Mechanical Equipment Compressors, Pumps, Motors & Variable Speed Drives

Introduction:

This course will provide a comprehensive understanding of equipment operating characteristics. It will introduce delegates to essential types of mechanical equipment, including positive displacement and dynamic pumps and compressors, motors and drives and their associated systems and components. The applications of these equipment will be discussed along with their suitability for different operational duties and selection criteria. In addition, the course will focus on associated equipment including packing, mechanical sealing systems, bearings and valves. The course will focus on maximizing the efficiency, reliability, and longevity of this equipment by providing a thorough understanding of the characteristics, common problems, condition monitoring and maintenance criteria related to machinery and equipment operation.

This course will feature:

- Pumps and pumping systems
- Discussion of associated equipment such as mechanical seal design, bearings & valves
- Compressors and compression systems

- Motors and variable speed drives
- Condition monitoring and predictive maintenance techniques

Who Should Attend?

Mechanical Engineers, General Supervisors, Consulting Engineers, Design Engineers, Foremen, Supervisors, Technicians, Maintenance Personnel, Engineers of all disciplines, Supervisors, Team Leaders and Professionals in Maintenance, Engineering and Production Managers, Maintenance Personnel, Heads of Maintenance and Operation, Chemical Engineers, Equipment Specialists, Technical Engineers, Operation Engineers, Planning Engineers, Process Engineers, Reliability Specialists, Boiler Plant Construction Managers, Consulting Engineers, Design Engineers, Insurance Company Inspectors, Operation, Maintenance, Inspection and Repair Managers, Supervisors and Engineers, Plant Engineers, Senior Boiler Plant Operators, Repairers and Installers

Course Objectives:

By the end of this course delegates will be able to:

- Identify the different types of pumps & compressors, & learn about selection, operation & maintenance strategies
- Condition, monitor and troubleshoot pump and compressor problems
- 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
- Specify, operate and maintain fluid movers (Motors) and drivers (Variable Speed Drives)

Course Outline:

Pumps and Pumping Systems

- Pump categories and selection, dynamic and positive displacement
- Pump Theory of Operation, governing fluid laws and performance curves
- Dynamic Pumps, centrifugal, axial, mixed flow
- General Performance Characteristics, cavitation, net positive suction head
- Positive Displacement Pumps, reciprocating, rotary
- Engineering of System Requirements, fluid type, system head curves

Compressors and Compressor Systems

- Positive Displacement Compressors, reciprocating and rotary
- Dynamic Compressors, centrifugal, axial, mixed flow
- Compressor Operation, gas laws, operation curves
- Compressor Performance Measurement and sizing
- Compressor Equipment
- Surging and Choking

Motors and Variable Speed Drives

- Characteristics and Operation of AC Induction Motors
- Starting and Speed Control of AC induction motors
- Speed control methods of AC Motors
- Construction, Enclosures and cooling methods of AC Motors
- Basic principles of AC Variable-Speed Drives (VSD's)
- Electromagnetic Interferences, Cable Details and Filtering

Maintenance and Troubleshooting

- Types of maintenance
- Factors affecting pump, compressor and motor maintenance

- Vibration analysis and condition monitoring
- Electrical signature condition monitoring
- Thermal imaging condition monitoring
- Oil analysis

Associated Mechanical Equipment

- Mechanical seals
- Bearings
- Faults associated with bearings and mechanical seals
- Lubrication
- Control valves