Compressors Major Inspection & Overhaul

Training Program

Introduction:

Enhance the knowledge level of, a group of fresh Mechanical Engineers with reasonable background on the theory of operation and explain how to install, troubleshoot, overhaul, and repair all types of compressors. Participants will also learn how to purchase, service, operate and maintain compressor components used in any of the process industries such as Oil and Gas, Power and Manufacturing; wet and dry gas seals & their operation.

Who Should Attend?

Mechanical Engineering

Course objectives:

- Understand the mechanical design of the centrifugal compressor
- Learn the principles of the centrifugal compressors
- Understand the anti-surge control systems
- Learn the failure analysis and troubleshooting the centrifugal compressor

- Learn the Maintenance of the centrifugal compressors

Course outline:

Dynamic Compressors (Component Design and Materials)

- Types; centrifugal, axial & ejectors; principle of operation and application
- Main parameters such as pressure ratio, pressure, mass flow rate, flow & pressure coefficients
- Specific speed and it's impact on efficiency
- The fan laws
- Centrifugal compressor stage & main components; types of impellers; volute;
- diffuser, return channel, diaphragm , stage seal
- Various construction designs for centrifugal compressors; volute, barrel, integrally geared
- Multistage centrifugal compressors; axial forces and force balancing
- Axial compressor stage
- Comparison between centrifugal & axial compressor; application
- Compressor performance curve; none dimensional parameters; comparison between axial & centrifugal curve.
- Axial compressor construction design
- Compressor materials
- Identifying main points on compressor curve; surge point, surge line; stonewall

  - ✓ Compressor stall & rotating stall
  - ✓ Full compressor characteristic
  - ✓ Explaining compressor surge
  - ✓ Operation of compressor/system; operating point; transient conditions
  - ✓ Capacity control and surge control methods
  - ✓ Operation and performance checks
  - ✓ Setting maintenance frequencies and procedures

- ✓ Preparing inspection and overhaul plans and schedules
- ✓ Preparing spare parts orders using manufacturer's documents
- ✓ Disassembly/ assembly procedures for barrel and axial compressor

- Compressor inspection; shaft, mechanical components, seals, clearances
- Compressor auxiliary systems; lubrication, sealing, cooling, surge control and their inspection

PD (positive displacement) Compressors

- Main types; principle of operation and application
- PD compressor performance curve; interaction with a system; pulsation dampening
- Reciprocating compressor; construction, arrangement & main mechanical
- components; piston, piston, rod, cylinder, crankshaft, cross-head, packing
- Compressor Valves (Operation and Maintenance Problems)
- Reciprocating compressor capacity control; loader/un-loader, pockets, clearance
- Piston Rod Packing
- Piston rod and frame loading
- Cylinder cooling
- Non-lubricated compressors
- Labyrinth Piston Compressors
- Rotary PD compressors, mainly helical and lobe types
- Reciprocating compressors maintenance
- Auxiliary system; lube oil, lubricator, cooling system

Overhaul and Repair of PD Compressors

- Compressor Alignment
- Web Deflection Measurements
- Foundation Problems and repair
- Bearing Maintenance and Replacement

- Cylinder Repair and Maintenance
- Rebuilding Compressor Pistons
- Installing Pistons on Piston Rods
- Setting Piston End Clearances
- Inspection and Refurbishment of Piston Rods
- Manufacture Techniques of Piston Rods and Parts replicatio