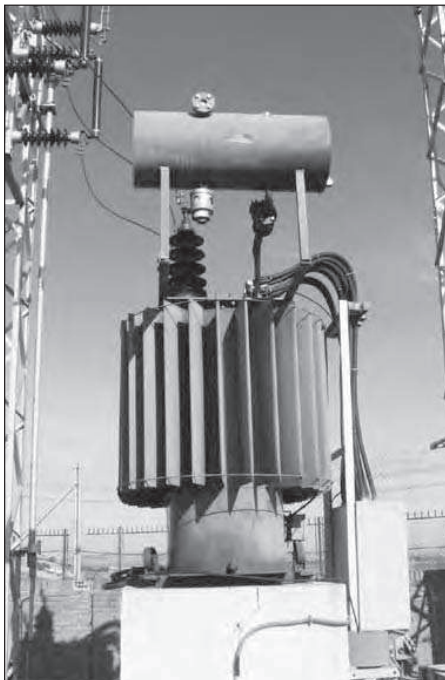

ELECTRICAL MAINTENANCE FOR ENGINEERS AND TECHNICIANS



WHAT YOU WILL GAIN:

- Know-how on latest testing and maintenance requirements
- Understand 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
- Become the local guru in electrical maintenance and testing

WHO SHOULD ATTEND:

- Instrumentation and Control Engineers/Technicians
- Process Control Engineers
- Electrical and Test Engineers
- System Integrators
- Designers and Design Engineers
- Plant Managers
- System Engineers
- Electronic Technicians

The Workshop

This workshop will update you with the latest information on cables, substations and switchgear, transformers and circuit breakers. You will become familiar with the techniques in control and maintenance and safety operations of the abovementioned electrical equipment. The Electrical Preventive Maintenance (EPM) program covers almost all the key aspects of EPM and its benefits. The electrical drawing and schematics area discusses in depth the topics of logic diagrams, ladder diagrams, cabling and wiring diagrams and electrical documentation.

The basic concepts of switchgear and substations, their functionality along with the maintenance and repair of the GIE (Gas Insulated Equipment) and GIS (Gas Insulated Substations) are examined in detail for substations and switchgear. You will also look at transformers: their construction, cooling, and voltage control. It covers special aspects of installation of large power transformers and fire protection measures taken while installing large power transformers. New approaches of fault finding, maintenance, testing and troubleshooting of electric motors are discussed, as well as concepts of circuit breaking and types of circuit breaker.

This course also covers inspection and cleaning of circuit breakers. Earthing techniques, types of faults and their effects, effects of inadequate earthing and inspection, concepts of SCADA, testing and maintenance of SCADA are covered. You will also focus on the power quality, issues with the power quality, role of UPS in maintaining power quality, installation and maintenance of UPS.

Pre-requisites:

You will need a general understanding of electrical systems.

The Program

INTRODUCTION

ELECTRICAL PREVENTIVE MAINTENANCE (EPM) PROGRAM

- 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 skills

ELECTRICAL DRAWINGS AND SCHEMATICS

- Single line, 3 line and schematic diagrams
- Logic and ladder diagrams
- Cabling and wiring diagrams
- Electrical documentation

ELECTRICAL SAFETY TECHNIQUES

- Principles and basic theory
- Static electricity and protection
- Electrical arcing and heating
- Inspection of electrical systems

CABLES

- Types, construction, selection and installation
- Insulation materials for LV and HV cables
- Failure of cables and fault detection
- Visual inspection and cable testing

SUBSTATIONS AND SWITCHGEAR

- Historic perspective
- Rating and specification
- Components
- Safety policies
- Gas-insulated substations and equipment
- Maintenance, repair and asset management

MEDIUM VOLTAGE SWITCHGEAR

- Switchgear options
- Outdoor and indoor MV switchgear
- Panel configurations and auxiliary devices
- MV switchgear ratings

TRANSFORMERS

- Theory, construction and cooling
- Voltage control and installation
- Power and distribution transformers
- Installation of large power transformers
- Fire protection measures and troubleshooting

MOTOR PROTECTION, CONTROL AND MAINTENANCE

- AC and DC electric motors
- 3-phase AC induction motors
- Motor control and protection
- Installation and fault finding
- Failure analysis and testing
- Maintenance and cleaning
- New technologies and developments

POWER QUALITY

- Surge and transient protection
- Earthing and noise control
- Harmonic sources
- Capacitive/inductive relationships
- Harmonic site analysis procedures
- Power conditioning
- Installation guidelines

UNINTERRUPTED POWER SUPPLY (UPS)

- Continuity of power and UPS systems
- Rectifiers and inverters
- Static UPS systems
- Testing and periodic inspection

MV AND HV TESTING OF ELECTRICAL EQUIPMENT

- Insulation, high potential and oil tests
- Transformers
- CT and VT testing
- Ductor and field test

SAFE OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT

- Key safety factors
- Isolation, visual checks and earthing
- Monitoring hot spots
- Emergency first aid training

EARTHING AND EARTH FAULT PROTECTION

- Faults, types and effects
- Causes of inadequate earthing
- Inspection, testing and monitoring
- Maintenance, fault finding and troubleshooting
- Personal protective equipment

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

- Components
- Monitoring, testing and maintenance

CIRCUIT BREAKERS

- Operating principles
- Types: air, oil, minimum oil, vacuum, air blast, SF6, moulded case circuit breakers
- Ratings, inspection and cleaning

SUMMARY, OPEN FORUM AND CLOSING

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.