Mechanical Maintenance: Pumps and Shaft Alignment

This five-day course covers pump design, operating theory, rotary pumps, reciprocating pumps, and centrifugal pumps, compression packing and gaskets, couplings, and alignment.

I. Pump Design
   • Standards
   • Applications
   • Pump Classifications

II. Pump Operation and Theory
   • Centrifugal Pumps
   • Design Aspects
   • Pump Laws
   • Positive Displacement Pumps
   • Pump Performance Comparisons
   • Special Purpose Pumps
   • Pump Characteristic Curves
   • Performance Testing Centrifugal Pumps

III. Rotary Pump Maintenance
   • Pump Performance
   • Pump Tests
   • Rotary Pump Problems
   • Rotary Pump Maintenance

IV. Reciprocating Pump Maintenance
   • Metering Pumps
   • Axial and Radial-Piston Pumps
   • Hydraulic Pump Maintenance

V. Centrifugal Pump Maintenance and Troubleshooting
   • Factors Affecting Performance
   • Troubleshooting
   • Inspecting Components for Wear

VI. Compression Packing
   • Mechanical Seals Applications
   • Packing Materials
   • Selecting and Sizing Packing
   • Lantern Rings and Throttle Bushings
   • Renewal Techniques
   • Formed and Molded Packing

VII. Gaskets
   • Transformer Gaskets
   • Preparation of Surfaces and Gaskets
   • O-Ring, Foam Rubber, and Cork Gaskets
   • Leak Detection
   • Common Gaskets and Materials
   • Gasket Replenishment

VIII. Coupling Purposes and Types
   • Couplings
   • Types of Flexible Couplings
   • Coupling Lubrication
   • Coupling Installation
   • Keys and Keyways
IX. **Alignment Introduction**
   · Shaft Alignment
   · Measuring and Correcting Misalignment
   · Typical Alignment Tools
   · Preliminary Preparation for Alignment
   · Coupling Alignment
   · Preparing for Alignment, Part 1
   · Foundations, Baseplates, and Machine Casings
   · Preparing for Alignment, Part 2

X. **Methods for Measuring Misalignment in Rotating Machinery**
   · Rough Alignment Method
   · Dial Indicator Method
   · Making the Corrections
   · Do’s and Don’ts of Moving Machinery