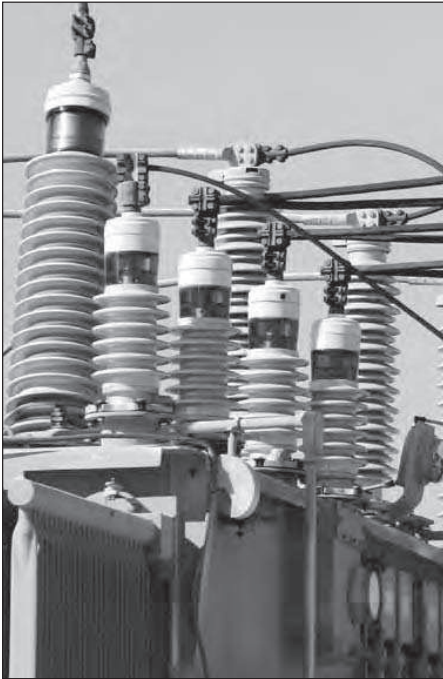

POWER DISTRIBUTION



OBJECTIVES:

- Correctly implement the right type of switchgear for the appropriate application
- Economically select and install the best-suited power cable for a specific application
- Evaluate the need for power factor correction and successfully implement correction strategies
- Implement successful maintenance strategies and procedures
- Effectively use software techniques to solve problem areas in your power network

WHO SHOULD ATTEND:

- Electrical engineers
- Project engineers
- Design engineers
- Instrumentation and design engineers
- Electrical technicians
- Field technicians
- Electricians
- Plant operators

The Workshop

A practical two-day workshop in power distribution, focusing on medium voltage (1kV-36kV) power considerations, switchgear, power cables, transformers, power factor correction, earthing, lightning protection and network studies.

You will gain technical know-how in these areas which are not covered by university or college programs.

Objectives

At the end of this workshop participants will be able to:

- Understand practical power distribution fundamentals
- Determine short-circuit ratings quickly and effectively
- Assess the influence of fault levels on switchgear ratings
- Select the correct type of switchgear for the right application
- Evaluate the advantages of modern state-of-the-art switchgear protection for your applications, including preventative maintenance information
- Recognise the different applications for various cable insulation types
- Know when and how to use single core cables vs three core cables
- Specify correct power cable installation methods
- Correctly utilise and protect power transformers
- Assess and specify correct grounding throughout your electrical network
- Determine the need for Power Factor Correction (PFC) for your environment
- Assess the economic justification for installing PFC equipment
- Correctly specify PFC equipment and be aware of practical consequences
- Confidently use computer simulation software to solve and predict power network

The Program

INTRODUCTION

- History and growth of power distribution
- Typical characteristics of a distribution system
- Main components of a distribution system
- Main equipment types in a distribution system
- Electrical safety and power security

OVERVIEW OF POWER DISTRIBUTION

- Voltage classification
- Multiple voltage levels in power distribution
- Types of distribution arrangements and redundancy
- Expandability

SHORT-CIRCUIT CURRENT CALCULATIONS

- What is a fault?
- Effects of a fault
- Types of faults
- Limiting the damaging effects of a fault
- Need to know the magnitude of fault current
- Fault current calculations

PRACTICAL WORK

- Calculation examples

TRANSFORMERS

- Introduction
- Transformer theory
- Transformer construction
- Transformer cooling
- Transformer voltage control
- Power transformers and distribution transformers
- Installation of transformers
- Special aspects in installation of large power transformers
- Fire protection measures for large transformer installations
- Transformer troubleshooting

MEDIUM VOLTAGE (MV) CIRCUIT BREAKERS

- Role of a circuit breaker in a distribution system
- Distinction between circuit breaker and disconnector/isolator
- Different types of circuit breakers and their operating principle
- Comparison of relative features and applications
- Circuit breaker operating mechanisms
- Circuit breaker ratings

MV SWITCHGEAR

- Switchgear options
- Outdoor MV switchgear
- Indoor MV switchgear
- MV switchgear panel configurations
- MV switchgear auxiliary devices
- MV switchgear ratings

POWER CABLES

- Types and construction of cables
- Basic design and selection
- Insulating materials for LV and HV cables
- Accessories for cable installation
- High voltage power transmission using cables
- Failure of cables
- Fault detection
- New technologies – superconductivity for high capacity cables

PRACTICAL WORK

- Sizing and installation of power cables using cable datasheets - typical problems

ELECTRICAL SAFETY AND ROLE OF EARTHING

- Overview of system earthing
- Hazards posed by electrical equipment
- Electrical shock hazard
- Direct and indirect contact
- Role of protective earthing
- Indirect contact hazard – importance of protection
- Sensing of earth faults
- Equipotential bonding
- Use of Personal Protective Equipment (PPE)
- Arc flash danger in electrical equipment

POWER QUALITY AND PF COMPENSATION

- Limits on electrical parameters
- What is power quality?
- Power quality indicators
- Power quality improvement measures
- Causes and effects of low power factor
- Power factor compensation
- Methods to improve power factor and benefits
- Economic justification for power factor correction - worked out examples
- Caution: capacitors with induction motors

POWER SYSTEM AUTOMATION

- Definition of the term
- What is power system automation?
- Power system automation architecture
- Use of DCS

SUMMARY, OPEN FORUM AND CLOSING