PERFORMANCE MONITORING OF PUMPS AND COMPRESSORS

WHAT YOU WILL LEARN:

- Optimising equipment performance
- Performance monitoring strategies
- General hydraulic concepts in relation to performance monitoring
- Centrifugal pumps - construction, operational principles, selection criteria, power requirements, efficiencies and losses, characteristic curves, performance calculations
- Gas properties - thermodynamic concepts and processes, Thermodynamic and gas laws, ideal gases, computation of gas properties, gas power cycles
- Reciprocating compressors - construction, operation, compression terms, performance calculations, evaluating efficiencies and methods to estimate them, analysis of PV diagrams
- Centrifugal and axial flow compressors - design and operational aspects, compression terms, performance calculations, evaluating adiabatic and polytropic efficiencies and methods to estimate them

WHO SHOULD ATTEND:

Anyone who deals with design, selection, sizing, operation and maintenance of pumps and compressors in the course of their work, including:

- Mechanical Engineers
- Maintenance Engineers
- Reliability Engineers
- Electrical Engineers
- Professional Engineers
- Utility Advisors and Planners
- Municipal and Regional Planners
- Operations Managers
- Maintenance Managers
- Project Managers
- Contract Managers
- Asset Managers
- Technical Managers
As the process plants have got bigger, the machines have become larger in terms of their power ratings and complexity. At the same time, the demand for efficient operation and higher availability of these machines has been on the rise and this in turn has led to the adoption of modern maintenance strategies and practices by the industry, so that these objectives may be achieved.

Condition Monitoring of equipment is one best practice that has proven itself over the years. It is now considered an integral part of an effective plant asset management strategy. Condition monitoring of plant equipment comprises of
- Mechanical health monitoring
- Performance monitoring

The former includes techniques such as vibration analysis, oil and wear particle analysis, thermography, ultrasonics and others. Performance monitoring on the other hand is the thermodynamic and hydraulic evaluation of the equipment. This technique determines the efficiency with which energy conversions occur in the equipment.

Performance calculations enable the computation of energy requirements of equipments. This helps in benchmarking their performance. In case gaps are noticed, this technique has the ability to trouble-shoot equipment problems. It can also indicate equipment problems that may not be normally detected by mechanical health monitoring. When used together, they help provide efficient operation of the equipment and at higher availability levels.

Another utility of the performance monitoring technique is that the same theory and concepts can be employed in the sizing, selection and rating of the equipment. It thus becomes a useful tool especially during the process of evaluation of technical bids.

This workshop covers in detail, the technique of performance monitoring as applied to centrifugal pumps and positive displacement, centrifugal and axial flow compressors. The topics of discussion include
- Principles of operation
- Thermodynamic and hydraulic evaluation
- Important performance parameters and selection considerations
- Methods to derive the above from first principles and empirical relationships
- Handling gas and gas mixture properties
- Interpretation of results

The course includes a large number of practical examples that help to learn and clarify the concepts. These can then be readily applied to real machines in plants, to evaluate their present performance, benchmark with rated values and analyse the causes for the gaps. Additionally, examples involving sizing and selection of the equipment are also included.

The workshop will be of immense benefit to those involved in the procurement, operation and maintenance of pumps and compressors.

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This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

To gain full value from this workshop, please bring your laptop/notebook computer.