

GENERATOR AND EXCITATION SYSTEMS (REF:OTSGES001)

Course Description

This course addresses the need of the power plant worker to understand basic principles of power generation and the safe, efficient operation and maintenance. It also provides a foundation for learning more of the technical aspects of power plant operations and maintenance.

Course Objectives

Upon successful completion of this course, the delegates will be able to:

- Carryout maintenance and troubleshooting techniques on power plant performance and generators
- Understand the principle, process and operations of power Generation.
- Discuss the principles of generators including generator auxiliary systems, generator construction.
- Determine excitation systems, voltage and frequency control
- Apply stator visual inspection and rotor visual inspection
- Distinguish abnormal operations and apply protective actions and recommendations for generator faults
- Perform testing and monitoring on pre-commissioning

Who Should Attend

This course is designed for operation engineers, instrumentation and control engineers, Electrical Engineers, Project Engineers, Maintenance Engineers, Power System Protection and Control Engineers, Building Service Designers, Electrical and Instrumentation Technicians.

Course Outline

Day 1

Excitation Systems, Voltage & Frequency Control

- Speed Governor Response to Frequency Deviations
- Automatic Voltage Regulator Response to Voltage Deviations
- Manual Regulator
- Impedance Compensator
- Volts/Hertz
- Maximum Excitation Limit
- Transfer & Tracking
- De-Excitation, etc.

- Generator Auxiliary Systems
- Purpose and Operations of the Generator Hydrogen Control System
- Generator Seal Oil System
- Stator Liquid Cooling System (as required)
- Abnormal Operations Relationships Between Operations, Protection and Alarms; Alarms, Protection when Off-Line, Tripping Methods, Protective Actions for Generator Faults and Abnormal Operations & Protection Recommendations (System Steady and Dynamic Conditions, etc.)
- Outage Planning & Scheduling

Why Maintenance

- Preparation
- Tooling
- Documentation
- Pre-Shutdown Maintenance
- Decision Making



Day 2

Generator Mechanical Maintenance Activities

- Why Generators Fail
- Special Tools
- Spare Parts
- Safety Precautions
- Disassembly/Reassembly Procedure
- Cleaning and Checklists

Stator Visual Inspection

- Loose Slot Wedges
- Discoloration
- Loose Punching
- Bar Vibration
- Girth Cracks
- Corona, etc.

Rotor Visual Inspection

- Collector Rings
- Rotor Journal Surface
- Terminal Studs
- Hydrogen Seal Areas
- Axial Flow Fans
- End Turns
- Field Slot Wedges
- Retaining Rings

Purpose of Generator Electrical Tests

- Safety Considerations

Day 3

Other Components

- Starting methods
- Starting characteristics
- Battery sizing
- Step load requirements
- Standby requirements
- Auto start and auto transfer schemes
- Auto transfer switches

DG Plant Layouts

- Industrial applications
- Power generation plant applications
- Single and multiple sets
- Fuel storage requirements
- Air intake system
- Auxiliary power requirements
- Typical power schemes

Testing and Commissioning

- Factory tests
- Pre-commissioning checks and tests
- Performance monitoring
- Fuel and lube oil consumption checks

Operation and Maintenance

- Safety requirements
- Operation monitoring based on applications
- Maintenance techniques
- Spares and inventory management
- Inspection
- Troubleshooting

