



EE206: HV Substation Inspection, Testing & Reporting



Training Description:

A substation is a high – voltage electric system facility. It is used to switch generators, equipment, and circuits or lines in and out of a system. It is also used to change AC voltages from one level to another, and/or change alternating current to direct current or direct current to alternating current.

The electric power substation, whether generating station or transmission and distribution, remains one of the most challenging and exciting fields of electric power engineering. Recent technological developments have had tremendous impact on all aspects of substation inspection, testing and reporting.

This intensive training course is designed to provide participants with a detailed and up-to-date overview of HV substation inspection, testing and reporting. It covers the types, parts, equipment and the major components of substation; the overcurrent protection for phase and earth faults and recommended grading intervals; the general substation inspections and the need for substation inspections; the categories and frequency of substation; the initial verification and electrical inspection safety; and the equipment to be inspected, inspection sequence and pre-tests precautions.

During this interactive course, participants will learn to carryout major substation inspection, environmental inspection, period testing and filing of inspection record sheet; illustrate documentation and record keeping, test requirements, component testing procedures, commissioning and megger test; recognize substation grounding systems and determine qualifications of testing organizational and personnel; employ testing procedures and basic fault calculations for medium voltage switchgear and oil circuit breakers; identify the measuring and control panel instruments of GIS and SF6 outdoor circuit breakers; operate mechanism of fluid/air pressure and carryout switchyard equipment inspection and reporting; and illustrate battery room equipment inspection and reporting including insulation testing and maintenance.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Inspect and test the HV substations in a professional manner
- ✓ Identify the types, parts, equipment and the major components of substation
- ✓ Employ overcurrent protection for phase and earth faults and recommended grading intervals
- ✓ Carryout general substation inspections and emphasize the need for substation inspections
- ✓ Discuss the categories and frequency of substation inspection and perform initial verification and electrical inspection safety
- ✓ Recognize the equipment to be inspected as well as apply inspection sequence and pre-tests precautions
- ✓ Carryout major substation inspection, environmental inspection, period testing and filing of inspection record sheet
- ✓ Illustrate documentation and record keeping, test requirements, component testing procedures, commissioning and megger test
- ✓ Recognize substation grounding systems and determine qualifications of testing organizational and personnel
- ✓ Employ testing procedures and basic fault calculations for medium voltage switchgear and oil circuit breakers





- ✓ Identify the measuring and control panel instruments of GIS and SF6 outdoor circuit breakers
- ✓ Operate mechanism of fluid/air pressure and carryout switchyard equipment inspection and reporting
- ✓ Illustrate battery room equipment inspection and reporting including insulation testing and maintenance

Training Designed for:

This course is intended for industrial, utility or plant engineers, maintenance supervisors, consulting engineers, electric utility engineers, substation fitters and other technical staff.

Training Program:

DAY ONE:

- ❖ Pre-Test
- ❖ Introduction
- ❖ Types of Substations, Substations Parts & Equipment
- ❖ Major Components, Overcurrent Protection for Phase & Earth Faults
- ❖ Recommended Grading Intervals, General Substation Inspections
- ❖ The Need for Substation Inspections

DAY TWO:

- ❖ Categories of Substation Inspection, Frequency of Substation Inspections
- ❖ Initial Verification, Safety in Electrical Inspection
- ❖ Equipment to be Inspected, Sequence of Inspection
- ❖ Pre-tests Precautions

DAY THREE:

- ❖ Major Substation Inspection, Environmental Inspection, Period Testing
- ❖ Filling in of 'Inspection Record Sheet', Documentation & Record Keeping
- ❖ Test Requirements, Component Testing Procedures

DAY FOUR:

- ❖ Commissioning, Megger Test, Substation Grounding Systems
- ❖ Qualifications of Testing Organizational & Personnel, Testing Procedures
- ❖ Basic Fault Calculations, Medium Voltage Switchgear
- ❖ **Practical Sessions**
 - This hands-on and includes real-life case studies and exercises

DAY FIVE:

- ❖ Oil Circuit Breakers
- ❖ Identifying the Measuring & Control Panel Instruments of GIS & SF6 Outdoor Circuit Breakers
- ❖ Meter Reading & Safe Level of SF6 Pressure in Different Compartments
- ❖ Operating Mechanism of Fluid/Air Pressure, Switchyard Equipment Inspection & Reporting
- ❖ Battery Room Equipment Inspection & Reporting, Insulation Testing & Maintenance
- ❖ Course Conclusion
- ❖ Post-Test and Evaluation



Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant’s manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department