Steam Turbine Control and Maintenance

Course Description:

Upon completion of this course, participants will have gained a thorough understanding of the various steam turbine configurations available to virtually every industrial user. Items discussed include mechanical design features, sizing and application criteria, maintainability, reliability, vulnerability, and troubleshooting issues. Participants will learn simple techniques and short-cut methods of machinery selection, which can take the place of tedious hand calculations and will serve as rapid means to determine sensitivity or influence of parameter changes on equipment performance. Participants will be able to determine the most appropriate and efficient matching of compressor or pump to steam turbine driver. Participants will also acquire knowledge of operating and maintenance issues by getting to know mechanical design, machinery components, piping design, as well as proven approaches to monitoring, troubleshooting, and maintenance of compressor installations.

Who Should Attend?

Persons in staff (senior technicians, operators, supervisors, superintendents) and corporate engineering, plant planning and design, systems design, equipment selection and evaluation, and equipment maintenance areas. Also, equipment and systems specialists in engineering contractor firms and managerial and supervisory individuals responsible for operations and maintenance functions.

The industries most directly involved with the subject matter are those producing chemicals, petrochemicals, petroleum products, natural gases, manufacturing gases, steel and other metals, and plants requiring process refrigeration. Throughout the course, participants will have ample opportunity to have equipment-related questions answered by the instructor.

Course Objectives:

Upon completion of the course, participants will be able to:

- Explain the operating principles of steam turbines,
- Recognize operating problems,
- Implement a steam turbine troubleshooting monitoring.

Course Outline:

Day 1 - Fundamentals and practical aspects of steam turbine operation

- Introduction
- Steam Properties
- Boiler Operations and Principles
- Basic Thermodynamics of Steam Turbines
- Steam Turbine Types
- Uses of Steam Turbines in Petrochemical Plants
- Steam Turbine Components
    - ❖ Rotor Components
    - ❖ Reaction and Impulse Blading
    - ❖ Stator Blading
    - ❖ Steam Turbine Bearings

Day 2 - Steam Turbine Systems

- Lube Oil Systems
- Sealing Systems
- Governors and Control Systems
- Boiler Operations
    - ❖ Drums
    - ❖ Feedwater Systems
    - ❖ Condensers
    - ❖ Boiler Control

Day 3 - Steam Turbine Operations

- Startup/Shutdown Operations
- Control Valve/Stop Valve Operations
- System Operations
- Component Expansion
- Steam Turbine Maintenance
    - ❖ Repair and Maintenance of Rotor Components
    - ❖ Stripdown/Rebuild Procedures
    - ❖ Blade Removal/Replacement
    - ❖ Visit to Siemens Factory to witness rotor maintenance

Day 4 - Steam Turbine Maintenance

- System Maintenance
- Repair Procedures
- Steam Turbine Alignment
    - ❖ Causes of Misalignment
    - ❖ Types of Misalignment
    - ❖ Pre alignment checks

- ❖ Reverse Alignment

Day 5 - Steam Turbine alignment

- Laser alignment
- Hot alignment
- Steam Turbine Troubleshooting
  - ❖ Methods of Troubleshooting
  - ❖ Commons Steam Turbine Problems and Solutions
  - ❖ Case Studies
  - ❖ Course review and Assessment