

6TH HIGH VOLTAGE CONFERENCE

Covering AS 2067 and High Voltage Design, Installation and Maintenance for Mining, Industrial Plants, Renewable Energy, Oil & Gas and Utilities

Keynote Speakers:

PROFESSOR ALEX BAITCH

Principal BES (Aust) Pty Ltd
Chairman Standards Australia
Committee, EL043 High Voltage Installations
Former National President Engineers Australia (2014)



STEPHEN PALMER

Director at Saeath Consulting
Secretary of the International CIGRE &
CIREC Joint Working Group B3.35



WHAT YOU WILL GAIN FROM THIS EVENT:

- Discuss the key aspects of AS 2067 in relation to substation design and high voltage installations
- Discuss and review the changes to the AS 2067 standard in relation to earthing
- Hear how to extend the life of your HV equipment through effective condition monitoring, testing and diagnostic techniques
- Understand earthing risk and determine appropriate safety criteria
- Learn how the increased uptake of renewable energy is affecting the HV industry
- Gain insight into the future trends of HV systems
- Learn how to avoid transformer failures with oil and electrical testing
- Understand best practice for life management of power transformers
- Hear relevant local case studies from the Australian electrical industry
- Network with specialists in the field and your peers
- No sales pitches – non commercial presentations

WHO SHOULD ATTEND:

- Substation engineers and technicians
- Generation, transmission engineers and technicians
- Electrical engineers, technicians and electricians
- Maintenance engineers and asset managers
- Plant, project and design engineers
- Engineering and safety managers
- Renewable energy specialists
- Government safety regulators/inspectors
- Network, protection and distribution engineers and technicians
- Risk assessors
- Maintenance specialists

And all other engineering professionals who have an interest in HV design, standards, installations, operations and maintenance.

26th, 27th & 28th
March 2019

The Park Hotel
BRISBANE, AUSTRALIA

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INTRODUCTION TO THE 6TH HIGH VOLTAGE CONFERENCE

The focus of this conference is the AS 2067:2016 HV standard which provides minimum requirements for the design and installation of high voltages above 1kV (ac) so as to provide safe functioning in operation. The newest edition of AS 2067 was released in 2016 and

the significant amendments have proved to be of continuing interest to anyone involved with high voltage substations and installations. The conference will also focus on earthing, design, testing, installation and maintenance topics.

CONFERENCE PROGRAM – DAY ONE – 26th MARCH 2019

PRE-CONFERENCE WORKSHOP 1

26th March 2019 – 8:30am – 12:00pm

High Voltage Substation Installation Standards – An in-depth look at AS 2067 and how it affects your work

The revised edition of AS2067: 2016 Substation and High Voltage Installations exceeding 1kV a.c. was released in September 2016. It is based on the IEC Standard IEC61936 and is applicable to most high voltage installations, be they customer installations, generation facilities or utility owned installations. As for the previous edition, the new edition of AS/NZS 3000:2018 Wiring Rules references AS2067 as the applicable standard for high voltage customer installations.

Most sections of AS2067:2016 have been revised. Amendments include many of the changes that have been made to IEC 61936 and incorporates a review of considerations of electrical clearances, fire issues, requirements related to the mining area for fixed installations and a substantial expansion of the clauses on earthing. The document covers aspects of many specialities applicable to the complex issues that need to be considered in designs.

Apart from earthing which is being dealt with separately, the workshop will review some of the key aspects of AS2067 in the design of substations and high voltage installations. Particular attention will be given to some of the amendments that have been made to the 2016 edition.

PRE-CONFERENCE WORKSHOP 2

26th March 2019 – 1:00pm – 4:30pm

Earthing obligations under AS2067 have changed: What has changed, why, and what do you need to do next

The much-anticipated revision to AS 2067 was published in September 2016. This standard is the primary standard for HV earthing system design and earthing system management and it includes significant changes, particularly the development of more transparent and site specific risk-based safety criteria, enabling more effective assessment and management of earthing-related risk. This workshop will review the key understanding, principles and issues foundational to earthing, present the AS 2067 requirements and recommendations, explain the reasoning behind the changes, and provide guidance on how asset owners, designers, testers and inspectors should seek to maximise their compliance and derived benefits. This half day workshop will include explanation of case studies and the opportunity to present and discuss attendees' own cases.

Workshops include lunch and morning and afternoon teas



WORKSHOP PRESENTER:

PROFESSOR ALEX BAITCH

FTSE, HonFIEAust, CPEng
Principal BES (Aust) Pty Ltd.

Honorary Professorial Fellow University of Wollongong
Chairman Standards Committee EL-043 High Voltage Installations

Member IEC Advisory Committee on Transmission and Distribution

Professor Alex Baitch is Principal of his electrical engineering consulting practice which he established over 20 years ago and has extensive industry experience. He is a Chartered Professional Engineer, a Fellow of the Australian Academy of Technology and Engineering, an Honorary Fellow of Engineers Australia and Honorary Professorial Fellow of the University of Wollongong. Alex is Chairman of the Australian Standards Committee EL043 which produced the Australian Standard AS2067 on Substations and High Voltage installations and its revisions.

He has also been a member of the IEC Maintenance team that has revised the IEC 61936-1 which forms the basis of AS 2067 and a member of the IEC Advisory Committee on Transmission and Distribution. He is active on a number of other Australian Standards and IEC committees such as SC77A on Power Quality, TC8 working groups on Electrical Systems issues and a member of CIGRE as a convener of a CIGRE Advisory Panel. He was the National President of Engineers Australia in 2014.



WORKSHOP PRESENTER:

STEPHEN PALMER

Director - Safearth Consulting

One of Australia's leading earthing specialists
Committee Member for IEEE Std80 and Std81
Secretary of the International CIGRE & CIRED
Joint Working Group B3.35

Stephen Palmer is Director of Safearth Consulting. He is one of Australia's leading earthing specialists, with expertise in all areas related to earthing, including design, audit and test in sectors including power generation and delivery, heavy industry, mining and rail.

For over 20 years Stephen has investigated and managed the risks associated with earthing, lightning protection and interference. As the leader of a team of 25 consultants & researchers, his experience extends well beyond the technical aspects of the field. He has been a contributing member on the committees responsible for Australian documents including EG-0, AS/NZ 3007 and AS/NZ 2067. He is a committee member for IEEE Std80 and Std81, and was the secretary of the international CIGRE & CIRED Joint Working Group B3.35, which has published TB 749 on substation earthing design optimisation including quantified risk. Stephen has delivered formal earthing training for more than a decade and has presented at numerous Australian and international conferences including for the NSW Government, Energy Networks Association (ENA), Engineers Australia, CIGRE and the IEEE.

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CONFERENCE PROGRAM – DAY TWO – 27TH MARCH 2019

8.00am Registration

8.25am Opening Address

8.30am Trends in High Voltage & Disruptive Technologies for the Energy Sector



Session 1

KEY NOTE

A review of the impacts of new technologies affecting the electric energy sector

Professor Alex Baitch – Principal BES (Aust) Pty Ltd, Chairman Standards Committee EL-043 High Voltage Installations

Worldwide there are dramatic changes occurring in the electricity industry and more broadly in the energy industry. With the spectacular growth of solar photovoltaic generation, wind energy, solar thermal, hydro and other forms of renewable energy, the electricity network is undergoing fundamental change. The worldwide focus on reducing carbon emissions means that carbon free electricity generation is being incentivised to compete with the more traditional sources of energy such as coal fired power, diesel and gas fuelled supplies. At the same time the intermittent nature of many such resources presents significant challenges to the industry.

The integration of energy management with communication and computing layers has resulted in the development of the concept of the Internet of Energy. Smart Energy development is all encompassing of the all elements of the electricity industry. It impacts generation, system operation, substation control and monitoring, distributed energy, industrial automation, electricity mobility, home and building automation through to perhaps most importantly, the retail energy market. Lastly, disruptive technologies such as bitcoin transactions will impact the way electricity is traded and provide the customer a new level of capability in participating in the electricity market. These are all presenting challenges to the development of the energy sector.

9.30am Making Predictive HV Testing Effective



Session 2

CASE STUDY

Jackson Hill – Director and Principal Engineer, Live HV

For several years high voltage cable testing had been provided for a prominent mining site in NSW. The testing had predicted several potential failures and provided an exact location of where these failures would be likely to occur. Three years after these failures were identified the cables began to fail at the exact locations identified. Although this proved the effectiveness of the testing it was a bad outcome for the mining site and highlighted several areas for improvement.

From site personnel changes, a lack of belief in partial discharge testing, infrequent testing and a lack of following up from all parties led to the lack of proactive action on the incipient faults detected. In order for testing to be effective there must be a complete cycle where both asset owners and testers are fully engaged with each other's capabilities and requirements. This presentation provides a history of the identified faults and failures, examines why they were not actioned and presents what improvements were made and how failures are now being prevented.

Morning Tea – 10.15am

10.45am Achieving the Best Outcome for Transformer Field Maintenance



Session 3

Kenneth Budin – Director, Budin Philipp Partners Pty Ltd

This presentation presents a practical approach to ensure the best possible outcome for power transformer field maintenance. Topics covered will include technical resources, knowing your transformers, training and managing contractors. The presentation draws on the best resources and technical guides from around the world, plus real-life experience. A significant component will cover the importance of training for those responsible for transformer life-management, including asset managers, engineers and service providers.

11.30am HV Training – Who, Why, What, When & How?



Session 4

CASE STUDY

Gazali Kumri – Electrical Trainer & HV Specialist, Competency Training

The most frequently asked question about what training personnel need when carrying out HV switching operations, is "Who?" and "Why?". Who? Legislation in each State clearly states that personnel who operate and maintain HV installations shall be trained and authorised. Why? So, they understand the hazards involved and can identify the risk to themselves, others, and to equipment. Also, to implement the correct and appropriate risk control measures to reduce the likelihood and consequence when exposed to an incident involving high voltage. Gazali will also cover what, when and how and to illustrate his points will discuss the recent inquest into the Danny Cheney Fatality which occurred in QLD.

Lunch – 12.15pm

1.15pm Acceptance Testing and Ongoing Condition Monitoring



Session 5

CASE STUDY

Karl Haubner – Applications Engineer, High Voltage Test Application Specialist - Asia Pacific, Doble

Acceptance testing and ongoing condition monitoring is an important strategy to improve the reliability of Medium Voltage (MV) distribution cable networks. The industry requires simple and cost-effective commissioning and diagnostic tools that accurately assess the cable insulation condition. Here Karl will review the most commonly performed offline diagnostic tests of Insulation Resistance, TDR, tan measurements, Partial Discharge measurements (using both VLF and DAC voltages) the Monitored Withstand Test and the outer sheath tests and their ability and sensitivity to determine different defects. Using several case studies the benefit of each of these techniques will be described and how the combination of the above tests can identify weaknesses to build up a comprehensive picture of the insulation condition of the cable to improve the reliability of the network.

2.00pm Synchronous Condenser Technology - An old tool rediscovered to address new grid challenges



Session 6

Csaba Szabó – Product Manager - High Voltage Machines, Discrete Automation & Motion - ABB Australia

Synchronous condenser technology is enjoying a rebirth as more renewables are integrated to grids. Many countries now face a trilemma of rising electricity prices versus compliance with international greenhouse gas commitments versus lack of grid resilience, reliability, and availability. Synchronous condensers are effective means to maintain grid quality, fault ride-through and fault support, which is essential to maintain electricity supply. Here Csaba will discuss how this technology can help improve the resilience and stability of electricity networks.

Afternoon Tea – 2.45pm

3.15pm Assessment & Management of Ageing High Voltage Transformers



Session 7

Philip Reilly – Transformer Oil Services Manager

Transformers are critical components of high voltage networks and asset managers of fleets of ageing transformers are required to make life extension decisions. This presentation will outline the ageing process in transformers and what activities are available to asset managers to extend asset life. How understanding the extent of ageing in a transformer can be achieved by diagnostic monitoring, including assessment of ageing markers in the oil, will also be discussed. Industry developments will be covered. How will the increasing use of natural and synthetic esters in transformer fleets affect understanding of condition and the life extension' decisions that will need to be made?

4.00pm Circulating Currents and Earthing of Direct Connected MV Generators in Large Cable Networks



Session 8

CASE STUDY

Jason Mayer – Senior Electrical Engineer, Aurecon Australia

Here Jason will cover a recently completed project that involved rectification for a client who had constructed a new standby diesel generator station that suffered from excessive circulating currents in the generator neutral when operated in fully islanded standby mode. When islanded from the grid, one generator was earthed via NER to provide the system reference. Significant circulating current caused overheating of the NER. An unfortunate combination of generator winding selection, earthing philosophy and the large underground cable network created the issue. This presentation describes the investigation undertaken, the options considered for rectification, the results from commissioning of the implemented solution and how to avoid these types of problems.

Closing – 4.45pm




Networking Session – 5.00pm to 6.00pm

An hour dedicated for all attendees to meet and socialise with experts and industry peers at the 6th High Voltage Conference Cocktail Hour.

CONFERENCE PROGRAM – DAY THREE – 28TH MARCH 2019

8.30am
Session 9

Cudal Quarry Electrical Fatality
Case study of the incident, its precursors, cause, outcomes and results for the landmark legal case.




Stephen Palmer – Director - Safeearth Consulting

KEY NOTE
In 2014 a resident was electrocuted in the shower at their home, a caretaker cottage near a small country NSW quarry operation. Safeearth was selected by the NSW Mines Safety Regulator to perform a forensic engineering investigation into the nature and cause of the fatality. The findings were staggering with a number of contributing breakdowns, including incompetent electrical work, defeated safety controls and poor electrical maintenance. Ensuing from the fatality was a recently concluded landmark legal case including the first prosecution for a Category 1 offence under NSW WHS law. This case study presents a summary of the incident and investigation, mechanisms that led to the lethal scenario and lessons learned.

CASE STUDY

9.30am
Session 10

The Changing Face of HV Operations




Jason Watson – Director - Training & Assessment, Thomson Bridge

The role of high voltage operations is changing, due a wide variety of reasons. This presentation will look at HV operations from the perspective of generation (thermal and renewable), networks (distribution and transmission), rail, mining and industry and will identify a number of trends and challenges across these industries such as: the aging work force in the industry; HV requirements in new generation (wind, solar, battery); variability in resource needs; transferability of skills between industries and states; arc flash – understanding and management; knowledge retention and skills transfer; changing technology; risk management for HV sites; maintenance of HV plant - old and new; and operability of new substations. These issues will be discussed and how they are impacting the approach, governance and resourcing of HV Operations for the future.

Morning Tea – 10.15am

10.45am
Session 11

Reducing Cable Failure Rates from REFCL




Jackson Hill – Director and Principal Engineer, Live HV

Reducing the risk of bushfire is a priority of all major utilities. One method being utilised is the Ground Fault Neutralizer (GFN) or Rapid Earth Fault Current Limiter (REFCL) system. The system limits the energy released during an earth fault on a powerline from falling trees and such in bushfire prone areas. While a successful method of bushfire prevention, the REFCL system can place additional stress on a high voltage network, leading to failures. A prominent Australian Utility noticed the worrying trend of an increase in underground cable failures during REFCL testing and prioritised the development of a strategy to mitigate such failures. Online Partial Discharge (PD) testing techniques were utilised and enhanced to significantly lower the failure rate.

CASE STUDY

11.30am
Session 12

Maximising Life of HV Equipment via Insulating Fluid Testing




Antony Giacomini – Sales & Marketing Manager (Asia-Pacific), TJH2b Analytical Services

Transformers, tap changers and circuit breakers can fail catastrophically and the consequences can be disastrous from a financial, operational and safety point of view. Insulating materials provide a powerful diagnostic tool since they contain a record of the events which have occurred in the system. Attendees of this session will benefit by learning key aspects of diagnostic testing to enable the identification of: faults to avoid catastrophic failure; pro-active measures to extend the life of the equipment; and equipment approaching (or at) end of life. Case studies of successful testing will be presented and processes that cause degradation of oil and paper, during normal and abnormal operation, will be described.

Lunch – 12.15pm

1.15pm
Session 13

Engineering Capability in the HV Industry




Ryan Hudson – Principal Engineer, Blue Sky

In this talk the design and development of technical and operational capability will be examined. With the dramatic changes around renewables, the introduction of EV's and the extreme age of much of our HV asset base, the need for efficient deployment of engineering and technical skill are apparent. We will show how capability that is engineered can produce efficient and reliable work lifecycles – through using the same professional rigour and intent that we routinely apply to traditional asset design and operational lifecycles. This talk is about engineers leading by applying engineering discipline to developing capability, supporting the systems we build; from concept, to design, to development, and through to supporting asset operations.

2.00pm
Session 14

Training in High Voltage Procedures – Conductor Isolation, Earthing and Access Practices



Paul Egan – Electrical Training Specialist, Coex Training


Recently a number of serious incidents have occurred where personnel have been exposed to live HV conductors. Investigations conducted showed similarities in the root causes of these incidents, such as: procedures not easy to understand; information regarding minimum approach distances/clearances not obvious or easy to understand; and the requirements for earthing not designated or clearly spelt out within the HV procedure document. The investigations carried out clearly determined that although the HV operators had completed Nationally Accredited Training, there had been no training or assessing in regard to the site HV procedures. The HV operators simply did not understand or know the contents of the procedures or how they were to be implemented. This presentation highlights key issues to be considered for effective HV training, what procedures must contain and how these documents need to be written.

CASE STUDY

Afternoon Tea – 2.45pm

3.15pm
Session 15

High Voltage Assets - Diagnostic Testing & Condition Monitoring



Omar Aziz – Electrical Services Manager, Integral Power

This presentation will cover HV transformer diagnostics and in particular Sweep Frequency Response Analysis (SFRA). Electromagnetic forces and mechanical shocks can cause mechanical failures in transformers and often occur under fault or excessive overload conditions causing windings to move. This can result in core deformation and insulation damage which is uneconomical to repair. Here Omar will show how SFRA can be used to evaluate the mechanical integrity of core, windings and clamping structures within power transformers including case studies from industry.

4.00pm

Discussion Panel

We will invite all the speakers to the front of the room to form a technical panel. This session will provide delegates with the opportunity to ask our speakers questions and discuss high voltage related issues in their workplace, covering typical problems and possible solutions.

Closing – 4.45pm



Sponsorship Opportunities

Representing your business at the 6th High Voltage Conference in 2019 will provide you the opportunity to reach key decision makers from a multitude of industries. For more information on sponsorship and exhibition opportunities please contact Sarah Montgomery via email conferences@idc-online.com

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6TH HIGH VOLTAGE CONFERENCE + 2 x PRE-CONFERENCE WORKSHOPS

The Park Hotel, Brisbane – 26th, 27th, 28th March 2019

Simply complete this registration form online or return by email

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2. HOW DID YOU HEAR ABOUT THIS EVENT?

- Received an email from IDC Received a brochure in the mail Searched online (Google, Yahoo etc)
 Recommended by a friend/colleague Magazine advertisement/insert (please specify which magazine below)
 Other (please specify) _____

3. REGISTRATION & PAYMENT DETAILS

Prices shown are inclusive of GST

PRE-CONFERENCE WORKSHOP 1 – High Voltage Substation Installation Standards

Brisbane – Tuesday 26th March 2019

- OPTION 1: Early Bird Discount – 10% OFF**
– Book on or before 26th February 2019 (SAVE \$45.00) \$405.00 x _____ delegates = \$ _____
- OPTION 2: Standard Rate (NO Early Bird Discount)**
– Book after 26th February 2019 \$450.00 x _____ delegates = \$ _____

PRE-CONFERENCE WORKSHOP 2 – Earthing Obligations under AS 2067

Brisbane – Tuesday 26th March 2019

- OPTION 1: Early Bird Discount – 10% OFF**
– Book on or before 26th February 2019 (SAVE \$45.00) \$405.00 x _____ delegates = \$ _____
- OPTION 2: Standard Rate (NO Early Bird Discount)**
– Book after 26th February 2019 \$450.00 x _____ delegates = \$ _____

6TH HIGH VOLTAGE CONFERENCE

Brisbane – Wednesday 27th & Thursday 28th March 2019

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- OPTION 4: 3 for 2 Offer Standard Rate (NO Early Bird)**
– Book after 26th February 2019 (SAVE \$1795.00) 3 delegates: 2 x \$1795.00 = \$3590.00 = \$ _____

Corporate Packages available upon request

TOTAL DUE = \$ _____

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AND / OR 3 FOR 2 OFFER: CONFERENCE ONLY

Register 3 delegates and only pay for 2

– SAVE up to \$1795

GENERAL INFORMATION

Confirmation Details

A confirmation email and invoice will be sent to delegates within 3 days of receiving the registration.

Cancellation Policy

A fee of 20% cancellation will apply for cancellations received 7 – 14 days prior to the start date of the conference. Cancellations received less than 7 days prior to the start date of the conference are not refundable, however substitutes are welcome.

Venue

The Park Hotel Brisbane
551 Wickham Tce, Spring Hill, QLD 4000
Phone: (07) 3058 9333

Accommodation

The conference venue is offering delegates the discounted rate of \$149 for a Deluxe Room with breakfast included for one. Contact the reservation team on (07) 3058 9333 to make a booking today.

Food and Beverages

All lunches, morning and afternoon refreshments are included.

Unable to Attend

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