

LIGHTNING, SURGE PROTECTION AND EARTHING

of Electrical & Electronic Systems



YOU WILL LEARN HOW TO:

- Select and apply an appropriate lightning dissipation system
- Understand how ground electrodes work and their role in preventing lightning and surges from damaging equipment
- List the types of systems that cannot be grounded
- Describe what systems can be operated ungrounded
- Correctly select and apply surge protection appropriate to the type of equipment being protected
- Apply practical knowledge of surge and transient protection
- Troubleshoot and fix Earthing and surge problems
- Design, install and test an effective Earthing system for electronic equipment
- Understand lightning and how to minimise its impact on your facility
- Protect sensitive equipment from lightning

WHO SHOULD ATTEND:

- Instrumentation & Control Engineers
- Consulting Engineers
- Electrical Engineers
- Project Engineers
- Maintenance Engineers
- Electrical Contractors
- Safety Professionals
- Consulting Engineers
- Electricians
- Electrical Inspectors
- Power System Protection & Control Engineers
- Building Service Designers
- Data Systems Planners and Managers
- Electrical and Instrumentation Technicians



THE WORKSHOP

Few topics generate as much controversy and argument as that of Lightning and Surge Protection of electrical and electronic systems. Poor practices in Earthing and incorrect application and selection of Lightning and Surge protection devices can be the cause of continual and intermittent difficult-to-diagnose problems in a facility, often resulting in lost production and equipment failure.

This workshop looks at these issues from a fresh yet practical perspective and enables you to reduce expensive down time on your plant and equipment to a minimum by correct application of these principles.

This workshop is designed to demystify the subject of Lightning, Surge Protection and Earthing and presents the subject in a clear, straightforward manner. Installation, testing and inspection procedures for industrial and commercial power systems will be examined in detail.

Essentially this course is broken down into the methods used to prevent lightning entering a facility such as dissipation arrays and those that divert surge energy away from sensitive equipment. Dissipation systems are discussed with associated earthing systems. Surge protection devices (surge arrestors) are dealt with by discussing the unique properties of the different devices to enable the delegate to select the correct device suited to the application required. Earthing and surge protection for Telecommunications and IT systems are examined in detail. Finally, the impact of lightning is examined and simple techniques for minimising its impact described.

PRE-REQUISITES

Some working knowledge of basic electrical engineering principles is required, although there will be a revision at the beginning of the workshop. Experience with Earthing problems will enable the workshop to be placed in context.

THE PROGRAM

DAY ONE

INTRODUCTION AND BASICS

- Fundamentals of Earthing
- Bonding
- Lightning
- Surge Protection
- Dissipation Arrays

RECOMMENDED DESIGN AND INSTALLATION PRACTICES

- Wiring and Earthing for Safety and performance
- Wiring and Distribution Systems
- Dedicated and derived Neutral Systems
- Earthing and bonding equipment
- Earth electrodes and earth mats
- Supplementary earthing systems (chemical earths)

FUNDAMENTALS OF EARTHING FOR BUILDING ELECTRICAL SYSTEMS

- Earthing of Building Systems
- Which Electrical Systems can be operated ungrounded
- Proper methods of Earthing Building Electrical Systems
- Location of the service Earthing Connection
- Proper Sizing of Grounded (Neutral) Conductors

TYPICAL RULES TO BE APPLIED

- Rules for multiple services to one Building
- Rules for Low Impedance and High Impedance Systems
- Rules for Bonding Requirements at Building Service Equipment
- Earthing Electrodes, Systems and Conductors
- Bonding Enclosures and equipment
- Equipment Earthing Conductor types
- Enclosure and Equipment Earthing
- Earthing of separately derived Systems
- Earthing at more than one building
- Disconnecting means for separate buildings

EARTHING AND NOISE CONTROL

- Misconceptions of performance Earthing
- Single Point versus Multi point techniques
- Noise and Zero Signal Reference Grid
- Avoiding Non recommended practices
- Shielding

DAY TWO

ELECTRICAL FAULTS

- Ground Fault Circuit Interrupters
- Equipment Ground Fault Protection Systems

APPLICATIONS OF EARTHING AND BONDING

- Earthing and Bonding in Hazardous (classified) locations
- Earthing and bonding for Health Care
- Earthing and Bonding for swimming pools, hot tubs and spas
- Static and Electricity: Earthing and Bonding Requirements
- Common Violations
- Building Electrical Inspection Procedures
- How to recognise Hazards

LIGHTNING

- Need for a lightning protection system
- Which protection systems work and which don't
- Best location for IT equipment
- Optimum Earthing for building
- Pitfalls of isolated Earthing
- Shielding and bonding of electronics and communications
- Optimum location of surge protection devices

SURGE AND TRANSIENT PROTECTION

- Lightning Phenomena
- Protection of Power Supply
- Protection of Electric Communications Circuits
- Power System Faults and Switching Surges
- Mitigation techniques
- Case Studies

POWER CONDITIONING

- Power Conditioners
- Uninterruptible Power Systems
- Power Quality Alternative Sources

SUMMARY, OPEN FORUM & CLOSING

ON-SITE TRAINING

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- ✓ Have the training delivered when and where you need it.

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