System and Protective Earthing for Electrical Networks Training Course

16 – 20 May 2027
Langkawi

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Training Center

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Ref: 1711_228604 **Date:** 16 – 20 May 2027 **Location:** Langkawi **Fees:** 8000 Euro

Overview

System and Protective Earthing for Electrical Networks Training Course is a one-week course for electrical, protection, and maintenance engineers and technicians, who leave with an Earthing Design and Verification Pack. Participants connect fault-current paths, neutral earthing, soil data, electrode geometry, bonding, touch and step voltage, testing, and maintenance. The course resolves fragmented design and field evidence through traceable calculations and inspections. Agile Leaders Training Center presents system and protective earthing for utility and industrial networks.

Who Should Attend

- Functions responsible for electrical-network design and technical assurance
- Teams responsible for protection studies and fault-current analysis
- Functions responsible for utility substation engineering and maintenance
- Teams responsible for industrial electrical installation and inspection
- Functions responsible for electrical safety and asset integrity

The course assumes participants can read single-line diagrams and basic fault calculations and leaves out temporary operational earthing, lightning-system design, and advanced electromagnetic modeling.

Departments and Industries

The course supports departments and industries that design, operate, inspect, or maintain permanent electrical earthing systems.

- Power generation, transmission, and distribution engineering
- Oil, gas, petrochemical, and process facilities
- Manufacturing, mining, and heavy-industry maintenance
- Transport, water, and infrastructure utilities
- Electrical design, protection, testing, and asset-management functions

Learning Objectives

By the end of this course, participants will be able to:

- Analyze system and protective earthing objectives
- Compare neutral earthing methods and fault-current paths
- Use soil-resistivity data for electrode-system decisions
- Evaluate touch and step voltage controls
- Build an electrical earthing grid design review
- Apply earthing system testing and maintenance methods

Course Agenda

Day 1: Earthing Functions and Fault Paths

- System and Protective Earthing Function Map
- Earth-Fault Current Path Diagram
- TN TT and IT Earthing Scheme Comparison
- Neutral Earthing Method Selection Matrix
- Protection and Earthing Interface Checklist

Day 2: Soil and Electrode Systems

- Soil Resistivity Survey Plan
- Earth Electrode Resistance Calculation Sheet
- Rod Ring Plate and Grid Option Matrix
- Electrode Material and Corrosion Review
- Seasonal Soil Condition Adjustment Record

Day 3: Grid Design and Safety Potentials

- IEEE 80 Earthing Grid Design Workflow
- Earth Potential Rise Calculation Record
- Touch and Step Voltage Evaluation Method
- Grid Conductor and Mesh Spacing Review
- Substation Fence and Transfer Potential Checklist

Day 4: Protective Conductors and Verification

- IEC 60364-5-54 Protective Conductor Review
- Equipotential Bonding Continuity Map
- Protective Conductor Sizing Check
- Earthing System Testing and Maintenance Plan
- Inspection Defect and Corrective Action Register

Day 5: Earthing Engineering Practice

- Exercise: Fault Path and Neutral Earthing Review
- Exercise: Soil Survey and Electrode Selection
- Exercise: Touch and Step Voltage Assessment
- Exercise: Bonding Inspection and Test Review
- Capstone Exercise: Earthing Design and Verification Pack

Practical Exercises

The course uses suggested activities from utility and industrial electrical networks.

- Suggested activity: trace an earth-fault path and compare neutral earthing options against protection behavior.
- Suggested activity: interpret soil-resistivity results and select an electrode arrangement for site conditions.
- Suggested activity: review an earthing grid for earth-potential rise, touch voltage, and step voltage.
- Suggested activity: evaluate bonding, conductor continuity, test results, defects, and maintenance actions.

FAQs

Who suits system and protective earthing training, and what does it assume?

The training suits electrical design, protection, utility, maintenance, testing, and safety functions and assumes familiarity with single-line diagrams and basic fault-current concepts.

How does permanent electrical-network earthing differ from temporary operational earthing?

Permanent earthing provides enduring fault-current paths, voltage control, bonding, and protective-device operation; temporary operational earthing protects work zones after isolation and belongs to switching and safe-work procedures.

Why are touch and step voltage evaluated in earthing grid design?

Touch and step voltage evaluation checks whether potential differences around an energized earth grid remain within the selected safety criteria during an earth fault.

How does soil resistivity affect earth electrode design?

Soil resistivity influences electrode resistance, grid dimensions, rod depth, spacing, material choices, seasonal performance, and the evidence needed to justify a design.

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How is an electrical earthing system verified after installation?

Verification combines visual inspection, conductor continuity, electrode resistance or impedance testing, bonding checks, records review, defect classification, and scheduled reassessment.

Conclusion

Participants take an Earthing Design and Verification Pack back to work. It connects fault paths, neutral-earthing decisions, soil evidence, electrode options, grid calculations, safety-potential checks, bonding maps, test results, and maintenance actions. The pack changes disconnected earthing decisions into traceable engineering reviews and reviewable field verification.