

ELECTRICAL MAINTENANCE FOR ENGINEERS AND TECHNICIANS



WHAT YOU WILL LEARN:

- A practical toolkit of know-how on latest testing and maintenance requirements
- Grasp the latest updates in cable testing and technical skills in EPM programming
- Understand the operation of electrical motors, transformers, switchgears, UPS, SCADA and circuit breakers
- Practical experience in MV and HV testing, transformer troubleshooting and fire protection measures for large transformer installations
- Design tips and tricks in motor and circuit breaker cleaning, testing and installations
- How to detect faults in cables and motors
- Skill yourself up as the local guru in electrical maintenance and testing

WHO SHOULD ATTEND:

- Consulting engineers
- Design engineers
- Designers
- Electrical engineers
- Electronic technicians
- Instrumentation and control engineers/technicians
- Plant managers
- Process control engineers
- System engineers
- System integrators
- Test engineers



Technology Training that Works

The Workshop

We have taken all the latest techniques and know-how relating to electrical maintenance and distilled this hard-hitting workshop so that you can update yourself in this fast-moving and powerful area. This workshop will also update you with the latest information on the maintenance and installation aspects of cables, substations and switchgear, transformers, circuit breakers and motors. You will become familiar with the latest techniques in safety operations of the above-mentioned electrical equipment.

The section on Electrical Preventive Maintenance (EPM) within the program cover the key aspects of EPM and its benefits. The electrical drawing and schematics area discusses the various types of drawings logic diagrams, ladder diagrams, cabling and wiring diagrams etc.

Safety is a very important aspect of electrical maintenance and equipment needs to be inspected and maintained according to the relevant international regulations. In this workshop the basic concepts related to safety rules and hazards are covered in detail with a separate section on inspection procedures.

Special focus has been given to the maintenance and asset management of switchgear. We also look at the testing procedures for major electrical equipment. A separate section is dedicated to covering special aspects of the installation of large power transformers and fire protection measures taken while installing them. A section on troubleshooting of transformers is also included.

This course also covers the new approaches of fault finding, maintenance, testing and troubleshooting of electric motors. As well as a section on installation and fault detection for cables.

Grounding techniques, types of faults and their effects, effects of inadequate grounding and inspection, concepts of SCADA, testing and maintenance of SCADA are covered in detail. We have also focused on issues with power quality, the role of the UPS in maintaining power quality, installation and maintenance of UPS, types of relays and relay maintenance.

Pre-requisites:

Delegates will need a general understanding of electrical systems.

Please bring a calculator (or computer), pens and notepaper along to the course to assist with the calculations and practical exercises.

Practical Sessions

This is a practical hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

To gain full value from this workshop, please bring your laptop/notebook computer.

The Program

INTRODUCTION

ELECTRICAL PREVENTIVE MAINTENANCE (EPM) PROGRAM

- EPM and its benefits
- Energy conservation
- Planning an EPM program
- Personal safety
- Equipment loss
- Production economics
- Main parts of an EPM program
- Programmed inspections
- Recordkeeping
- Training for safety and technical skills

ELECTRICAL DRAWINGS AND SCHEMATICS

- Single line and 3 line diagrams
- Schematic diagrams
- Logic diagrams
- Ladder diagrams
- Cabling and wiring diagrams

ELECTRICAL SAFETY TECHNIQUES

- Principles of safety rules
- Basic theory of electrical safety
- Static electricity and protection
- Hazards due to electrical arcing and heating
- Inspection of electrical systems for safety

SUBSTATION COMPONENTS, MAINTENANCE AND ASSET MANAGEMENT OF SWITCHGEAR

- Substation types
- Substation components
- Switchgear diagnostic techniques
- Substation battery conditioning and monitoring
- Circuit breaker measurement
- Maintenance and asset management of switchgear

PRACTICAL MV AND HV TESTING OF ELECTRICAL EQUIPMENT

- Introduction
- Insulation testing
- High potential tests
- Oil testing
- Testing of transformers
- CT testing
- VT testing
- Ducter testing
- Tests on other major equipment
- Field tests

TRANSFORMERS

- Installation of transformers
- Special aspects of installation of large power transformers
- Fire protection measures for large transformer installations
- Transformer troubleshooting

MOTOR PROTECTION, CONTROL AND MAINTENANCE

- Protection of motors
- Installation and fault finding
- Motor failure analysis
- Testing
- Maintenance and cleaning

CABLES

- Cable installation
- Failure of cables and fault detection
- Visual inspection
- Cable testing

POWER QUALITY

- Introduction to power quality
- Installation guidelines

UNINTERRUPTED POWER SUPPLY (UPS)

- Static UPS systems
- Testing
- Periodic inspection and maintenance of UPS batteries

SAFE OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT

- Introduction
- Key safety factors in operations and maintenance of electrical installations
- Isolation during maintenance of electrical installations
- Visual checks for safety
- Monitoring hot spot to improve safety
- Earthing for safety during maintenance
- Need for periodic inspection and maintenance
- Emergency first aid training

GROUNDING AND GROUND FAULT PROTECTION

- Need for protection
- Basic requirements of protection
- Types of protection
- Faults, types and effects
- Causes of inadequate grounding
- Grounding system inspection
- Testing and monitoring
- Maintenance of grounding system
- Grounding for safety during maintenance
- Use of personal protective equipment
- Fault finding and troubleshooting

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

- Introduction
- SCADA components
- Monitoring
- Testing and maintenance

OTHER TOPICS

- Relay types and maintenance
- Portable electric tools
- Maintenance reports

SUMMARY, OPEN FORUM AND CLOSING