The Complete Program On Boiler & Steam System Operations

Introduction:

This course was designed to take the mystery out of wondering if your boiler is safe and operating efficiently, and provides maintenance technicians and others the confidence and comfort level needed for operating and maintaining their boilers. For the novice technician needing a well-rounded education and the experienced stationary engineer who needs a refresher course for continuing education, this training program provides a no-nonsense, practical and real world approach for boiler operation, maintenance and safety. Overall, this program is designed to extend boiler life, improve boiler efficiency, and save energy costs for the employer, while establishing a culture of safe work practices among the employees.

This course is designed to provide up to date operation and maintenance strategies of industrial boilers and steam turbines. This course entails a study of steam and thermal laws applied to industrial processes followed by an illustration of the design, operation and maintenance of steam turbines and plants, and their related aspects. The aim is to provide a satisfactory approach to the problems posed by steam turbines and the means to solve them.

Highlights of the course include:

- Identify and specify new steam turbine plant
- Understanding of proper operation and monitoring techniques as applied to steam turbines
- Ability to put in place measures to quantify equipment condition

Who Should Attend?

Mechanical Engineers, General Supervisors, Consulting Engineers, Design Engineers, Foremen, Supervisors, Technicians, Maintenance Personnel, Engineers of all disciplines, Boiler Personnel, Supervisors, Team Leaders and Professionals in Maintenance, Engineering and Production Managers, Maintenance Personnel, Heads of Maintenance and Operation, Chemical Engineers, Equipment Specialists, Technical Engineers, Operation Engineers, Planning Engineers, Process Engineers, Reliability Specialists, Boiler Plant Construction Managers, Consulting Engineers, Design Engineers, Insurance Company Inspectors, Operation, Maintenance, Inspection and Repair Managers, Supervisors and Engineers, Plant Engineers, Senior Boiler Plant Operators, Repairers and Installers

Course Objectives:

By the end of this course delegates will be able to:

- Operate, maintain and troubleshoot boiler, steam turbine and steam system in a professional manner
- Recognize boiler and boiler systems as well as burner, super heater and reheaters
- Discuss boiler instrumentation and controls
- Employ boiler startup and shutdown including boiler operation and steam system management
- Review the fundamentals of the steam turbine covering turbine sections and component descriptions
- Define turbine systems including lubricating oil systems, gland steam and water seal systems, hydraulic power unit and abnormal operations
- Identify the turbine supervisory instrument location and function
- Describe the concepts of steam turbine control and apply turbine normal operations
- Interpret safety valves and low water cutoff controls
- Maintain steam valve and apply boiler water chemistry and treatment

- Employ boiler efficiency and water heat recovery as well as combustion analysis and tuning procedures
- Perform boiler inspection and testing including maintenance planning, scheduling and decision making
- Carryout boiler maintenance and protection and discuss turbine shells, casings and rotors
- Detect abnormal conditions, identify the potential results and operate action to prevent loss
- Perform systematic troubleshooting techniques and recognize emissions and pollution control

Course Outline:

Fundamentals of Boilers and Steam Turbine Systems

- Design and Operation of Industrial Boilers
- Technical Characteristics of Boiler Systems
- Steam Turbine Design and Construction
- Operation of Steam Turbine and Efficiency Calculations

Fundamentals of Combustion and Heat Transfer

- Theory of Combustion
- Thermodynamics
- Steam Tables

Burner Operation and Control

- Gas Train
- Oil Train
- Standard Burner
- High Turndown Burner
- Burner Controls

Monitoring and Inspection of Steam Turbines

- Turbine Safety and Control Systems: Over-speed, Over-pressure & Lubrication
- Condition Monitoring: Vibration, Lube Oil Temperature, Bearing Degradation

- Installation, Start Up, Commissioning and Maintenance
- Inspection and Performance Testing

Heat Recovery and Cogeneration Systems

- Steam Turbine Associated Equipment: Heat Exchangers & Pumps
- Steam Turbine in Power Plant Operation
- Comparison with Gas Turbine Systems
- Combined Heat & Power Generation

Boiler Room Safety

- Boiler Accidents
- Cause and Effect

cause and Effect Case Study

- Safety Valves
- Confined Spaces
- Lockout/Tagout

Construction and Design Standards

- ASME Codes
- NFPA Codes
- NBIC Code

Controls and Safety Devices for Automatically Fired Boilers

- Water Level Control
- Temperature Control
- Pressure Control
- Fuel Trains

Boiler and Burner Efficiency

- Heat Exchanger Efficiency
- Combustion Efficiency
- Efficiency Tests
- Condensate Return
- Steam Traps

Troubleshooting

- Burner
- Controls
- Additional