Training Title

BOILER OPERATIONS MAINTENANCE & STEAM MANAGEMENT

Training Duration

5 days

Training Venue and Dates

PE202	Boiler Operations Maintenance & Steam Management	5	01 – 05 July 2024	$5,500	Dubai, UAE

In any of the 5-star hotels. The exact venue will be informed once finalized.

Training Fees

- **$5,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch.**

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION

Boiler operations are important unit operation in all oil and gas facilities, refinery operation and gas processing. This course is designed to enhance the knowledge of boiler operation and practical aspects of operational and control system in boiler operation.

The course is designed to give a detailed understanding of boiler construction, operation with design considerations as well as more detailed operations, control, and safeguard system.

Combustion process described in detail is part of this course. Understanding air – fuel ratio. Safe operation practices.

Course sessions will emphasis on implementing the procedures/documentations & control measures required for ensuring safe operation, integrity, and best operational practices.

Design constrains, operational issues, troubleshooting etc will be included with case studies and experience transfer from similar examples from other countries.

TRAINING OBJECTIVES

By the end of the training course, the participants should be able to get enhanced exposure in:

- Safe operation and control practices of boiler and other unit operations
- Understand combustion process, combustion chemical reaction.
- How to calculate air / fuel ratio. Control air fuel ratio for safe and efficient combustion process.
- Understand Flue gas analysis. Importance of flue gas analysis and corrective steps in combustion process based on flue gas analysis.

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- Understand the Boiler construction, operation, start up and shut down. Safe operation procedures. Boiler operating variable control and safe guarding system.

WHO SHOULD ATTEND?

The program is ideal for junior, supervisory and middle management level personnel who operate and /or supervise oil, gas, and refinery operation.

TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions and motivate everybody to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of the multiple-choice type will be made available on a daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

DAILY OUTLINE

DAY-1

1. Basics of Steam Generation

   Introduction, Properties of steam and water, Boiler systems, Boiler Types and Classifications, Boiler construction and Design, Boiler efficiency.
2. Overview of furnace systems

   Different types of furnace systems and their functions, Basic component of a furnace system, Application of furnace systems.
2. Heat transfer in furnaces – definition of heat transfer, types of heat transfer, conduction, convection and radiation. Different heat transfer zones in a furnace. Distribution of heat.
3. Furnace design and construction – Heat transfer zones, Refractory materials, Tube bundle design, Insulation materials, Limitations.

DAY - 2

1. Furnace Operation – Operating parameters, control parameters, furnace efficiency, Energy recovery, Factors affecting furnace efficiency, scope and limitations for improving furnace efficiency.
2. Boiler Feed water – Properties, chemical treatment, water sampling and analysis. Corrosion – basics of corrosion, corrosion monitoring, corrosion control.
3. Combustion - Combustion principle, combustion requirement, Controlled combustion, chemistry of combustion, parameters affecting combustion. Air fuel ratio. Theoretical Oxygen demand, excess air requirement, excess air percentage calculation...

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DAY-3

1. Fuels – solid, liquid and gaseous fuels, calorific values, heating values, fuel selection, fuel characteristics.
2. Burner – Burner principle, types of burners, construction of burners, fuel - air mixing in burners, Burner operation, Low NOx burner characteristics.
3. Purging operation in Burners – basic principle, importance of purging.
4. Combustion quality – flue gas analysis, analysis of oxygen, carbon dioxide in flue gas. Unburned material in flue gas, combustion quality control, excess air adjustment, air flow control. Air/ fuel Ratio control.

DAY - 4

1. Air and flue gas circulation- draft system, Natural draft, forced draft, induced draft, Air dampeners. Air flow control. Differential pressure control.
2. Combustion Safety – Safe combustion procedure, combustion control, monitoring of various parameters, Safeguard systems, Flame detectors, Thermo-electric switches, fuel safety systems, Air flow safety systems.
3. Basic instrument and control in Boiler - process variable, Flow control, type of controllers, ratio control. Steam drum control, feed water control, 3 element control, combustion control and draft control.

DAY-5

1. Boiler Operation: - Standard operation procedure, monitoring various parameters for safe operation. Monitoring and control of operating condition, modification of operating conditions.
2. Start up and shut down: - Operating procedure, Preparation, safe ignition procedure, ignition after a shut down, normal shut down, emergency shut down.
3. Hazardous condition in Boiler operation: - exclusivity, flammability limits, explosive atmosphere in furnace, Mechanical failure in furnaces, tube rupture, refractory failure, excess heat transfer conditions.
4. Trouble shooting in boiler operation – optimization of operation condition, troubleshooting various operating problems, Safe operating practices.
5. PFD and P&ID review of Boiler, Feed water system, condensate return tank, de-aerators, feed water pump, superheated steam delivery. How to read a P&ID. Understand various inlet outlet flow system in a Boiler, understand control system and safeguard system using a P&ID.
6. Pressure relief valves in Boiler- basic principle, operation, set point, failure, routine maintenance and inspection.
7. Case studies- various case studies on boiler operation. Video Presentation. ADGAS Boiler P&ID review.

NOTE:

Pre & Post Tests will be conducted. Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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