



Earthing Conference

Including Surge & Lightning Protection

22nd & 23rd May, 2024

Park Regis

Birmingham, United Kingdom

What you will gain from attending this conference:

- › Reduce your project risk, learn design and testing techniques for HV substation earth grids.
- › Master IEC 62305 protection against lightning.
- › Learn modelling techniques for wind and solar farms.
- › Learn how to design earthing systems for the IT/telecommunication industry.
- › Learn BSEN, IEC, IEEE, NEC and ITUT Standards for DC Systems and Battery Rooms.
- › Reduce lightning and fault risks in BESS facilities. *Battery Energy Storage System.
- › Mitigate Risks, learn compliance & regulations from the HSE Specialist Inspector.
- › Get legally protected learn how to reduce accidents and protect your staff.
- › Gain key insights into complex global earthing practices.

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Earthing Conference

Including Surge & Lightning Protection

The conference is crucial, highlighting the significance of proper earthing practices across industries. With modern society heavily reliant on electrical systems, ensuring their reliability and safety is paramount. Addressing earthing, lightning protection, surge protection, shielding, and electrical systems is essential for minimizing downtime and preventing catastrophic failures. Poor earthing practices can result in costly and frustrating issues for businesses.

This conference aims to fill knowledge gaps and elevate industry practices by offering fresh insights and practical solutions. In 2024, our presentations and case studies will cover a range of topics, including modern renewable earthing systems, design practices for solar and wind farms, standards for cabling, testing of HV substation earth grids, safety standards for earthing testing, and IT equipment earthing standards (BSEN, IEC, IEEE, NEC, ITUT).

Delegates can expect a cohesive learning experience focusing on clarity and practicality, facilitating effective implementation of conference insights. Collaboration and knowledge sharing among electrical professionals can significantly improve outcomes for stakeholders. This conference presents an excellent opportunity to deepen your understanding of earthing and related topics, contributing to a safer and more reliable electrical environment.

About IDC Technologies

For the past thirty years we have run practical conferences around the world focusing on useful technical outcomes for you. We are not yet another organiser spruiking business type presentations; but a group of dedicated engineering professionals focusing on useful practical technical outcomes for you and your team. We pride ourselves on a legacy delivering worldwide, including Australia, New Zealand, Singapore, the United Kingdom, Ireland, India, the USA, Canada, and South Africa. We are committed to delivering high-quality conferences and workshops and have engaged thousands of professional engineering delegates. Our clientele includes esteemed institutions and organisations worldwide, including Rolls Royce, NASA, and BP, to name a few. This attests to our reputation as a leader in engineering professional development and cutting-edge engineering developments which directly benefit you. We are a sister company to the well-known engineering college – the Engineering Institute of Technology which had over 6000 students (mostly practicing engineering professionals) from 160 countries in 2024 completing engineering certificate, diploma, bachelor, master and doctoral programs.



Day One | Wednesday 22nd May, 2024

9:00am

Session One | Keynote Presentation

Keynote Speaker (Highest Rated Speaker in 2023)

Global Earthing Assessment at a UK Industrial Site

Matthew Taylor: PhD, MJT Earthing & Lightning Consultants



The establishment of Global Earthing System (GES) status for interconnected substation networks can be of great benefit to Site or Network Operators. The earthing standards give some guidance on the identification of a GES, tending to focus on the area or density of the network, but do not describe a method of assessment. The research here will be outlined.

This paper describes the assessment of a large, UK industrial site and the definitive identification of it as a GES. The benefits of this classification in terms of safety, maintenance and future extension or decommissioning works are discussed.

10:00am

Morning Tea

10:30am

Session Two

Earth Fault Current Distribution and Transfer Potentials - HV Cable Circuits

Jon Williams: Principal Engineering Consultant, PSE2 Consulting

Dionysis Skevis: Engineering Consultant, PSE2 Consulting



Fundamental to the design of an earthing system is the ground return current, applied to an EPR calculation. Within S34 standard, there are several methods of calculating the fault current split between the cable screen/sheath and the ground. However, there are limited C factors and an ever-increasing range of cables. While mutual and self-impedances are considered within calculations, joint bays—where screens can be swapped between phases and, at minimum, are earthed—are currently unaccounted for within standards or cable tools. The effect of joint bays on long cable routes and their impact on fault current distribution and transfer voltages is reviewed.



11:15am Session Three

Testing of HV Substation Earth Grids and Large Interconnected Earthing Systems - A DNO Perspective

Ken Atkinson: Senior Earthing Specialists, System Protection and Earthing Section, ESB Networks



Design and testing of HV substation earth grids with large interconnected earthing systems (for customer installations such as wind farms, solar farms and data centres) poses particular challenges for Distribution Network Operators. This presentation will discuss some of these challenges and the approach taken by ESB Networks (the Distribution Network Operator in the Republic of Ireland) to ensure consistency, reduce project risks during construction and commissioning of HV substations, and maintain the earthing safety of staff and customers at these installations.

12:00pm Lunch

1:00pm Session Four

When the Inspector Calls

Terry Green: Specialist Inspector (Electrical & Controls), HSE



The role of the HSE Electrical Specialist Inspector is to carry out general electrical inspection work and enforcement. This provides an insight into what a Duty Holder will experience when faced with a visit from an HSE inspector. The presentation will also provide what an Inspector will be looking to receive in terms of documentation and evidence when trying to establish that a Duty Holder is meeting the requirements of UK Health and Safety legislation.

As the HSE we will address the UK legal provisions requirements for electrical systems (relevant to earthing). The presentation will provide examples of incident investigations where earthing is involved.

1:45pm Session Five

Managing Complex Earthing Systems for Large Scale Solar Farms

Hugh Wren: Design Manager, greymatters



With recent changes in the renewables landscape, ground-mount solar projects are only getting bigger. Having recently delivered the earthing and lightning protection design for one of the largest solar and BESS projects in the UK, at over 400 MW, we will share some learning points and approaches for the whole start-to-finish process to ensure the most rigorous design. The primary challenge is managing the physically large scale of the site and how to manage the size of the model, balancing accuracy with computation time. The design needs to address the hazard from impressed voltage due to overhead lines and avoid impacts on third-party properties nearby. We will also look at the lightning protection challenges associated with such large sites whereas the standard IEC 62305 approach doesn't fully capture the nuances of this type of site.

2:30pm Afternoon Tea

3:00pm

Session Six

Earthing design for Wind Farms with Diverse Soil Resistivity

Ross Falconer: Head of Power Systems, Aurora Power Consulting



Designing a safe earthing system for a wind farm can be challenging given that the turbines and substation are spread out over a large area. Often soil resistivity data measured at the various turbine locations and the substation is diverse with limited correlation, making it difficult to produce an overall soil model of the entire site. This paper will explore different modelling techniques for integrating soil resistivity data into a combined earthing model for a wind farm, and how to ensure the model is accurate without it being overly complex.

3:45pm

Session Seven

Modelling a Fall of Potential Earthing Grid Impedance Test

Jayson Patrick: Technical Director, Electrotechnik



The fall of potential (FOP) method is a popular measurement method and the 61.8 % rule (both outlined by IEEE Std. 81) is used for establishing the resistance of an electrical earthing grid. While this rule can provide a quick estimation of the resistance of an electrical earthing grid, it has drawbacks that must be considered and understood. In this presentation, we demonstrate through modelling how the soil resistivity variation and earth grid configuration cause inaccuracies in the earth grid impedance tests, and we provide practical recommendations which will improve the accuracy of earth grid impedance tests.

4:30pm

Session Eight

Utility Scale Solar Farms and Modern Earthing Testing

Rowan McMurray, Principal Engineer, Safearth EU



To design and commission the earthing system of a utility scale solar farm as if it was an extra-large substation can be shown to miss key requirements, and may result in non-compliant safety performance and, in time, a compromised earthing system. However, properly planning and executing proven test methods can lead to more reliable designs, construction, commissioning, and lifetime management of any earthing system.

5:15pm-6:15pm Earthing Conference Soirée (Park Regis Lounge)



Day Two | Thursday 23rd May, 2024

9:00am Session Nine | Workshop

Transmission Line Earthing Workshop

Bill Carman: Principal Consultant, *Safearth UK*

The explosion of offshore windfarms is bringing many new transmission line projects to the UK and Europe. This workshop will walk through the earthing and lightning protection considerations for a new transmission line from design concept and route selection to detailed design, commissioning and lifetime supervision. We will cover the fundamentals at the same time as showing how the latest analysis and testing technology has been applied using real life examples based on experiences in a power utility (Ausgrid) and consulting in Australia and Europe.



10:00am Morning Tea

10:30am Session Ten

Earthing design Consideration for Control, IT and Telecommunication System

Hadi Beik Daraei: Engineering Manager, *LPI Group*

This presentation analyses potential interference within the installation environment of IT equipment, while elucidating the precise functions of the Earthing and Bonding system. We will review different types of earthing systems, like safety, and functional EMC, examining the impact of dirty earth.

We will demonstrate the different types of earth networks and address what can be achieved in the Earthing and Bonding design process relating to data and telecommunication centers.

This paper will also review the current standards, European and International standards associated with IT Equipment Earthing (BSEN, IEC, IEEE, NEC, ITUT), further addressing shielding, telecommunications, DC Earthing systems, and Earthing systems in battery rooms.



11:15am Session Eleven

Safety Management, the Regulations, and the Legal Requirements the Industry Needs To Be Aware Of!

Andy Baker: Principal Electrical Engineer, *ELECTRICAL SAFETY UK*

At Electrical Safety UK, we specialise in conducting thorough studies to ensure safety and compliance are addressed.

Often, we are asked, "Where does the law mandate us to do this?" Our presentations answer the question by outlining legal requirements and guide you in establishing a fool proof, safe system of work. Furthermore, we demonstrate how seamlessly integrating these practices into your organisation can make it a standard part of your operations.

We're here to emphasise that if you're putting people to work, it's crucial to be well-informed about essential safety measures that need to be addressed!



12:00pm**Lunch**

1:00pm**Session Twelve****Hands-on Workshop on Fault Current Distribution Calculations for Complex Power Cable Systems****Jayson Patrick: Technical Director, Electrotechnik**

When an earth fault occurs in a transmission system, the fault current returns to the power source via the available conductive paths (i.e., cable screens, overhead earth wires, earth continuity conductors, earthed telecommunication systems, or the earth itself). The portion that returns via the soil through buried earthing systems gives rise to touch and step voltages at those locations, which is of concern. Accurate calculation of fault currents is complex because it depends on current distribution between overhead earth wires, cable sheaths, earth continuity conductors, the earth itself, and the values of the earthing system impedances; therefore, detailed calculations are recommended. The significant benefit of performing accurate fault current distribution calculations is that in many cases, the portion of the fault current discharged into the earth will be much lower than the maximum fault current available, leading to earthing designs that are both safe as well as economical. This hands-on software workshop will demonstrate fault current calculation methods, how to obtain the necessary input data, and important factors influencing the earth fault current magnitude will be examined with two case studies involving complex power cable connections.

***All delegates will require their computers, please ensure you are able to enable the software prior to the conference we will send you a link to the software, please advise you IT Team to ensure your computer is able to activate the software prior.*

2:30pm**Afternoon Tea**

3:00pm**Session Thirteen****Applying Human and Organisation Performance (HOP) Principles to Electrical Work Activities****Mitch Cini: Global HSE Operations Manager, ABB****Mark Sage: Global HSE Manager Process Automation & Global Division HSE Manager Energy Industries, ABB**

Join us for an engaging 90-minute workshop on “Applying Human and Organisation Principles (HOP) to low voltage electrical work activities”. HOP Principles are an innovative approach to safety management that focuses on learning from normal work, rather than relying solely on reactive safety measures. In this workshop, we will explore the benefits of applying HOP Principles to low voltage electrical work activities, and how they can help organizations achieve a more proactive safety culture. Participants will have the opportunity to put HOP related tools into practice and be challenged to consider how to do electrical safety differently. Don't miss this thought-inspiring workshop that will revolutionize your approach to electrical safety management.

**4:30pm****Session Fourteen****Open Forum Speakers & Delegates Question & Dialogue**

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Tickets & Registration

All ticket prices below include 20% VAT

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A great opportunity to bring together a group of work colleagues, clients, stakeholders, or university friends for an unparalleled learning and networking experience.

Standard Pricing

Book after 1st April 2024

- › Single booking - **£880.00**
- › Group booking of 2 - 7 people - **£792.00** per person
- › Booking a table of 8 people - **£772.00** per person

