



# Earthing Conference

Including Surge & Lightning Protection

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21st & 22nd May 2025  
Park Regis, Birmingham, UK



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## Overview

# The High Voltage, Earthing & Arc Flash Conference

Join us at this year's Earthing Conference, including the Surge & Lightning Protection. This comprehensive program covers everything from distribution to generation and lightning protection, offering in-depth technical insights, regulatory updates, and real-world case studies. Designed for engineers, asset managers, and electrical safety professionals, the conference addresses key earthing systems, surge protection, lightning protection, and high-voltage engineering topics.

With a mix of international perspectives, the program investigates earthing topics across various sectors, providing valuable tools and strategies to enhance safety, compliance, and system reliability. Be part of the conversation shaping the future of earthing, surge and lightning protection!

## What You'll Gain From Attending:

- › Cutting Edge Insights: Fresh, newly developed case studies and lessons learned. From backed research.
- › Practical Takeaways: Real-world application, focusing on safety, compliance and reliability.
- › Networking Opportunities: Connect with peers.
- › Expert Speaker: Learn from industry leaders who are working in the field.
- › Professional Development: Stay ahead, hear new industry strategies and developments, and understand how Earthing is done in other parts of the world.

## What Delegates Will Learn:

- › Hear a case study and examples on Earthing Site Survey, Performance and Testing, learn key methodologies.
- › A hands-on workshop teaching the different cable bonding methods, cable sheath currents, and a step-by-step guide.
- › Learn how to balance cost and safety in Earthing Design, manage transferred potentials in LV Networks, and avoid pitfalls and oversimplified approaches using interconnected earthing systems methods.
- › Address the unique earthing challenges in large renewable projects. Improve your accuracy in soil modelling for large-scale areas.
- › Understand the 'why' behind earthing system design, covering how to design, install and manage the entire lifecycle of the earthing system.
- › Learn new strategies in practical earthing management and avoid common shortcuts.
- › Get insights into how to investigate the effects of breaks in Earthing Systems on Earth's Potential Rise (EPR) and evaluate the impact of soil resistivity.
- › Detect and mitigate risks associated with Earthing System Failures.
- › Hear from presenters engaged in real-world findings of AC interference in a significant UK transmission project.
- › Learn how to understand and mitigate diverted neutral currents and identify early warning signs before issues escalate.
- › Delegates will learn how to improve power system reliability in managing diverted neutral currents.



# 2025 Keynote Speakers

## **Dr. Matthew Taylor (Highest Ranked Speaker 2024)**

**BEng (Hons) PhD CEng FIET, MJT Earthing & Lightning Consultants**

Earlier career with South Wales Electricity.

Completed a PhD in soil resistivity measurement and analysis at Cardiff University

27+ years as an earthing and lightning protection consultant

Led design and assessment projects across substations, power stations, railways, renewables, industrials, pipelines, and military sites

Contributor to BS EN 50522, ENATS 41-24, ENA EREC G78, and ENA EREC S41

Advisor to the GEL/81 working group for BS EN 62305

Chartered Engineer and Fellow of the IET

Committed to delivering quality advice and mentoring the next generation of earthing and lightning protection engineers.



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## **Stephen Palmer**

**BEng, GradCertBA, FIEAust, SMIEEE, CPEng, EngExec, RPEng, NER, APEC Engineer, IntPE(Aus), RPEQ, MAIC, Safearth**

25+ years of experience in earthing design, audit, and testing for power generation, transmission, distribution, heavy industry, mining, and rail.

Extensive work managing earthing, lightning protection, and interference risks.

Leads an international team of 50+ consultants and researchers.

Secretary of the CIGRE & CIRED Joint Working Group B3.35, which published TB 749 on substation earthing design optimisation.

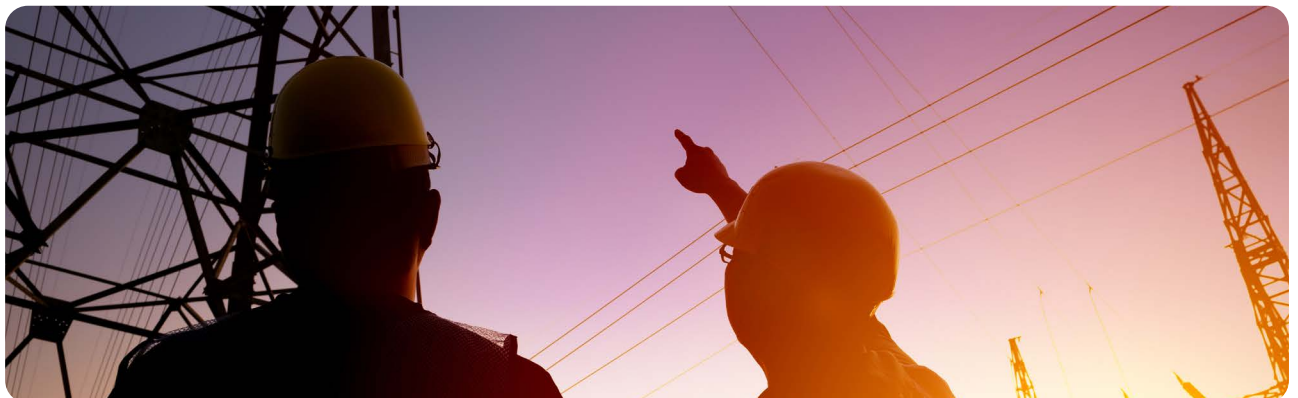
Convenor of Working Group B3.54 on earthing system testing methods, set for publication this year.

Contributor to IEC and Australian standards, including leading the Australian review of IEC 61936 earthing elements.

Committee member and technical editor for the revisions of IEEE 81 (earthing system testing) and IEEE 80 (earthing system design).

Delivered formal earthing training for 20+ years in Australia, America, Canada, and the UK.

Presented at numerous international conferences, including Cigre, CIRED, and IEEE.



## Day One | Wednesday 21<sup>st</sup> May, 2025

### 9:00am Session One | Keynote Presentation

#### Accurate Earth Fault Current Distribution to Address Third-Party Impact from a Large Solar Site fed by a nearby Transmission Substation

**Dr. Matthew Taylor:** *Managing Director, MJT Earthing & Lightning Consultants Limited*



The need for fault current distribution studies to determine ground-return earth fault current for use in earthing studies, is well understood. The earthing standards provide simplified methods of calculation and typical fault current split ratios that are sufficiently accurate in many cases. However, where sites are fed by short overhead lines, or the source and faulted substation earth electrode resistance zones overlap, a more complex analysis is needed. This paper describes the assessment of third-party impact from a large solar site within relatively close proximity to a source substation. Accurate and approximate methods of fault current distribution analysis are compared. The benefits of accurate simulation using CDEGS HIFREQ are presented.

### 10:00am Morning Tea

### 10:30am Session Two

#### Design Considerations for Earthing & Lightning Protection in Solar and BESS

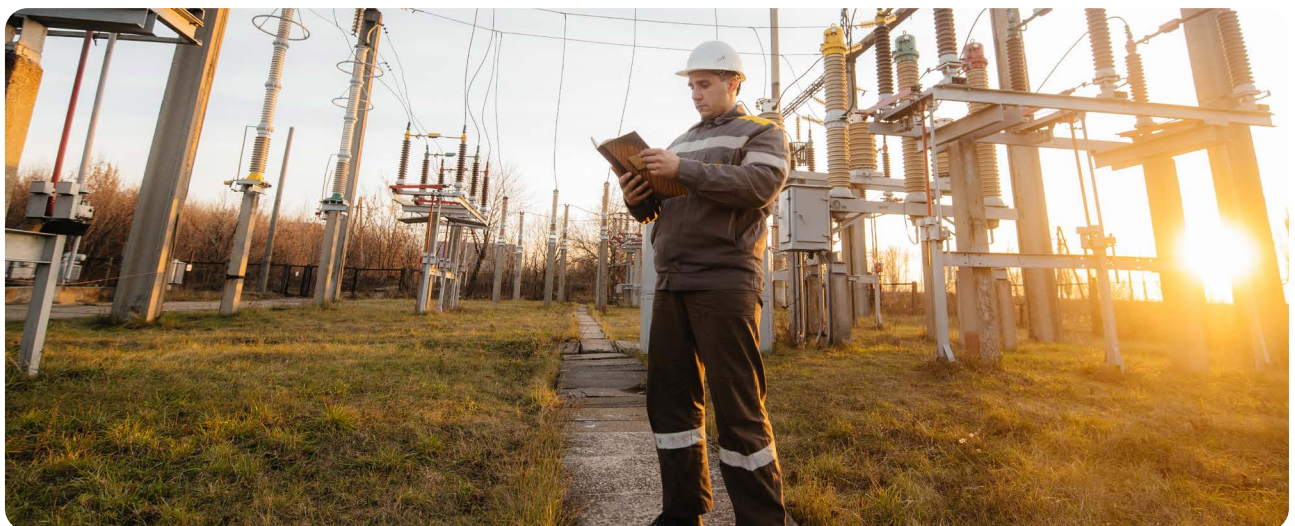
**Hadi Beik Daraei:** *Engineering Manager, LPI Group*



This presentation explores essential design considerations for earthing and lightning protection in solar and BESS systems. It will include a comparison of the protection needed for PV cells located on rooftops and the specific requirements for solar farms. In solar farms, the cost of the earthing system is a major concern due to the large area occupied by the PV array. Any overdesign in a solar farm is considered a rejected design.

In general, for solar and BESS, we will discuss lightning protection based on IEC 62305-2 (2024) risk assessments, DC system grounding, potential stress voltage on insulation, and electrode material selection to prevent corrosion. We will also examine the interface between earthing systems operating at different voltages (MV/LV/HV).

Attendees will gain practical insights into meeting industry standards and ensuring adequate lightning and earthing protection in their facilities.



## 11:15am Session Three - Case Study

### Earthing Site Survey and Earthing Performance Testing at a Rural HV Substation - A Case Study

**Ken Atkinson:** Senior Earthing Specialist, System Protection and Earthing Section, Network Assets *ESB Networks*

**Jamie Forsyth:** Earthing Technologist, System Protection and Earthing Section, Network Assets *ESB Networks*



This case study will focus on an earthing site survey and earthing performance tests carried out at a rural 38 kV substation in Ireland where asset replacement works are planned. The earthing site survey includes a visual survey, earth grid tracing/scanning, and earth grid continuity/integrity tests. The earthing performance tests include a high-current fall-of-potential test and touch/step voltage measurements at and near the substation. The survey and test results will be compared against available design records, and appropriate practical earthing safety remedial measures will be identified for implementation on-site as part of the asset replacement works.

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## 12:00pm Lunch

## 1:00pm Session Four - Workshop

### Workshop on Thermal Impact of Earthing Conductors and Cable Bonding Arrangements

**Ross Falconer:** Director, *Enable Power Design*

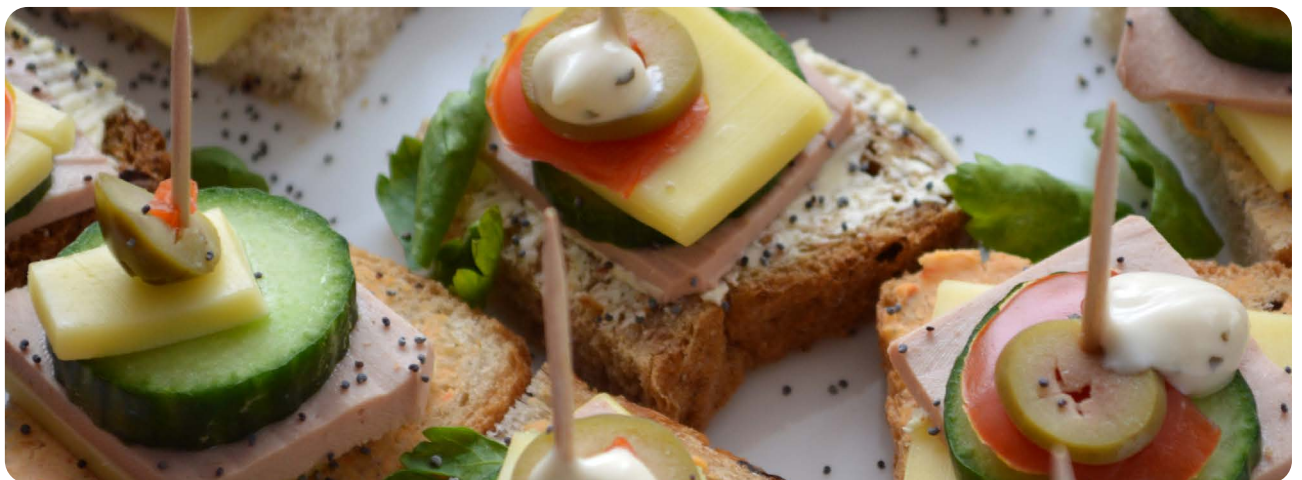


The various methods used to bond HV cable sheaths to the earth significantly affect the heat generated by the cables and their thermal rating. In addition, cable bonding arrangements influence currents and heat induced in nearby earthing conductors. In particular, for single-point bonding, which eliminates sheath currents and increases cable current ratings, the precise placement of any earth continuity conductors (ECC's) is crucial to minimise currents and heat generation. This hands-on workshop will use the software to demonstrate how to calculate the temperature profile and current ratings of different cable arrangements near earthing conductors.

*\*\*All delegates will require their computers. Please ensure you can enable the software before the conference. We will send you a link to the software. Please advise your IT Team to ensure your computer can activate the software before the conference.*

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## 2:00pm Afternoon Tea



**2:30pm**

## **Session Five**

**How do I know if a distribution system earthing installation complies with tolerable touch voltage standards?**

**Dr. Bill Carman:** Principal Consultant, *Safearth UK*

**Brett Duncan:** Director (Electrical Engineer), *BJD Consulting Engineers*

Distribution substation earthing systems are expected to have a low cost of design and low installation cost. They usually rely upon interconnection with upstream HV cables or interconnection with or separation from the surrounding LV network to control potentials transferred onto the LV neutral network. The expectation of low design and installation costs is contrasted by how significant the cost can be in the event of poor safety performance of these systems. Simplified approaches are attractive and appropriate in certain circumstances but can lead to undesirable costs and residual risk outcomes. Using an 11kV private network as a case study, this presentation will examine the design process and the use of selective testing to reduce uncertainty in design input parameters and confirm the presence of a global earthing system.



**3:30pm**

## **Session Six**

**Earthing design for Wind Farms with Diverse Soil Resistivity**

**Daniele Cuccarollo:** Electrical Engineer - Earthing Specialist, *SINT srl*

The green transition is driving the development of large-scale renewable energy facilities, with some installations exceeding 1 GW in capacity and spanning vast areas. Onshore photovoltaic and wind installations pose unique challenges for grounding system design. Key issues include achieving calculation accuracy within acceptable processing times, modelling ground resistivity over large areas and balancing detail with project scale. Large systems amplify these challenges, particularly in low-resistivity soils, where computational methods can struggle with precision. Proper soil modelling, accounting for lateral and vertical resistivity variations, is critical.

This presentation will cover the assessment of a 100 MW wind farm with five 20 MW strings connected to a high-voltage grid. It will address fault currents and grounding considerations to ensure safe, cost-effective designs.



**5:00pm**

## **Networking Soiree**



# Day Two | Thursday 22<sup>nd</sup> May, 2025

## 9:00am Session Seven | Keynote Presentation

### Designing, Testing and Investigating Earthing Systems: What you need to know!

**Stephen Palmer: CEO & Managing Director, Safearth**



Standards and regulations tell us 'what' we need to achieve, and sometimes key steps in 'how' we need to achieve them. As Simon Sinek has famously promoted, starting with 'why' a powerful mindset toward is finding what might otherwise be hidden. We must, however, identify the hidden, neglected or misunderstood earthing issues if we wish to optimise the systems. This optimisation includes design, installation, residual risk, safety and cost. It should also consider supervision, maintenance, refurbishment, retirement, and eventually, the removal of the system.

It is agreed that the above list of optimising steps can seem like a lot, and perhaps more effort than is commonly applied, but what if it's not too much effort? What if we start with why, consistently apply the correct understanding and the most effective methods, and do it often enough to achieve efficiency and make that list normal? Time will tell.

This presentation will cover earthing works, where current flows and why, how we can and can't change that, what that means regarding safety outcomes, and how earthing should be best managed. The session will look at common shortcuts in earthing and identify which myths are gold and which are not.

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## 10:00am Morning Tea

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## 10:30am Session Eight

### Effect of Integrity of the Earthing System on the Rise of Earth Potential

**Dr. Niamat Ullah: Principal Power System Engineer, Jacobs Consulting UK**



This paper investigates the effects of breaks in bonds, breaks in the earthing system and breaks in the earth wire (EW) on the earth potential rise (EPR) in a substation and at the transmission tower bases using various models of an L6 tower. Different approaches were adopted to examine the integrity of the earthing system and the terminal towers. These effects were investigated to examine the associated difference in the EPR magnitudes with respect to a healthy system at various locations. Comparisons of the computed EPR magnitudes were made between the healthy and unhealthy systems to quantify any difference. The studies were conducted at power frequency for uniform soil with different soil resistivities. It was found that full breaks in the double bond of the terminal towers increase the EPR significantly at the fault location while they reduce EPR at the terminal tower bases. A fault on the isolated section of the grid can result in EPR values up to 8 times of those on a healthy system at higher soil resistivities, provided that the extended earthing system stays connected to the grid.

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## 11:15am Session Nine | Case Study

### A New 400kV Line and its Pipeline Impacts

**Hugh Wren: Earthing Engineering Manager, Earthing Risk Management**



Due to net zero targets and grid modernisation plans, transmission owners are building many new transmission routes across the UK. Previously AC interference was not considered a significant issue. Latterly, as a result of recent developments, it has become clear that AC interference deserves more attention throughout the lifecycle of a project.

This presentation will share what ERM learned from assessing AC interference on one of the most prominent 400kV line builds in a generation.

## 12:00pm Session Ten

### Analysis of Earth Fault Current Distribution Calculation Methods

**Stephen Jay:** Senior Consultant, *PSE 2 Consulting*

To design safe earthing systems, accurate ground return current calculations are essential. Since 1986, the prevailing method in the UK has been to utilise the tables and calculations provided in ENA S34. However, this has become less applicable over time as cable types and sizes have changed and developed. In this work, we compare the use of S34 with ATP Draw and CDEGS FC DIST for calculating fault current distribution and discuss the benefits and shortfalls of each method.



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## 12:45pm Lunch

## 1:45pm Session Eleven

### Continuity Testing – Not as easy as 1,2,3!

**Rowan McMurray:** Principal Engineer, *Safearth*

Continuity or integrity testing is a commonly applied testing method for determining the condition of earthing grids and earthing systems. At its most basic level it is a simple, low-cost test that provides a simple verification, but it has potential to bring much greater value. It is now recognised best practice for validation that everything that should be bonded together is bonded together, and that items that should be separated are in fact separated. There are however many approaches to how continuity is measured and how that measurement is interpreted and applied to asset management decisions. Choosing methods is an important decision with significant implications for the asset lifecycle.

This presentation will review the development of various electrical approaches to measuring continuity and how some common instruments have applied those methods. The strengths and weaknesses of variations, including AC versus DC sources, low versus high current, two versus four wire measurements and continuous versus pulsed or reversed signals, will be presented and discussed. It will then consider the three levels of continuity testing commonly used and the different approaches within those levels, including joint, segment and site testing and how the measured values can be assessed for adequacy or insight into the true condition.



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## 1:45pm Session Twelve

### Diverted Neutral (net) Current and The Impact on Earthing Systems

**Paul Meenan:** Head of M&E | Asset Management, *c2c (Trenitalia c2c Ltd)*

Diverted neutral currents, often a precursor to broken protective earth-neutral (PEN) conductors or imbalances within electrical networks, pose significant risks to earthing systems and overall electrical safety. These currents can lead to elevated touch voltages, equipment damage, and increased risks of electric shock.

This presentation will explore the root causes, detection methods, and mitigation strategies for diverted neutral currents. It will include monitoring techniques using CT sensors and intelligent systems integrated within consumer units. With evolving grid demands and distributed energy systems, addressing diverted neutral currents is critical to ensuring long-term reliability, compliance, and safety of earthing infrastructures across domestic, commercial and industrial installations.



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## 3:15pm Afternoon Tea

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**3:15pm**

## **Session Thirteen | Workshop**

### **Exploring Soil Resistivity Testing & Modelling**

*It will be hands-on for calculations and modelling*

**Stephen Palmer: CEO & MD, Safearth**

**with co-hosts Dr. Bill Carman & Rowan McMurray**

The most critical measure for estimating how isolated earth grids will perform is the electrical performance of the soil where it will be buried.

This presentation will recap how soil creates grid resistance and surface potentials, and how the electrical characteristics can be measured or estimated. It will consider the changes in those characteristics over seasons or time. The session will also share how to build an electrical model for soils from test data, and how to avoid the most common pitfalls.

This practical workshop is suitable for relative novices but offers perspectives and insights that perhaps even the most experienced can learn from. It will be hands-on for calculations and modelling, and participants are asked to bring their laptops and most challenging soil-related experiences for discussion.



**4:45pm**

## **Conference Wrap**

**An opportunity for delegates to collaborate with speakers for a Q&A.**



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## Tickets & Registration



### Early Booking Rate

Expires 14<sup>th</sup> April 2025  
**£810**



### Standard Pricing

Book after 14<sup>th</sup> April 2025  
**£880**

Please refer to our registration page for discounted packages for two or more delegates.

## 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

Park Regis Birmingham  
160 Broad Street, Five Ways  
Birmingham B15 1DT  
**Telephone:** +44 121 369 5555

### Accommodation

Accommodation is not included in the conference ticket and should be booked separately if required.

Please note that **10% off** the best available rate is available at the time of booking. Guests must call the reservations team and quote **IDC190525** to receive the discount.

**Email:** [hello@parkregis-birmingham.com](mailto:hello@parkregis-birmingham.com)

**Telephone:** +44 121 369 5555

### 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.

