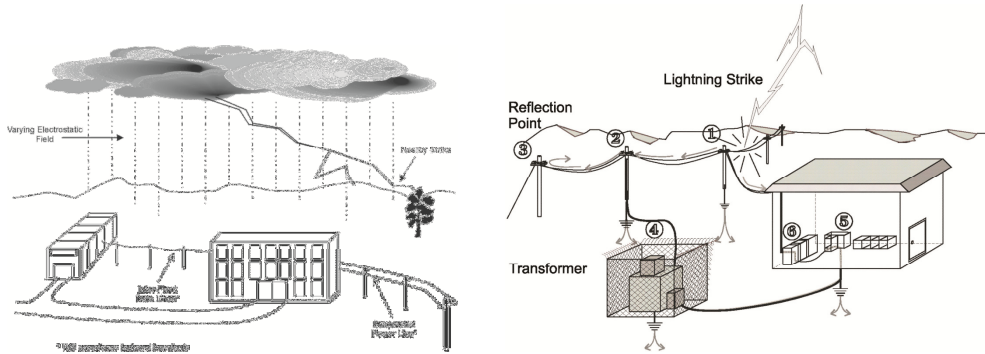




Technology Training that Works

Practical Earthing (Grounding), Bonding, Lightning and Surge Protection



4 hour live, practical online course

Wednesday, December 10, 2014

8:00AM CST – 12:00PM CST

(14:00 – 18:00 UTC/GMT)

IMPORTANT NOTE: The terms 'earth' as well as 'ground' have both been in general use to describe the common signal/power reference point and have been used interchangeably around the world in the electrotechnical terminology. The IEEE Green Book, however, presents a convincing argument for the use of the term 'ground' in preference to 'earth.' An electrical ground needs not be anywhere near the earth (meaning soil). For a person working in the top floor of a high-rise building, electrical ground is far above the earth. Both terms, earth/earthing and ground/grounding, are used throughout this course.

YOU WILL LEARN HOW TO:

- Apply good earthing practice to your next installation
- Detail the applicable national standards
- Troubleshoot and fix earthing and surge problems
- Design, install and test an effective earthing system for electronic equipment

WHAT'S INCLUDED:

- Four 50 minute live, practical sessions with your instructor and attendees
- The full technical eBook manual for "Practical Earthing, Bonding, Lightning and Surge Protection," which includes course slides, cases studies, calculations and practical exercises
- Four hours of additional in-depth video sessions covering many additional areas – yours to keep and watch any time you want

TOTAL COST: Only \$335 per person!

SPECIAL OFFER TO YOU:

Register by November 12 and you will receive two eBooks each with hundreds of pages of engineering knowledge:

- Practical Power Quality: Problems and Solutions
- Practical Shielding, EMC/EMI, Noise Reduction, Earthing and Circuit Board Layout

Total value to you = \$162



Technology Training that Works

THE COURSE:

Few topics generate as much controversy and argument as that of earthing and the associated topics of surge protection, shielding and lightning of electrical and electronic systems. Poor earthing practice can be the cause of continual and intermittent difficult-to-diagnose problems in a facility. This course 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 through correct application of these principles.

This course is designed to demystify the subject of 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 earthing, shielding and surge protection for both power and electronics systems. Earthing and surge protection for telecommunications and IT systems are examined in detail. Finally, the impact of lightning is examined and simple techniques for minimizing its impact are described.

THE INSTRUCTOR

Behrouz Ghorbanian
BSc, MSc, MIEAust

Behrouz has completed degree courses in Telecommunications and Electrical Engineering overseas. He also completed his studies in Electrical Utility Engineering at Curtin University in 2004.

Behrouz started his career in the oil and gas industry where his role got him involved in the maintenance and repair of electronic and navigational marine equipment (VHF and SSB radios, Sat Nav, engine control panels etc). He then moved to the power industry and was involved in the design, installation, and commissioning of substations mainly for consultancies and utilities. He has also established a good reputation for teaching power system protection over his long term services lecturing at Curtin University, and also over the period he worked as a Protection Engineer in New Zealand.



Over the past years, Behrouz has been involved in many major projects across Australia. His most recent experience is related to cost estimation and risk assessment of major substation projects with a special focus on the secondary systems (Protection, COMMS, SCADA). He has also worked as an Engineering Manager and Senior Project Engineer on major copper mine projects overseas.

Behrouz has also gained good knowledge in substation design, HV cables sizing and installation, transmission system design, earthing system design and applications, and power system protection design and applications.

WHO SHOULD ATTEND:

- Building service designers
- Consulting engineers
- Data systems planners and managers
- Electrical and instrumentation technicians
- Electrical contractors
- Electrical engineers
- Electrical inspectors
- Electricians
- Instrumentation and control engineers
- Maintenance engineers
- Power system protection and control engineers
- Project engineers
- Safety professionals



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PRE-REQUISITES:

No formal electrical education is required as everything is examined from a fundamentals and practical point of view. As such, this is certainly not an advanced course but one focusing on the fundamentals using basic math to ensure you quickly understand the key concepts.

CONTENT SUMMARY

INTRODUCTION

*This is an intensive four (4) hour presentation; we will be emphasizing sections marked in **BOLD** below. Full recordings will be provided for the lower intensity sessions (another four hours of video as detailed below) to review after the course.*

SESSION ONE

EARTHING BASICS

- Basics of earthing
- Bonding
- Lightning and surge protection
- Static charges
- Shielding
- UPS systems and their earthing practice

Additional video session covered in-depth for review at any time:

- **EARTHING OF POWER SYSTEM NEUTRAL**
Unearthed and solidly earthed systems
Impedance earther systems
Resonant impedance earth systems

SESSION TWO

EQUIPMENT EARTHING

- Shock hazards to the human body
- Earthing of equipment
- Operation of protective devices
- Thermal capacity of earthing wires
- Touch potential
- Induced voltages
- Multiple earthing connections
- Surge protection earthing

SESSION THREE

LIGHTNING AND ITS EFFECT ON BUILDINGS AND ELECTRICAL SYSTEMS

- The incidence and probability of lightning strike
- Methods of lightning protection
- Planning for lightning protection
- Improvements to lightning protection
- Effects of lightning strike on overhead lines
- To protect or not to protect



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Additional video sessions covered in-depth for review at any time:

- **STATIC ELECTRICITY AND PROTECTION**
 - What is static?
 - Generation of charge
 - Common examples
 - Energy of a spark
 - Ignition capability of a spark
 - Dangers of static buildup
 - Control of static
 - Assessment of risks and planning

- **EARTH ELECTRODE SYSTEMS**
 - Earthing electrodes
 - Soil resistance
 - Measuring soil resistivity
 - Resistance of single rod electrodes
 - Current carrying capacity of an electrode
 - Measurement electrode resistance single and multiple rods
 - Concrete encased electrodes
 - Corrosion of electrode systems

SESSION FOUR

SURGE PROTECTION OF ELECTRONIC EQUIPMENT

- What is a surge?
- Bonding of different earthing systems
- Surges and surge protection
- Principles of surge protection
- Achieving graded surge protection

ELECTRICAL NOISE AND MITIGATION

- Definitions of electric noise
- Analysis and categories of noise
- Electrostatic coupling
- Electromagnetic coupling
- Shielded isolation transformer
- Insulated earth receptacle
- Zero signal reference grid

Additional video session covered in-depth for review at anytime:

- **UPS SYSTEMS AND THEIR EARTHING PRACTICES**

SUMMARY, OPEN FORUM

CLOSING

Registration form on next page!



Technology Training that Works

REGISTRATION FORM – Practical Earthing (Grounding), Bonding, Lightning and Surge Protection – 4 hour live, practical online course

ATTENDEE DETAILS

Contact: _____ Company Name: _____

Company Address: _____

Suburb: _____ Province: _____ Post Code: _____

Phone: _____ Fax: _____ Email: _____

Mr/Ms: _____ Job Title: _____ Email: _____

Mr/Ms: _____ Job Title: _____ Email: _____

Mr/Ms: _____ Job Title: _____ Email: _____

Should you have more people interested in attending this workshop, please contact us via canada@idc-online.com

COURSE DETAILS

Wednesday, December 12, 2014
8:00AM CST - 12:00PM CST

Please register by November 26
to avoid disappointment

HOW DID YOU DID YOU HEAR ABOUT THIS COURSE? (PLEASE TICK)

- Received an email from IDC
- Searched online (Google, Yahoo etc)
- Recommended by a friend/colleague
- Other (please specify) _____

PAYMENT DETAILS

Please Note: Full payment is required prior to the start of the course.

BOOKING FOR _____ **ATTENDEE/S** \$335 x _____ attendees = \$ _____

EARLY BIRD BOOKING OFFER: (if booking on or before November 12, 2014)
YES, I qualify and would like to receive my 2 FREE e-Books

PLUS GST OR HST = \$ _____

TOTAL = \$ _____

I wish to pay by Cheque, made payable to IDC Technologies

Company Order Number: _____

Please charge my Mastercard Visa Expiry Date: ____/____

Cardholder's Name: _____

Cardholder's Signature _____

On the reverse of your card, above the signature, is a security number. In order to authorise your card transaction, we require the last 3 digits: _____

If the Cardholder's address is not the same as shown above please tick this box:

REGISTER NOW:	Fax: 1800-434-4045	Mail: IDC Technologies Suite 402, 814 Richards Street, Vancouver, BC V6B3A7	E-mail: canada@idc-online.com	Web Site: www.idc-online.com	INQUIRIES: Phone: 1800-324-4244
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