Mechanical Equipment Compressors, Pumps,Seals, Motors, And 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 seminar will focus on associated equipment including packing, mechanical sealing systems, bearings and valves.

The course will focus on maximising 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

- Compressors and compression systems
- Motors and Variable Speed Drives
- Discussion of associated equipment such as mechanical seal design, bearings, & valves
- Condition monitoring and Predictive Maintenance techniques

Who is this Course for?

This course is suitable to those who wish to update themselves on mechanical equipment including pump and compressor technology, judge the suitability of different types of pumps and compressors, drive equipment and associated components for their needs, and learn how to operate and maintain them for the benefit of their organisations.

This course is suitable to a wide range of Technical professionals but will greatly benefit:

- Professionals in Maintenance, Engineering and Production
- Those with little or no prior formal background who function as Managers, Planners, Inspectors, Designers, Researchers, Investors or Procurers
- Those who are or will become involve at any stage in project applications and applicable maintenance technologies

How will this be Presented?

This course will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. This includes workshop principles with formal lectures, Videos and animations, question & answer sessions, case studies and interactive worked examples. Relevant case studies will be provided to illustrate the application of each tool in an operations environment. There will be ample opportunities for discussion and sharing.

What are the Goals?

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

- 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)

Course Outline:

Day One: 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 - cavitations, net positive suction head
- Positive Displacement Pumps - reciprocating, rotary
- Engineering of System Requirements - fluid type, system head curves

Day Two: 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

Day Three: 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

Day Four: 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

Day Five: Associated Mechanical Equipment

- Mechanical Seals
- Bearings
- Faults associated with bearings and mechanical seals
- Lubrication
- Control Valves
- Examples