

Earthing, Lightning & Surge Protection Course



13 – 15 May



Live Online Training



Only 17 Seats Available



3 CPD Points from ECSA



COURSE OVERVIEW

Earthing and protection of industrial and commercial electrical systems against lightning continue to be a very important area of study. Any engineer involved in power supply networks ought to have some working knowledge of earthing and its role in ensuring safety of equipment and people to avoid mistakes that could lead to fatalities and cessation of business.

For proper operation and maintenance of electric power substations it is important to understand and maintain correct earthing systems in the utility substation and in industrial electrical networks. This 3-day course will be covering earthing, surge and lightning protection for power and electronic systems, telecommunications and IT systems.

Some of what you will learn:

- Principles of design, testing and maintenance of earthing systems and equipment
- Hazards and safety precautions associated with earthing
- Requirements and procedures for electrical safety compliance standards
- New methodology for carrying out lightning risk assessments on distribution lines
- The role of earthing in the mitigation of noise in electrical systems
- Soil characteristics, resistivity and structure in relation to the design of earthing systems



DAY 1

Session 1: Fundamentals and Preliminaries

- Reasons for Power Systems Earthing
- Reasons for Equipment Earthing (Bonding)
- Touch and Step Potentials
- Power System Earth Systems (LV, MV and HV)
- Earthing and International / National Standards

Session 2: Systems Components

- Air terminals location, size and materials
- Minimum requirements for roof and ground conductors
- Connectors and fittings

Session 3: Importance of Neutral Grounding

- Reduced magnitude of transient over voltages
- Simplified ground fault location
- Improved system and equipment fault protection
- Reduced maintenance time and expense
- Greater safety for personnel
- Reduction in frequency of faults

Session 4: Methods of Neutral Grounding

- Unearthed neutral system
- Solid neutral earthed system
- Resistance neutral earthing system
- Resonant neutral earthing system
- Transformer earthing

Session 5: Body Current Limit

- 1 mA: Threshold of perception
- 1 mA to 6 mA: Let-go currents
- 9 mA to 25 mA: Painful, difficult to release energized objects
- 25 mA to 60mA: Muscular contractions, breathing difficult
- 60 mA to 100mA: Ventricular fibrillation

DAY 2

Session 6: Earth Electrode Systems

- Objectives
- Resistance Requirements
- Soil Resistivity
- Measurement of Soil Resistivity
- Types of Earth Electrode Systems
- Resistance Properties
- Measurement of the Resistance of Earth Electrodes

Session 7: Electrode Enhancement and Protection

- Electrode Enhancement
- Cathodic Protection
- Lightning Protectors
- Resistance and Surface Potential Distribution of Typical Earth Electrode Construction
- Constructional aspects of Earths of Earthing Electrodes

Session 8: Recommended Design & Installation Practices

- Wiring and grounding for safety and performance
- Wiring and distribution systems
- Dedicated and derived neutral systems
- Grounding and bonding systems

Session 9: Static electricity and protection

- What is static electricity and how is it generated?
- Examples of static charge build up and its dangers
- Energy of spark due to static electricity
- Ways of controlling static build up
- Risk assessment and preventive measures

Session 10: Soil Resistivity Testing

- Wenner method
- Schlumberger method
- Soil resistivity variability

Session 11: Physics of lightning and Lightning Protection

- Physics of Lightning
- Electrical Surges due to Lightning
- Lightning Waveforms
- Lightning Protection Systems (Evaluation and Selection)
- Lightning Protection of Electricity Supply Systems
- Lightning Protection for Buildings

DAY 3

Session 12: Surges and surge protection

- Causes and mitigation of surges
- Ways by which surges couple into electrical circuits
- Principles of surge protection and commonly used devices
- Graded surge protection
- Relative merits of different types of surge protection devices for sensitive instrumentation
- Surge protection of telemetry and data communication systems

Session 13: Power Conditioning

- Power conditioners
- Uninterruptible power systems
- Power quality alternative sources

Session 14: Quality (PQ) — Electrical noise and mitigation

- Wiring and Grounding for Power Quality
- Electrical Environment and Causes of Power Quality / Noise Disturbances
- PQ and Grounding for PQ
- Typical Wiring and Grounding Problem
- Minimize Electrical Interference
- Shielding Methods

Session 15: Power Quality (PQ) — Harmonics

- Frequency and Power Quality
- Effects of Harmonics in Electrical Systems
- Minimize Harmonic Interference

End of Training Program



WHO SHOULD ATTEND

This 3-day training course is specifically designed for:

Electrical Engineers & Technicians / Engineering Managers / Project & Design Engineers

Maintenance Engineers / Power System Protection & Control Engineers

Instrumentation & Control Engineers / Electrical Design Consultants

Facilities Managers / Building Service Designers / Plant Operators

Government Safety Regulators / Inspectors



Brief Bio

Professor Walker is the director of a company that specializes in consultation on High Voltage insulation testing as well as the supply of test equipment for High Voltage applications. He is a Doctor of Technology graduate from the Vaal University of Technology, completed in 2005 with a thesis titled "Diagnostic Evaluation of Water Tree Aged XLPE-Insulated Cables".

He started with a Higher National Diploma in Electrical Engineering acquired at Vaal Triangle Technikon where he later worked as a lecturer in the Department of Power Engineering after completing his Bachelor of Technology Degree. In 2005 he was appointed an Associate Professor at Vaal University, and subsequently the head of the Institute for High Voltage Studies, a position he held until his retirement the following year.

Professor Walker has over the years of acquiring field and academic experience; he also published a number of articles and journals on electrical power systems and has presented a number of papers at local and international conferences.

Note: Professor's full professional Biography is available on request.



FREE
Apple iPad



Booking Form

#: **LM**

Earthing, Lightning & Surge Protection Course | 13 – 15 May |
Hilton Hotel, Sandton or Live Online

Please complete this form and return to: info@kapitalbiz.co.za & will confirm your booking.

Company Name: _____

Postal Address: _____

Country: _____

VAT Number: _____

Tel Number: _____

Cell Number: _____

Date: _____

Authorized By: _____

Position / Signature: _____

Delegates Details (*please use block capitals*)

First Name & Last Name(s)	Email Address	Designation	Cell Number
1.			
2.			
3.			
4.			
5.			
6.			
7.			

1. Payment Terms On the return of the registration form, full payment is required within 14 working days. Payment must be received prior to the training start date. **KapitalBiz** reserves the right to refuse entry into the conference should full payment not have been received prior to this date. Cancellation will be charged under the term set out below. **2. Cancellations, No shows & Substitutions:** Cancellations received in writing more than 21 days prior to the event being held carry a 50% cancellation fee. Should cancellations be received between 21 days and the date of the event, the full training fee is payable and non – refundable. Non- payment or non-attendance does not constitute cancellation. No show will be charged the full registration fee. Cash alternatives will not be offered, however, substitutes at no extra charge are welcome. **3. Alterations to advertised package:** **KapitalBiz** reserves the right to alter this program without notice or penalty and in such situations no refunds or part – refunds or alternative offer will be made. Should **KapitalBiz** permanently cancel an event, for any reason whatsoever; the Client shall be provided a credit of the equivalent amount paid towards the cancelled event. In the case of a postponed or cancelled event, **KapitalBiz** will not be responsible for covering airfare, accommodation, or other travel cost incurred by Clients. **4. Copyright:** All intellectual property rights in the materials distributed by **KapitalBiz** in connection with this event are expressly reserved and any unauthorized duplication, publication or distribution is prohibited. **5. Program Information** indicated in brochure is for indicative purposes only. Final program details including daily schedule and topics schedule may vary. Training assessment for SAQA/NQF points purposes not included as part of training. Skills evaluation and assessment may be available through 3rd party if required.

Bank Name: Standard Bank
Bank Account: KapitalBiz Consulting Enterprise Pty Ltd
Acc. Type: Business Current Account
Acc. Number: 402197348 : **Branch Code:** 00110600
SWIFT Code: SBZA ZA JJ : **Branch Name:** Northgate

- (A) LOCAL**
Training Fee 3 (Days) = R 17,999 + VAT
- (B) INTERNATIONAL**
Training Fee 3 (Days) = \$ 1, 300 (Online)