TRAINING OUTLINE

COURSE TITLE: BOILER OPERATION & MAINTENANCE

DURATION: 2 DAYS

SPEAKER: MOHD FAUZI BIN MAT RASID (STEAM ENGINEER GRADE 1 –JKKP 2025/JS01/1590)

TRAINING OUTCOMES

The Boiler Operation & Maintenance course is specially developed to upgrade theoretical and operational skills in handling steam boilers for the current workforce.

Upon Completion of the training program, the participants will be able to:

1. Describe the fundamentals and types of steam boiler
2. Proper operate the boiler with safe manner by using startup & shutdown sequence referring to boiler's maker documents
3. Monitor and control pressure, temperature, and water levels to ensure optimal performance
4. Learn how to maintain accurate records of boiler operation and maintenance
5. Define boiler maintenance philosophy, program and activities.
6. Coordinate and execute Boiler maintenance activities

MODULE DETAILS

1. **MODULE 1 – BOILER OPERATION & SAFE PRACTICES**

1.1 Fundamentals and overview of a Boiler

a. Principle of steam generation
b. Types of Boiler
   - Firetube
   - Water Tube
   - Combination Boiler

1.2 Boiler Operation Cycles

a. Starting up Procedures
   - Pre-start checklist (water, fuel, auxiliaries & safety device)
   - Start up sequence (Purging, Ignition and Flame, warm up and loading up)
b. Key Operating Parameter to monitor
   - Pressure (steam & Boiler water)
   - Temperature (water, steam & chimney)
   - steam flow
   - Boiler drum water level
c. Critical equipment to monitor
   - Safety valves
   - Burners
   - Feedwater Pumps
   - Instrumentations
d. Shutdown Procedures
   - Shutdown sequence (Depressurization, Flame off and safe cooling)

1.3 Boiler Protection

a. Safety Interlock & Alarms
   - Low water level
   - Flame Failure
b. Overpressure Protection
c. Water Treatment & Chemical Dosing (corrosion & Scale Prevention)

1.4 Boiler preservation

1. Wet lay up
   - Chemical dosing
   - Nitrogen Blanketing
2. Dry lay up
   - Dehumidifier agent

2 MODULE 2 – BOILER MAINTENANCE

2.1 Introduction to Boiler Maintenance

a. Maintenance objectives
b. Importance of Boier Maintenance program
c. Critical boiler parts & maintenance focus
d. Maintenance Philosophy

2.2 Routine maintenance

a. Definition
b. Tasks & Activities (Daily, Weekly, Monthly)
    - Daily
    - Weekly
    - Monthly

2.3 Preventive maintenance

a. Definition
b. Maintenance Schedule & Activities
    - Scheduled Inspection & servicing
    - Cleaning (Soot Blowing, Chemical cleaning)
    - Safety Valve & Low water cut off testing
    - Lubrication of Fan, Pumps and auxiliary drives

2.4 Predictive maintenance

c. Definition
d. Maintenance Activities – Tools and Techniques
    - Ultrasonic Thickness checks (Drum and tube)
    - Eddy current testing (superheater & Economizer tubes)
    - Water Chemistry trend monitoring (Oxygen, TDS, pH, Hardness)

2.5 Corrective maintenance

a. Definition
b. Maintenance Activities
    - Identifying damage & deciding on repair or replacement
    - Tube plugging & retubing activities
    - Refractory patching and firebrick replacement

TRAINING SCHEDULE

	TIME	DESCRIPTION	REMARK
DAY 1	8.30-8.45	REGISTRATION DAY 1	
	8.45-9.00	INTRODUCTION AND ICE BREAKING	
	9.00-10.30	MODULE 1	
	10.30-11.00	TEA BREAK	
	11.00-12.30	MODULE 1	
	12.30-14.00	LUNCH AND ZOHOR PRAYER BREAK	
	14.00-15.30	MODULE 1	
	15.30-15.45	TEA BREAK	
	15.45-17.00	MODULE 1	
	17.00	ADJOURN DAY 1	
DAY 2	8.30-8.45	RECAP OF PREVIOUS DAY LESSONS	
	8.45-9.00	MODULE 2	
	9.00-10.30	MODULE 2	
	10.30-11.00	TEA BREAK	
	11.00-12.30	MODULE 2	
	12.30-14.00	LUNCH AND ZOHOR PRAYER BREAK	
	14.00-15.30	MODULE 2	
	15.30-15.45	TEA BREAK	
	15.45-17.00	MODULE 2	
	17.00	END OF COURSE	