DESIGN AND OPERATIONS OF COAL FIRED POWER PLANTS

21st to 25th March, Kuala Lumpur

Expert Course Faculty Leader
Brian Matkin

ORGANISED By
powerEDGE
Course Overview

The aim of the course is to provide a fundamental understanding of the engineering principles associated with the design and operation of the major plant items and supporting systems incorporated in a fossil fuelled power plant. A basic technical knowledge is assumed, but the trainer will explain the basic concepts behind the operation of plant items, in addition to their detailed function. Presentation of the course will be through a combination of lectures, presentations and group activities.

Course Objective

At the end of the course participants will have gained a thorough understanding of the processes and operation of a fossil fuelled power plant. They will be able to:

- Explain the thermodynamic process of power generation
- Describe fuel handling and methods of firing
- Describe the steam raising process and the components and operation of boilers
- Understand the operation of large steam turbo-generators
- Explain the function of alternators, transformers, switchgear and instrumentation
- Describe start-up and shut down procedures of power generating units

Who Should Attend

The course is intended for existing operations staff, or those aspiring to an operational role, in a coal- or oil-fired power station. The course will also be useful to maintenance staff who require a fuller understanding of the processes of fossil fuelled power generation.

Unique Features with powerEDGE Training

- Pre-Course Questionnaire to help us focus on your learning objectives
- Detailed Course & Reference Manual for Continuous Learning and Sharing
- Practical Exercises & Case Examples to better understand the principles
- Limited class size to ensure One-to-One Interactivity
- Assessment at the end of the course to help you develop a Personal Action Plan

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Course Outline

**Thermodynamics and Steam theory**
- Heat transfer - radiation, conduction, convection
- Sensible and latent heat
- Superheat and reheat
- Saturation temperature, dryness, evaporation, condensation
- Throttling effects
- Steam table exercises

**Condensers, Feed and CW systems**

**Condensers**
- Key features of water cooled and air cooled condensers
- Condenser tube leaks, cleaning systems
- Vacuum Plant, Steam ejectors - liquid ring pumps

**Feed System**
- Feed heaters - deaerator – boiler feed pumps

**CW system**
- Direct & closed circuit systems
  - Pumps - screens - valves
  - Natural draught cooling tower -- hybrid cooling tower
  - Purge -- make-up – dosing

**Electrical Theory and Alternators**
- Electrical theory
- Electromagnetic induction
- Generator components - rotor – stator- exciter - AVR - slip rings & brushes - brushless excitation - cooling
- Generation of AC current
- Inductive & capacitive circuits -- power factor
- Synchronising
- Generator capability chart
- Switch gear
- Transformers
- Protection (simple appreciation)

**Instrumentation and Control**
- Pressure level, flow and temperature
- Transducers and transmitters
- Principles of control
- Pneumatic, hydraulic, electrical actuators
- Direct digital control (DDC) and distributed control (DCS)
- Control strategies

**Water Treatment and Chemical Control**
- Water impurities
- Hardness, silica, pH, dissolved solids, dissolved oxygen
- Cation and anion resin exchange
- Corrosion, prevention, dosing

**Operation of units and auxiliary systems**
- Boiler and steam turbine operation
- Alternator operation
- Auxiliary plant
- Unit starts and testing
- Unit trip and ‘black’ start procedures
- Alarms and emergencies
- Optimisation and efficiency

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Brian has considerable experience with coal fired plant up to 350MW and all Auxiliary Power Station Plant. As a Shift Charge Engineer, besides being responsible for the safe and efficient operation of the Units he was responsible for training Unit Operators to become Technician Engineers. In this new role the staff became responsible for the Permit System, HV Switching & Emergency Procedures.

**Brian's Industry career achievements**

**Eon/Powergen TXu Drakelow Power Station**
- Drakelow Power Station was a coal fired Power Station operating 2 x 350 MW Assisted Circulation Boiler/Units and 1 x 350 MW Supercritical Pressure Once through Boiler/Unit
- During unit outage joined Mechanical Maintenance where he was responsible for the Condenser/Feed Range repairs & Budget.

**Eastern Electricity Drakelow Power Station**
- Responsible for the introduction of computer based refresher training for PF Codes of Practice including liaison with outside agencies.
- In charge of Operations staff rotas and training of operators on the supercritical unit.
- Being responsible for the mill ball budget, saved costs by utilising high chrome second hand mill balls rather than new cast steel ones.

**CEGB Drakelow Power Station**
- Responsible for investigation into the total compressed air supply to the station and the replacement of the reciprocating compressors with up to date screw type compressors along with associated oil separating and drying equipment.

After the closure of Drakelow Brian went on to become involved in providing Operations training at various locations including Operations simulator training on a 500MW unit simulator (Coal Fired).
Also he was part of a team to develop operations training for Flue Gas De-Sulphurisation Plant (Limestone/Gypsum Process). In addition he has carried out auditing of Safety Rules and associated documentation.
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**IN HOUSE Available Dates**

Minimum 10 pax to Maximum 20 Pax

*price may vary for customisation

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**Early Bird Expires**

31\textsuperscript{th} Dec 2010

**4 Easy Ways to Register**

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**PAYMENT METHODS**

- By Cheque/ Bank Draft: Make Payable to Asia Edge Pte. Ltd.
- By Direct Transfer: Please quote AE1 with the remittance advise

**PAYMENT POLICY**

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to Asia Edge Pte Ltd. payment terms

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