena
- Lubrication and cooling systems

4. Troubleshooting Techniques & Predictive Tools

- Vibration analysis and condition monitoring
- Common mechanical failures: misalignment, wear, leaks
- Diagnostic instrumentation and data interpretation
- Case studies: real-world failure analysis

5. Maintenance Planning & Performance Optimization

- Maintenance management systems and scheduling
- Repair vs. replacement decision-making
- Performance testing and benchmarking
- Interactive group exercises and final review

Targeted Audience

- **Maintenance Engineers and Technicians**
- **Mechanical and Process Engineers**
- **Plant Engineers and Operators**
- **Maintenance Planners and Schedulers**
- **Reliability and Asset Integrity Professionals**
- **Operations and Production Supervisors**
- **Technical Support Staff involved in rotating equipment**
- **Anyone responsible for pump and compressor maintenance, troubleshooting, or performance optimization**

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Course Methodology

Facilitated by an experienced professional trainer, this training course will be conducted as a highly interactive workshop session. A variety of training methodologies and facilitation techniques will be employed before and during the course, as applicable. These methods are aimed at enhancing individual and group interaction while maximising learning. Some of these methods are:

- Online Pre-post Test
- Colourful Visual Aids
- Gamification
- Self-Assessment Instruments
- Simulations
- Case Studies
- Videos
- Group Exercises & Discussions
- Role plays
- Indoor & Outdoor games