



Electrical Faults: Causes, Analysis, Detection & Remedies Conference

19 – 23 April 2027
Cape Town (South Africa)



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Ref: 8010_1058730 **Date:** 19 – 23 April 2027 **Location:** Cape Town (South Africa) **Fees:** 5300 Euro

Introduction:

The electrical fault analysis, remedies, detection, and solutions conference calculates fault currents in practical electrical power systems. Short-circuit currents are associated with large amounts of very destructive energy. Therefore, calculations must be made to ensure that the short-circuit ratings of equipment are adequate to cater to these high currents. An accurate assessment of these currents is also essential for determining the settings of the system protection devices.

The analysis methods used throughout the industry are thoroughly explained in this seminar. A robust engineering software package that makes complex and repetitive calculations easy to follow and document is used throughout the workshop to ensure that attention to detail is not compromised and minimum simplifications are made. A considerable portion of the conference is devoted to applying these methods to practical systems, starting from the preparation of the system for analysis through the calculation process, by manual calculation, and by the use of computer analysis to the point of application of the results.

The electrical fault analysis, remedies, detection, and solutions conference is illustrated by practical examples of systems, including ones explained in detail in industrial standards that engineers need to be familiar with and able to follow and apply. Finally, industrial software programs capable of modelling complex electrical systems and making power system fault analysis a relatively easy task for engineers are introduced, provided that one can explain and understand the results a computer program gives.

This electrical fault analysis, remedies, detection, and solutions seminar is essential as with any computer software-based application where the input data are wrong; for whatever reason, the results are also insufficient. One needs to be able to observe such errors and make engineering judgments for their correction.

Understanding Electrical Faults and Remedies:

Electrical fault analysis is critical in operational safety and system reliability. During this electrical fault analysis, remedies, detection, and solutions conference, attendees will be able to delve into an electrical fault-finding course that covers various types of faults typical in power systems. Detailed discussions on the causes of faults in the power system will be coupled with strategies for effective electrical detection and remedying electric procedures.

Participants will engage in an electric root cause analysis course to enhance their understanding of what causes electrical resistance and the effects of electrical faults. Fundamentally, this electrical fault analysis, remedies, detection, and solutions course aims to define electrical faults in technical terms, provide an electrical fault definition, and explain the meaning of electrical faults through interactive sessions, case studies, and hands-on application of software tools.

The insights of this electrical fault analysis, remedies, detection, and solutions conference participants will be gained here to empower you with theoretical knowledge and practical skills in handling and preventing potential electrical faults, ensuring you can apply a reliable electrical remedial approach in your field.

Targeted Groups:

- Electricians.
- Design electrical engineers.
- Electrical supervisors.
- Plant electricians.
- Operations and maintenance engineers, supervisors and technicians.
- Maintenance technicians.

Conference Objectives:

At the end of this electrical fault analysis, remedies, detection, and solutions conference, the participants will be able to:

- Learn about the basic theory of the three-phase power system under balanced and unbalanced conditions.
- Understand the per-unit system and analytical circuit-based techniques to calculate industrial power systems for faults.
- Learn advanced engineering math software that can be used to make complex and complicated calculations an easy task.
- Understand the balanced three-phase and unbalanced faults and their analysis using symmetrical components.
- Learn about applying impedance reduction techniques and positive, negative, and zero sequence circuits and their interconnection for faults.
- Learn about the CAD-driven, PC-based software that can be used first to confirm the results of industrial power systems to be studied and analyzed during the conference and its use for analyzing more complicated systems.
- Learn how to collect data and information needed for a power system in a structured way before fault analysis.

Targeted Competencies:

At this electrical fault analysis, remedies, detection, and solutions conference, the target audience will be able to:

- Learn about the identification of causes of electrical faults.
- Understand three-phase short circuit currents.
- Understand the recognition of unsymmetrical faults in transformers.
- What are Partial discharge phenomena, and how do you apply the required analysis?
- Understand the representation of unsymmetrical faults in a power system.
- Learn about manual and software-assisted calculation of fault currents.

- Simulation for protection relay configuration.

Conference Content:

Unit 1: Introduction to Fault Analysis:

- Source of fault current.
- Fault statistics.
- Basic assumptions.
- Short-circuit rating of equipment.
- Select the correct switchgear rating for fault duties.
- Overview of per-unit system.
- One-line diagrams.
- Learn about sources of impedance data for all items of plant.
- Overview of tutorial to demonstrate the preparation of a system for the study.
- Learn about the introduction to the engineering software used throughout the conference to make complex and repetitive calculations as accurate as possible.

Unit 2: Three-Phase Short-Circuit Currents:

- Manual calculation of three-phase short-circuit current.
- Circuit reduction techniques.
- Industrial systems.
- Electricity supply systems.
- Understand what the tutorial is based on attendees' plans.
- Cables subjected to short-circuit currents.
- Compliance with regulations.

Unit 3: Unsymmetrical Fault Conditions:

- Overview of symmetrical components.
- Consideration of various fault types.
- Sequence networks.
- Understand the consideration of phase shift in two-winding transformers.
- Consideration of earth impedance.
- Consideration of three-winding transformers.

Unit 4: Representation of Unsymmetrical Faults in Power Systems:

- Fault diagrams.
- Learn what interconnected sequence networks are.
- Understand special considerations concerning the limitation of earth fault current.
- Overview of demonstration examples based on industrial power systems.

Unit 5: Computer-Based Calculation of Faults:

- Overview of introduction to a scaled-down industrial program capable of modelling complex power systems under fault conditions.
- Use of the software program in practical studies checking manual calculations.
- Industrial standards.