Circuit Breakers and Switchgears Inspection, Maintenance, Design, Repair and Troubleshooting

Course general description:

This program is designed to update participants with the latest development of Circuit Breakers and to present some of the most common and updated aspects of low, medium and high voltage switchgear maintenance. It should be understood that there is an incredible variety of equipment used on low, medium and high voltage switchgear today. Switchgears play an important role in the distribution and control of electrical power in manufacturing or power plant and in a utility distribution system. Neglecting maintenance practices can lead to power system inefficiency and loss of system reliability..

Audience:

This course is designed for:

1- Skilled trades
2- Electrical supervisors
3- Electrical Engineers
4- Anyone involved in the Maintenance of industrial power circuit breakers.

Course objectives:

By end of the course participants will gain:

1- How to List the voltage convention classifications used in this course.
2- Describe switchgear construction.
3- Describe a ground fault relay system.
4- Describe the three basic types of low and medium voltage circuit breaker contacts.
5- Describe the molded case circuit breaker

Course duration:

5 days

Course location:

Cairo-Dubai-Istanbul

Course contents:

Day-1

- Electrical engineering basic concepts
- Three phase review and per unit
- Voltage levels
- One line and three line diagram
- Generation system layout
- Transmission system layout
- Substation system layout • Distribution system layout
- Fuses • Auto-recloses
- Automatic sectionalizer

Day-2

- Circuit Breakers
- Isolator switches
- Load switches
- Relays

- Current transformer
- Voltage transformers
- Arc phenomena
- Maintenance of the Arc
- Properties of Arc
- Arc Interruption theory
- Circuit Breaker Rating
- Circuit constants and circuit conditions
- Conditions of severity
- Restriking voltage transient
- Class A ultra fast transients
- Class B system transients

Day-3

- Low voltage molded case current limiting circuit breakers
- Low voltage molded case circuit breakers with high breaking capacity
- Insulated case circuit breakers
- Low voltage air circuit breakers
- Low voltage circuit breakers specification
- Advantages of vacuum interruption
- Vacuum contactors and interrupters
- The vacuum medium
- The vacuum arc
- Vacuum arc stability
- Vacuum switch construction
- Applications of vacuum circuit breakers
- **Day-4**
- Basic Features of SF6 Breakers
- Dielectric properties of SF6
- Quenching properties of SF6
- Construction of SF6 breaker

Day-5

- SF6 CB types
- Puffer type SF6 breakers
- Double Pressure System
- Single Pressure Puffer Piston System
- Single-Pressure Self Blast System
- Improvement in SF6 Breakers for HV

Methodology:

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions

- 10% Software (if applicable or examples)

Course code: (TEEI013)