

# GENERATOR EXCITATION SYSTEMS



**EPE121**  
**Electrical &**  
**Power**  
**Engineering**

**COURSE TITLE****GENERATOR EXCITATION SYSTEMS****COURSE DATE/ VENUE**

17-21 January. 2022

Vienna, Austria

**COURSE REFERENCE**

EPE121

**COURSE DURATION**

5 Days

**DISCIPLINE**

Electrical & Power Engineering

**COURSE INTRODUCTION**

The successful operation of any Generating Systems ultimately depends on how well the inspection, testing, maintenance and troubleshooting functions are carried out. Well-developed procedures and planning will in the long run result in reduced costs, equipment down time, parts requirements and troubleshooting complexity.

Delegates are encouraged to participate by active involvement in group discussions, practical exercises and sharing experiences.

**COURSE OBJECTIVE**

Following the attendance at this seminar, participants will return to their respective departments equipped with new or refreshed skills to ensure that electrical generating equipment and it's control systems are inspected, tested, maintained and when necessary repaired using well planned troubleshooting procedures in a fashion that ensures reduced costs and/or down time plus identified faults or problems are repaired and the underlying causes are identified and eliminated to reduce further failures. On successful completion of this seminar, participants will have:

- A better understanding of generator principles
- A better understanding of troubleshooting procedures as applied to generating equipment

- An improved capability in the use of test equipment
- A better understanding of failure modes and failure analysis
- A refreshed awareness of electrical safety concerns

## **COURSE AUDIENCE**

This is intended for Electrical Engineers, Electrical Supervisors and Electrical Technicians engaged in the inspection, testing, troubleshooting, maintenance and repair of electrical generation equipment.

## **COURSE CONTENT**

### **DAY 1**

#### **Definitions**

- Generator systems (AC) and equipment
- Generator systems (DC) and equipment
- Operation, inspection, testing, control, maintenance and troubleshooting
- Control systems

#### **Interpretation and Use of Drawings**

- Single-line electrical drawings
- Control schematics
- Wiring lists
- P&ID's
- Logic and standard symbols

#### **Maintenance Planning**

- Developing schedules and procedures
- Define operation requirements for parts and labor
- Define maintenance requirements for parts and labor
- Regular, preventative, predictive and emergency maintenance

#### **The Use of Test Equipment**

- Digital voltmeter (DVM)
- Oscilloscopes
- Megger
- Frequency meter
- Temperature probes/pyrometers
- Ammeters
- Power meters
- Load banks
- Digital hydrometers
- Cable fault locators

## **DAY 2**

### **The Technology of Generators**

- Principles of electrical generation (AC, DC and Emergency)
- Power supplies (battery chargers, rectifiers, inverters)
- Batteries
- Generator Drivers (gas/steam/water turbine, diesel/gas engine)
- Governors (control systems)
- Programmable logic controllers (PLC)
- Synchronization
- Power grid and network considerations

## **DAY 3**

### **The Technology of Generators**

- Increasing or decreasing the voltage (transformers)
- Neutral ground resistors (NGR)
- Switchgear
- Motor control centers (MCC)
- Disconnect switches
- Power monitoring
- Control relays/timers/switches
- Generator protective devices

### **Inspection and Testing of Generators**

- Methods
- Terminology
- Principles
- Special techniques
- NEC check lists

## **DAY 4**

### **Troubleshooting of Generators**

- Methods
- Terminology
- Principles
- Special techniques
- Case studies/examples
- Single line drawings
- Group exercises

### **The Development of a Job Plan**

- Identification of the troubleshooting step-by-step sequence
- Procedure preparation

- Documentation
- Follow-up
- Safety considerations and training

### **A Review of Safety Requirements**

- Area classifications
- NEC electrical codes
- Safety information

## **DAY 5**

### **The Identification and Repair of Problems/Failures**

- Common mode failures
- Phase imbalance
- Contact pitting/arcng
- Electronic component failure
- Fusing
- Generator windings/bearings/brushes
- Excitation circuits
- Battery cells
- Inverters/rectifiers/battery chargers
- Bushings
- Switches
- Control circuits
- Ground faults



## **COURSE CERTIFICATE**

**TRAINIT ACADEMY** will award an internationally recognized certificate(s) for each delegate on completion of training.

## **COURSE FEES**

\$6,150 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## **COURSE METHODOLOGY**

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will

make extensive use of real-life case examples in which he has been personally involved. 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 multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions

