



Boiler Operations Mastery





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Introduction:

This Training program is designed to equip participants with comprehensive knowledge and skills related to boiler systems. This program covers various aspects including operating principles, maintenance procedures, inspection protocols, control techniques, and troubleshooting strategies. Participants learn to effectively manage boiler operations, ensure safety and reliability, and address potential issues to optimize performance.

Program Objectives:

At the end of this program, the participants will be able to:

- Identify the appropriate boiler feedwater treatment methods.
- Identify the important steps in the inspection of cooling towers.
- Know how to apply effective inspection and discover weakness points.
- Recommend the best practice for condition monitoring.
- Explain functions of controls, safeguards, interlocks and alarm systems and the malfunctions that can cause boiler shutdown.
- Describe correct procedures for boiler starting up and shutdown.

Targeted Audience:

- Technicians and Engineers in charge of Boiler Operation.
- Technical Personnel dealing with Boilers Maintenance.
- Boiler Inspectors and Contractors.
- Technical Personnel in charge of Steam Generation and Distribution Systems.

Program Outlines:

Unit 1:

Overview of Steam Generation and Use:

- Overview of Boiler Types and Industrial Steam Generators.
- Elements of Boiler Plant: Fired Tube Boilers and Water Tube Boiler.

- Steam Generation Basics and the Generation operation parameters.
- Power types - KW, KVAR, KVA.
- Synchronization techniques and basic conditions.
- Flame Characteristics.
- Products of Combustion and Environmental Regulations.

Unit 2:

Boiler Efficiency and Performance:

- Boiler Efficiency: Economic and Environmental Aspects.
- Boiler Feed Water Preheating Train.
- Air Economizers and Waste Heat Utilization.
- Boiler Performance and Specifications.
- Evaluating Boiler Efficiencies.
- Boiler Blow-Down Control Recovery.
- Steam Distribution System Losses.

Unit 3:

Boiler Safety Operation and Control:

- Boiler Control Strategies: Safeguards, Interlocks, and Alarm Systems.
- Explain PLC for boiler controls practical.
- Burner Management System BMS.
- Safe Start-Up and Shutdown Procedure.
- Scale and Corrosion Control.
- Chemical & Physical Treatment of Feed Water.
- De-aeration of Feed Water: Removing of Oxygen and CO₂.

Unit 4:

Boiler Inspection, Maintenance, and Repairs:

- Routine & Periodic Boiler Inspections: Risk-Based Inspection RBI.
- Common Boiler Problems in Operation.
- Abnormal Operating Conditions and Operator Actions.
- Maintenance Work Done Periodically.
- Checklist for Maintenance of Fuel Supply System.
- Maintenance of Condensate Recovery and treatment.
- Using CMMS computer managed maintenance systems.

Unit 5:

Boiler Troubleshooting and Accident Prevention:

- Boiler Failures and Accidents: Root Cause Analysis.
- How to apply FMEA Failure Mode Effective Analysis
- Boiler Troubleshooting Guide.
- Applying RBI Risk-Based Inspection techniques.