

ELECTRICAL SWITCHBOARDS, CIRCUIT BREAKERS, PROTECTIVE RELAYS, CABLES AND PLCs



LONDON

11 & 12 May 2015

ONLY £995 per person
excluding VAT

EARLY BIRD BOOKING OFFER

TOTAL VALUE TO YOU - £343

Book by 13 April 2015 and you will receive **25% OFF** the full registration price + **4 eBooks** each with hundreds of pages of engineering knowledge



- Safe Operation and Maintenance of Circuit Breakers and Switchgear
- Practical HV Cable Joining and Terminations for Engineers and Technicians
- Practical Electrical Safety Techniques for Industry
- Power Cables: Operation, Maintenance, Location and Fault Detection

PLUS OUR 4-FOR-3 BOOKING OFFER

A 2-day practical workshop presented by:

Prof Ian Bitterlin

CEng MIET MCIBSE MBCS PhD
BSc(Hons) BA DipDesInn



4 FOR 3 DISCOUNT OFFER - see registration form for details

WHAT YOU WILL LEARN:

- Nuts and bolts of electrical inspection, testing and commissioning
- Detailed principles and rules for inspection, testing and commissioning of switchboards, switchgear, cabling and protection relays
- Selection of appropriate type and rating of switchgear and circuit breakers
- The different standards and specifications used for switchgear and circuit breakers
- Asset management of switchgear and protective relays
- Safe maintenance policies including safe working in switch rooms, indoor and outdoor substations

WHO SHOULD ATTEND:

- Design engineers
- Electrical engineers and technicians
- Electrical maintenance engineers, technicians and supervisors
- Electricians
- Field and service technicians
- Instrumentation engineers and technicians
- Plant operators
- Project engineers

As well as managers, engineers, technicians and others who may work with switchgear, circuit breakers, switchboards and cabling, who need to update their skills and knowledge in this critical area of inspection, testing and commissioning.



AUSTRALIA • CANADA • INDIA • IRELAND
MALAYSIA • NEW ZEALAND • SINGAPORE • SOUTH AFRICA
UNITED KINGDOM • UNITED STATES • VIETNAM



Register NOW: Email the registration form to us at uk@idc-online.com

For more information contact (020) 8335 4014 or visit www.idc-online.com

INSPECTION, TESTING AND COMMISSIONING OF ELECTRICAL SWITCH

DISCOUNT OFFER

**SAVE
£995**

**BUY THREE
GET ONE FREE!**

Register three people on a public two-day workshop and receive your fourth registration **FREE**

* discounted and free registration to be used for the same workshop in the same venue

ABOUT IDC TECHNOLOGIES

With a portfolio of over 300 workshops specialising in the fields of industrial data communications, telecommunications, automation and control we have trained over 500,000 engineers, scientists and technicians over the last 20 years.

We have an enthusiastic team of professionals in offices conveniently located around the world, who are committed to providing the highest quality of engineering and technical training.

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All IDC Technologies training workshops are available on an on-site basis, presented at the venue of your choice, saving delegates travel time and expenses, thus providing your company with even greater savings.

SAVE MORE THAN 50% OFF
the per person cost!

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FOR UP TO 6 PEOPLE, and can be **CUSTOMISED** to your needs.

Have the training delivered **WHEN AND WHERE** you need it!

For more information or a **FREE** detailed proposal contact:
Kevin Baker on **(020) 8335 4014** or email: training@idc-online.com

An intensive, practical 2-day workshop presented by **Prof Ian Bitterlin**

CEng MIET MCIBSE MBCS PhD BSc(Hons) BA DipDesInn

Ian commenced his engineering career with a focus on electrical drives (Schindler & Mannesmann Demag) in design and applications engineering. Since then he has worked in various leading organisations in the areas of static, rotary and diesel UPS's, flywheel systems, static transfer switches, TVSS's and automatic transfer switches. Now Ian is an independent Consulting Engineer specialising in data-centre power and cooling.

He co-authored two sections of the CIBSE Electrical Guide on UPS and HV Switchgear and is an active member of The Green Grid. He has presented numerous papers and courses throughout the world on drives, UPS's and critical power applications. Ian is an entertaining and knowledgeable instructor and you are sure to find his hard hitting presentation relevant and useful.



THE WORKSHOP

Whether you are designing, specifying, installing, testing or commissioning electrical equipment from small to large commercial and industrial installations, you need to have a thorough understanding of switchboards, switchgear, circuit breakers and associated protective relays.

The overall focus of this workshop is on electrical inspection, testing and commissioning and will commence with a detailed examination of switchgear (and circuit breakers). Circuit breakers are critical components in electrical distribution systems and their operation significantly affects the overall operation of the system. Protection relays are then discussed. These are used in power systems to maximise continuity of supply and are found in both small and large power systems from generation, through transmission, distribution and utilisation of power in plant, industrial and commercial equipment.

We cover commissioning and periodic inspection of cables and their various failure modes and how to detect these faults. The often neglected topic of switchboards will be detailed next, followed by the interesting topic of interfacing to the control system (either PLC's or other control devices).

Case studies and practical sessions are used throughout to illustrate key practical principles.

This workshop covers key elements in a practical and project focused way. Many people assume that inspecting, testing and commissioning is a fairly straightforward process and is simply a rubber stamp confirmation of a so-called outstanding design. Our experience in the field demonstrates quite the opposite; where the litany of problems ranges from design and installation errors to equipment manufacturing defects. It is best that these problems are identified and corrected before the inevitable downtime comes in an operational installation where many thousands of dollars are lost in correcting the faults. The situation today is made more challenging by the heightened safety requirements and interfacing to low powered electronic control and monitoring devices (such as PLC's) using software that has to also be verified.

The fee for each workshop covers all materials including workshop manual, lunches and refreshments

FREE REFERENCE MANUAL
as a hard-copy and eBook (VALUED AT £79.95)

Our delegates don't just receive photocopied notes!

You will receive a comprehensive fully illustrated reference manual filled with hundreds of pages of tables, charts, figures and handy hints.



THE PROGRAM

DAY ONE

FUNDAMENTALS OF SWITCHGEAR

- Single line diagrams
- Typical construction – LV/MV and HV
- Active and passive network components
- Circuit breaker utilisation
- Fuse switches
- HV fuses in combination with and as alternatives to circuit breakers
- Auto-reclosers and auto-reclose operations

Practical Session

SPECIFICATION OF SWITCHGEAR

- Switchgear ratings – highest system and impulse withstand voltages, load and short circuit currents
- Simple and complex protection schemes
- Switchgear ancillaries, measurement CTs, VTs and relays
- Cable terminations
- Indoor and outdoor operation

Practical Session

SHORT CIRCUIT TESTING

- Symmetrical and asymmetrical breaking
- Make and break operations
- Understanding test oscillograms
- Case study – specification for a 132kV switchboard

Practical Session

SWITCHGEAR DIAGNOSTICS, TESTING AND MAINTENANCE

- Asset records
- Condition Based Maintenance (CBM)
- Reliability Centred Maintenance (RCM)
- Switchgear inspection methodologies
- Insulation deterioration
- Diagnostic techniques:
 - Partial discharge measurement and survey
 - Partial discharge – Transient Earth Voltage (TEV) monitoring
 - Partial discharge by acoustic methods
 - Timing tests
 - Thermovision
 - Tan delta testing
- Principles of circuit breaker maintenance
- Contact maintenance and contact wipe
- Oil testing
- Maintenance of vacuum circuit breakers and SF6
- Switchgear defects and defect control
- Switchgear installations

Practical Session

POWER SYSTEM PROTECTION PRINCIPLES AND RELAYS

- Principles of protection
- Types of faults
- Types of protection systems
- Types of protective relays
- Electromechanical and static relays
- Numerical relays

Practical Session

DAY TWO

CONFIGURATION OF NUMERICAL RELAYS

- Setting approach in conventional relays
- Configuration of relays
- Troubleshooting typical problems

CABLING COMMISSIONING AND PERIODIC TESTING

- Review of codes for testing
- Drum length checks
- Post installation checking
- Pre-commissioning and periodic tests
- Tests as tools for condition monitoring and early failure alarm
- HV tests using DC and very low frequency AC
- Partial discharge tests and mapping of results
- Dielectric dissipation factor measurements
- Micro destructive and non-destructive tests for life assessment
- Operation and maintenance of cables

Practical Session

CABLE FAILURE MODES AND FAULT DETECTION

- Types of failure
- Reasons for failure
- Fault location
- Electrical tests for detection of cable faults
- Safety issues in fault detection
- Analysis of failures

Practical Session

SWITCHBOARD INSTALLATION, INSPECTION AND COMMISSIONING

- Inspection
- Routine, type, acceptance and pre-commissioning tests
- High voltage equipment test techniques
- Commissioning procedures

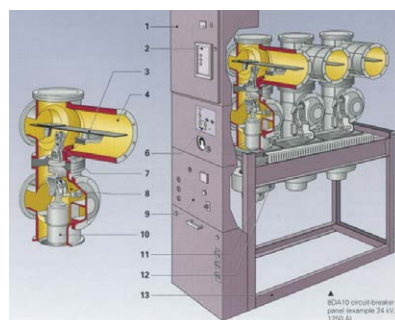
Practical Session

INTERFACE TO CONTROL EQUIPMENT (PLCs)

- Overview of PLC
- PLC I/O modules
- Pre-commissioning tests
- Commissioning procedures
- Typical faults

Practical Session

SUMMARY, OPEN FORUM AND CLOSING



PRACTICAL SESSIONS

This is a practical, hands on workshop enabling you to work through exercises which reinforce the concepts discussed. Practical sessions include:

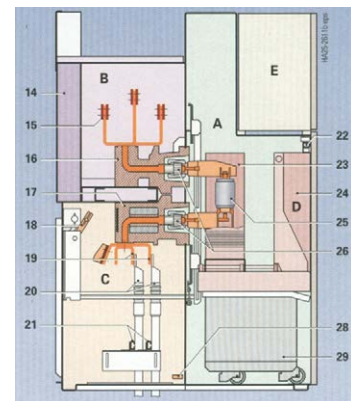
- 31 short, punchy videos on switchgear, circuit breakers, protective relays and cables
- 32 short, practical design exercises on each topic using simulation software and calculators
- 4 case studies on switchgear, circuit breakers, protective relays and cables where you will work in small groups to solve real electrical engineering problems

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

CASE STUDIES

A number of case studies are discussed throughout the workshop:

- Improper circuit breaker trip unit and relay settings
- Motor overload protection
- Medium voltage distribution system installation problems
- Switchboard metering problems
- Emergency distribution problems
- Noisy transformers
- Incorrect earthing and neutrals



DELEGATE DETAILS

Contact: _____ Company Name: _____

Company Address: _____

City: _____ County: _____ Post Code: _____

Phone: _____ Fax: _____ Email: _____

ATTENDEES:

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 Carol or Alison on (020) 8335 4014 or email: uk@idc-online.com

WORKSHOP DETAILS

LONDON - 11 & 12 May 2015
Contact us for venue details

Please register by 20 April to avoid disappointment

DISCOUNT OFFER - SAVE £995 - BUY THREE, GET ONE FREE!

Register three people on a public two-day workshop and receive your fourth registration FREE
* discounted and free registration to be used for the same workshop in the same venue.

PAYMENT DETAILS

Note: Prices are EXCLUSIVE of VAT

Please Note: Full payment is required prior to the commencement of the workshop.

BOOKING FOR ONE DELEGATE: £995 x 1 delegates = £ _____

BOOKING FOR FOUR DELEGATES: £995 x 3 delegates = £ _____

The fourth participant is FREE

EARLY BIRD BOOKING OFFER: (if booking on or before 13 April 2015)

YES, I qualify and would like to receive my 4 FREE eBooks
PLUS 25% OFF the registration price

LESS 25% = £ _____

+ VAT = £ _____

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:

HOW DID YOU HEAR ABOUT THIS WORKSHOP?

Received a brochure in the mail

Received an email from IDC

Searched online (Google, Yahoo etc)

Recommended by a friend/colleague

Other (please specify) _____

REGISTER NOW:

Fax: (020) 8335 4120

Mail: IDC Technologies, Suite 18, Fitzroy House, Lynwood Drive, Worcester Park, Surrey, KT4 7AT

Email: uk@idc-online.com

Web Site: www.idc-online.com

ENQUIRIES:
Phone: (020) 8335 4014

WORKSHOP DETAILS

- Workshops start at 8:30am and finish at 5:00pm daily.
- Registration is from 8:00am on the first day.
- The workshop fees are per delegate and include a reference manual, handouts, lunches and all refreshments.
- Full payment is required prior to the commencement of the workshop.

EARLY BIRD BOOKING OFFER

Please note that the Early Bird Booking Offer is only available to those registrations received by 13 April 2015 and paid prior to the commencement of the workshop.

CANCELLATION

A fee of 20% will apply for written cancellations received 7-14 days prior to the commencement of the workshop. Cancellations received less than 7 days prior to the workshop are not refundable however substitutes are welcome.

CONFIRMATION

Confirmation will be sent upon receipt of registration. Full details and workshop instructions will be sent to you prior to the workshop date.

PLEASE NOTE

Venues to be confirmed upon registration. Venues are subject to change. Instructors may change without notice.

IDC Technologies has no affiliation with suppliers or manufacturers and therefore presents a completely unbiased factual view of the industry.

100% MONEY BACK GUARANTEE

IDC Technologies' engineers have put considerable time and experience into ensuring that you derive the maximum value from each workshop. If you feel by lunch time of the first day that the workshop is not appropriate, please let us know so that we can arrange a 100% refund of your fee.

PRIVACY INFORMATION

If your address details are incorrect, or you wish to remove your name from our mailing list, please contact us by phone, fax or email.

At times we make use of lists that cannot be cross-checked against our own database and you may receive a duplicate. If so, please pass this on to an interested colleague.

CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

This program is designed to meet your continuing professional development requirements. A certificate documenting your attendance will be awarded at the end of the workshop. This serves as important evidence of your continuing professional commitment to your career.

www.idc-online.com