Pumps and Pumping Systems Training Course Contents

Two-day course content on Centrifugal Pumps and Pumping Systems design, use and maintenance for maintenance managers, engineers, supervisors and pump maintainers

DAY 1 Course Content

The Design and Engineering for High Pumping System Reliability

- Key Concepts in Designing for Reliability
  - Life-cycle Effect on Costs and Profits
  - Defect and Failure True Costs
  - Risk and Probability of Failure
  - Physics of Failure
  - Degradation Curve – Degradation Causes
  - Reliability Growth Cause Analysis
  - The Process Maps for Reliability
  - FMECA/FMEA/RCM
  - Maintainability and Supportability
  - Stores and Storage Practices

- Pumping System Failures
  - Hydraulic Gradient and Piping Losses
  - Pump Head and Flow
  - System Curves
  - Anti-Cavitation Considerations
    - NPSH
    - Cavitation
    - Non-steady Duty
  - Distortion Prevention
  - Degradation Management
  - Case Study - Practical Examples

- Open Discussion Forum with Attendees

- Pump Set Selection
  - Pump Types and Their Limitations
  - Duty Conditions
  - Process Conditions
  - Cavitation Conditions
  - Specific Speed
  - Centrifugal Impeller Types and Selection
  - Efficiency and Power Draw
  - Best Efficiency Point
  - Energy Efficiency
  - Shaft Rigidity and Deflection
  - Bearing Housing and Bearing Selection
  - Shaft Seal Selection
  - Purchasing Specification
  - Supplier Provided Documentation

- Installation Design
  - Best-Practice Engineering Design
  - Component Standardisation
  - Suction Conditions
  - Foundations
  - Base Frames
  - Hold-down Bolting
  - Piping and Valves
  - Pipe Expansion and Alignment
  - Vapour/Air Pockets
  - Maintainability

- Open Discussion Forum with Attendees
DAY 2 Course Content

Installing, Operating and Maintaining Pumping Systems and Installations

• Pump Installation
  o Engineering Specifications
  o Installation Procedures for Work Quality Assurance
  o Instrumentation and Process Control
  o Transmitted Vibration Control and Isolation
  o Piping Orientation and Connections
  o Addressing Piping Stress
  o Shaft Seal Flushing
  o Precision Shaft Alignment Requirements
  o Performance Testing, Commissioning and Acceptance

• Open Discussion Forum with Attendees

• Pump Operation
  o Operator and Process Interface
  o Operating Procedures for Process Stability
  o Operator Training
  o Performance Monitoring
  o Performance Degradation
  o Operator Watch-keeping

• Pump Maintenance and Reliability
  o Maintenance and Reliability Strategy
    ▪ Component Failure Curves
    ▪ Defect Elimination
    ▪ System Reliability
    ▪ Life Cycle Costs
  o Condition Monitoring and Predictive Maintenance
  o Preventive Maintenance
  o Maintenance Procedures for Work Quality Assurance
  o Lubrication Standard
  o Balancing Standard
  o Alignment Standard
  o Bearing Vibration Standard
  o Precision Maintenance

• Open Discussion Forum with Attendees