

High Voltage WA Conference

25th & 26th March 2021

DoubleTree by Hilton Perth Waterfront, Western Australia

Your Keynote Speakers



Stephen Palmer

- ◆ Managing Director at Safeearth Australia's leading earthing specialists
- ◆ Committee Member for IEEE Std80 and Std81
- ◆ Convenor of the International CIGRE Working Group B3.54
- ◆ Secretary of the CIGRE & CIRED Joint Working Group B3.35 who produced TB 749



Brett Cleaves

- ◆ Director, Electrical Engineer, Electrical Safety Specialist, and Project Manager - Engineering Safety Pty Ltd
- ◆ Snr Electrical Engineer - Streamlined Energy
- ◆ 20 years of engineering and project management including 10 years in arc flash safety

What You Will Gain From Attending?

- ◆ Update your knowledge of international grounding design and testing Standards worldwide
- ◆ Find practical solutions to your HV design and installations issues
- ◆ Discuss and review the changes to the AS 2067 standard in relation to earthing
- ◆ Learn 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
- ◆ Discover the most effective partial discharge detection techniques
- ◆ Hear about the latest arc flash standards and how they will affect the HV industry
- ◆ 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
 - ◆ Industrial organisations with high HV electrical distribution
 - ◆ 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.

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Introduction to High Voltage

This conference has been created for those working with high voltage systems in the mining, industrial plants, oil and gas and utilities industries. The event will focus on earthing, design, testing, installation and maintenance topics.

The high voltage installation can range from a substation, auxiliary systems, interconnecting cables/lines and naturally the user's facilities such a plant, factory, office facility and mine site. Equipment includes switchgear, transformers, converters, cables, lines, batteries, earthing systems, capacitors, reactors, buildings and structures. The conference will cover 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.

In addition to HV design and installation, HV maintenance is a challenging undertaking and the Australian industry needs to have the sustainability and reliability of ageing HV equipment at the forefront of their minds when planning and designing their upcoming projects. The conference will discuss problems that arise from HV equipment maintenance and how industry can overcome these issues through well planned maintenance programs, adherence to standards/regulations and forward thinking.

Conference Program – Day One

25th March 2021

8:00am – Registrations Open

8:25am – Opening Address

Chairperson: Andrew Maunder

Managing Director, Safetylec Management Solutions

8:30am – Session 1 **KEY NOTE**



International Update - An update on Grounding Design and Testing Standards Directions and Changes around the World

Stephen Palmer – Managing Director at Safearth

Convener of the International CIGRE Working Group B3.54

In many countries, including the Americas, asset owners and designers rely on the guidance of IEEE standards including Std 80, 81, 837, 1246 & 1268, for most aspects of substation earthing. However, there are a number of other international earthing documents with international significance. Documents such as IEC 61936 and EN 50522 are relied on extensively, but these are all heading for further change. Of significance is the growing value placed on measurement of actual performance rather than traditional reliance on estimates using complex tools and limited models. This presentation will summarise the most significant changes of recent history and the directions that are being signalled for current and future revisions. Consideration of a number of possibilities will be provided along with a discussion of the possible consequences of following or not following these international directions.

9:30am – Session 2



Arc fault Standards, what's changed, what's changing and what does it mean for the HV industry

Brett Cleaves – Electrical Engineer/Director, Engineering Safety Pty Ltd

The evolution of arc flash standards and guidelines has accelerated of the last 5 years. In many ways the principles have evolved to be consistent with accepted risk control processes and the hierarchy of controls. Incident energy models are now more accurate, but also require more detailed input data. The welcome focus on non PPE solutions and integration of arc fault controls in equipment standards has resulted in numerous developments and innovations in equipment design. Careful consideration is also required to make sure changes to legacy equipment and equipment and operations hazard exposures are understood and correctly implemented.

10:15am – Morning Tea

10:45am – Session 3 **CASE STUDY**



Partial Discharge (PD) Testing of HV Assets: Periodic or Permanent?

Neil Davies – Managing Director, EA Technology

The use of instruments to detect and measure Partial Discharge (PD) activity is well established as a way to identify HV substation assets which are in danger of failing. But

which makes the better business case – ongoing PD monitoring or periodic PD surveys? The paper will discuss how different types of defects can manifest and how the period from the time the condition indicator can be detected to when failure occurs (P-F interval) can vary significantly. The business decisions driving different adoption methodologies will be explored. Real life examples and case studies will be presented from the application of periodic surveying using hand held equipment, through to temporary and permanent monitoring solutions installed onto HV switchgear and cables.

11:30am – Session 4 **CASE STUDY**



Making Predictive HV Testing Effective

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.

12:15pm – Lunch



1:15pm – Session 5

CASE STUDY



Safe Design of High Voltage Installations – Earthing and Arc Flash

Leif Bradbrook – Director, FNV Engineering Pty Ltd

Designing high voltage installations requires the electrical engineer to balance many requirements and inputs from stakeholders to arrive at a safe and fit for purpose design.

Earthing safety and arc flash protection are key areas that have received a lot of attention in recent years with the increased risk-based analysis driven by work health and safety legislation. The safe design must consider a holistic approach in regard to cost, resources, installation, maintenance and life of project. This presentation considers the design decisions and compromises made to best fit a project and some case examples of when there is a weak link in the chain.

2:00pm – Session 6

CASE STUDY



Anatomy of Arc Flash Incidents and Case Studies

Pat Mynett – Senior High Voltage Trainer, Project Management Vision (PMV)

Contributing factors to arc flash incidents include:

inappropriate operations; lack of maintenance; condition of equipment; verifying de-energisation; working energised; peer pressure; short cuts and complacency. All of these can be attributed to human performance issues. These factors will be discussed using two high voltage arc flash case studies from industry.

Case Study One – 1000 Volt Underground Mine 2nd degree burn injuries, loss of production and damage to equipment.

Case Study Two – 6,600 Volt Motor Circuit resulting in minor burn injuries, loss of production and damage to equipment.

2:45pm – Afternoon Tea



3:15pm – Session 7



Intelligent Techniques for Power Transformer Sweep Frequency Response Analysis

Ahmed Abu-Siada – Electrical and Computer Engineering Department, Curtin University

Power transformers play a significant role in the current transmission and distribution networks. Insulation systems within power transformers comprise of paper and oil that decompose due to the high electrical and thermal stresses within operating transformer. To maintain the transformer within the expected harsh operational environment, reliable and intelligent condition monitoring techniques should be adopted. While there are several techniques currently used by industry to monitor the condition of power transformers based on its insulating system and diagnose any existing faults, most of these techniques are either offline and/or exhibit inconsistent interpretation process. In this presentation, the advancement in frequency response analysis since development will be elaborated in detail with practical case studies and finite element simulation results. Current industry practice to monitor the mechanical condition of power transformers will be covered. Limitation of current measurement/interpretation techniques will be highlighted. Research direction to overcome these limitations will be also presented.

4:00pm – Session 8

CASE STUDY



Insight into the World of the Electrical Regulator

Jason St Martin – Senior Electrical Inspector Compliance, Department of Mines, Industry Regulation and Safety (DMIRS)

In Western Australia, there are several different organisations and government agencies who have an interest in high voltage installations depending on their location and application. Who are they, what do they want and who do they want it from? Once those questions are answered, we will look at risk, compliance and responsibility from the perspective of the regulator for the design, construction, commissioning and the required maintenance over the life of the installation. What are some of the common misconceptions in the industry? Finally, we will look at two examples from my travels as an inspector.

4:45pm – Day One Closing

5:00pm – 6:00pm – Networking Drinks

Sponsorship Opportunities

Representing your business at the High Voltage WA Conference in 2021 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 at: conferences@idc-online.com or call 1300 138 522

8:30am – Session 9

MORNING WORKSHOP



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

Stephen Palmer - Managing Director at Safearth.

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. It will also examine how these changes are being seen internationally and what may come with future changes to IEC 61936 and AS 2067. This half day workshop will include explanation of case studies and the opportunity to present and discuss attendees' own cases.

About the Workshop Presenter

Stephen Palmer - Managing Director at Safearth, One of Australia's leading earthing specialists; Committee Member for IEEE Std80 and Std8; Convener of the International CIGRE Working Group B3.54; Secretary of the CIGRE & CIREN Joint Working Group B3.35 who produced TB 749

Stephen Palmer is Director of Safearth Consulting. He is 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 35 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. He is Convener of the International CIGRE Working Group B3.54 on earthing system testing and was the secretary of the CIGRE & CIREN 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.

Morning Tea from 10:00am – 10:30am

12:00pm – Lunch



1:00pm – Session 10



HV Joints and Terminations - Developments in Technology and Installation Practices

David Flinn – EHV Cable Joints 420KV and Trainer for Südkabel

Cable installations are only as good as the cables and accessories specified and selected, and with cable installation often lasting well beyond the life of the apparatus its connected to its important to understand what is being specified and why. With over 30 years of cable jointing experience across the globe including Oil and Gas filled cables, and XLPE jointing up to 420 kV on almost all of the leading manufacturers accessories, David has practical in-depth knowledge on all things cable jointing. David's presentation provides a unique jointers eye perspective on the evolution of cable technologies, jointing techniques, and development and improvements in cable accessories and their implications for the life of your installation and the safety of your installation crews or subcontractors..

1:45pm – Session 11

CASE STUDY



Transformer Oil Diagnostics - Sampling, Testing & Analysis

Andre du Plessis – Electrical Engineering Consultant, Adp Oz Int

Power transformers are a major asset and we can extend their life and save money by sampling their oil and having it diagnosed during preventative maintenance. On time corrective action saves money and downtime. The life of the transformer is connected with the insulation. Evaluation of the insulation system is essential to assess the condition of the transformer when new and while in use. This evaluation involves both electrical and physicochemical techniques/diagnostic methods which will be covered in this session. Failure is normally catastrophic.

2:30pm – Afternoon Tea

3:00pm – Session 12

CASE STUDY



Partial Discharge Testing on Rotatory Machines

Vikas Bhandari – Electrical Engineer, Machinemonitor Pty Ltd

This presentation will discuss partial discharge testing as a predictive maintenance tool for stator winding insulation system in motors and generators to optimize the sustainability and reliability of ageing HV assets. Vikas will discuss his site work and data analysis experience, which includes; testing techniques on site; failure mechanisms; interpretation of partial discharge testing (PHA, PD Variables, PRPD) and his site experiences predominantly in Western Australia.

3:45pm – Session 13

CASE STUDY



HV Arc Fault Incidents and Practical Steps for Prevention

Brett Cleaves - Electrical Engineer/Director, Engineering Safety Pty Ltd

Electrical workers PPE is an injury mitigating control that's rightly sits at the bottom of the hierarchy of hazard controls but dominates the discussion around arc fault safety. Reliance on PPE alone still leaves people at risk of injury and does little to protect plant and equipment from damage from arcing faults. Using examples from arc fault incidents Brett will discuss some of the other higher order arc fault hazard controls and some of the latest products available to improve arc fault safety for people and damage to equipment.

4:30pm – Closing

About the Keynote Presenters



Stephen Palmer

Stephen Palmer is Director of Safeearth Consulting. He is 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 35 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. He is Convenor of the International CIGRE Working Group B3.54 on earthing system testing and was the secretary of the 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.



Brett Cleaves

Founder and director of Engineering Safety Pty Ltd Brett Cleaves brings a wealth of experience in the practical application of electrical safety solutions with over 20 years of engineering and project management including 10 years in arc flash safety.

Brett is an electrical engineer with a passion for electrical safety and a wealth of experience in the area of arc flash hazard review and the practical application of arc flash mitigation techniques. Brett worked for BlueScope Steel for over 18 year starting as an electrical engineering cadet and eventually having the Electrical Engineer Governance role managing the works Electrical Safety Committee, carrying out electrical incident investigations and performing numerous arc blast & flash modelling and review studies. His final role at BlueScope was as the works high voltage operations engineer. Since then Brett has been working with Endeavour Energy managing the construction of HV transmission lines and has launched Engineering Safety Pty Ltd providing assistance to companies with arc flash studies and strategies for reducing exposure levels through to PPE policy assistance.

General Information

Confirmation Details

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

Cancellation Policy

A 20% cancellation fee 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

DoubleTree by Hilton Perth Waterfront

1 Barrack Square, Perth WA 6000
Phone: (08) 6372 1000

Accommodation

The conference venue has accommodation available. Please book through their reservations team on (08) 9221 1200 or h1764@accor.com.

Food and Beverages

All lunches, morning and afternoon refreshments are included in your delegate registration.

Unable to Attend

If you are unable to attend the full conference program, contact us for details to attend individual sessions or to purchase the Conference Resource Kit.



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Registration Form

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Email: _____

2: Mr Mrs Ms Name: _____ Job Title: _____

Email: _____

3: Mr Mrs Ms Name: _____ Job Title: _____

Email: _____

4: Mr Mrs Ms Name: _____ Job Title: _____

Email: _____

02 How Did You Hear About This Event?

Received a brochure in the mail Received an email from IDC

Searched online (Google, Yahoo etc) Recommended by a friend/colleague Magazine advertisement/insert

Other (please specify): _____

03 Registration & Payment Details (NB: prices shown are inclusive of GST)

Total

OPTION 1: Early Bird Discount 10% OFF – Book on or before 25th February (SAVE \$179.50)
\$1,615.50 x _____ delegates = \$ _____ \$ _____

OPTION 2: Standard Rate (No Early Bird) – Book after 25th February
\$1,795.00 x _____ delegates = \$ _____ \$ _____

OPTION 3: 3 for 2 Offer & Early Bird 10% OFF – Book on or before 25th February (Save \$2,154.00)
3 x delegates = 2 x \$1,615.50 = \$3,231.00 \$ _____

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Additional delegates? Corporate packages available upon request.

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