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بروجاكس للتدريب والتطوير  
Projacs Training and Development

# Electrical Grounding and Expectations of Future Loads and Method of Calculation

التأريض الكهربائي وتوقعات الاحمال المستقبلية وطرق حسابها

17 – 21 May 2021

Istanbul / Turkey



## Introduction

The first part of this course is intended to prepare the target persons with the ability to perform all electrical grounding system design for Domestic, Commercial and Industrial Facilities and AC Substations.

The second part is to present the proper methods for load calculation calculates. It helps the attendee to understand how to use worksheet to provide an accurate, consistent, and simplified method of determining the minimum size electrical service for a new or existing dwelling looking to add additional electrical load. It helps to prevent oversizing service, which costs more money, and under sizing service, which is a safety/fire hazard.

The course is designed for engineers, new graduate engineers, site field engineers, maintenance engineers and technicians.

## Objectives

**By the end of this course practitioners shall learn to:**

- Know all the grounding system terminology,
- Distinguish between different types of grounding systems,
- Know design steps for grounding systems,
- Distinguish the different grounding systems included in Domestic, Commercial and Industrial Facilities,
- Performing grounding design calculations for AC Substations,
- Recognize different calculation method for electrical load estimation.
- Understand the procedures and logic of each method for electrical load estimation.
- Perform the calculations steps of each method for electrical load estimation.

## Who Should Attend?

The course is designed for engineers, new graduate engineers, site field engineers, maintenance engineers and technicians.

## Course Outline

### Day-1

- Introduction to Grounding System Design
- Function of Earthing System
- How Earthing system works
- Advantages/disadvantages of various grounding systems
- The different components of grounding systems,
- Resistance-to-Ground testing
- Determine grounding requirements from soil resistivity results,
- Soil Resistivity testing
- Short circuit level calculations

### Day-2

- Basics of grounding system design
- IEEE Std. 80 Design Procedure
- The required field data for grounding systems design,
- Design steps for grounding systems,
- Design considerations of a grounding grid for medium and high voltage
- The basic principles of grounding in distribution systems
- Ground Potential Rise
- Fault Current Distribution
- Estimation of the Touch and Step Voltages

### Day-3

- Protective or Safety grounding systems
- How grounding can resolve human safety issues in distribution networks
- Safe and unsafe working conditions
- Influenced on Communications/Control Circuits
- Influence on Pipelines
- The impact of lightning strikes on grounding systems
- Ground Impedance Measurements
- Ground Mat Measurements
- Tower Ground Resistance Measurements

## Day-4

- Load Types
- Load Characteristics
- LOAD ANALYSIS
- ESTIMATION OF LOADS
- PREPARATION OF LOAD DATA
- DEMAND AND LOAD FACTORS

## Day-5

- LOAD GROWTH.
- Factors for Individual Facilities
- Building Demand and Load Factor Calculations
- The determination of emergency electric power requirements
- Minimum essential load,
- Uninterruptible load.

## Training Method

- Pre-assessment
- Live group instruction
- Use of real-world examples, case studies and exercises
- Interactive participation and discussion
- Power point presentation, LCD and flip chart
- Group activities and tests
- Each participant receives a binder containing a copy of the presentation
- slides and handouts
- Post-assessment

## Program Support

This program is supported by interactive discussions, role-play, and case studies and highlight the techniques available to the participants.

## Schedule

**The course agenda will be as follows:**

- |                     |                  |
|---------------------|------------------|
| • Technical Session | 08.30-10.00 am   |
| • Coffee Break      | 10.00-10.15 am   |
| • Technical Session | 10.15-12.15 noon |
| • Coffee Break      | 12.15-12.45 pm   |
| • Technical Session | 12.45-02.30 pm   |
| • Course Ends       | 02.30 pm         |

## Course Fees\*

- **2,950USD**  
*\*VAT is Excluded If Applicable*

## مقدمة

يهدف الجزء الأول من هذه الدورة إلى إعداد الحضرين للتعرف على نظام التأريض للمرافق المنزلية والتجارية والصناعية ومحطات AC.

الجزء الثاني يهدف الى تقديم الطرق الصحيحة لحساب الاحمال . كما أنه يساعد الحضور على فهم كيفية استخدام ورقة العمل لتحديد الحد الأدنى من الخدمة الكهربائية لمسكن جديد أو موجود و كيفية إضافة حمل الكهربائي إضافي. والذي يساعد على منع الزيادة الأكثر من اللازم للخدمة، والتي تكلفك المزيد من المال.

## أهداف البرنامج

في نهاية هذه الدورة المتدربين سوف يتمكن المتدربون من:

- التعرف كل مصطلحات نظام التأريض،
- التمييز بين الأنواع المختلفة لأنظمة التأريض،
- التعرف على خطوات تصميم أنظمة التأريض،
- تميز أنظمة التأريض المختلفة المنزلية والتجارية وفي المنشآت الصناعية،
- إجراء حسابات تصميم أنظمة التأريض لمحطات AC،
- التعرف على طريق الحساب المختلفة لتقدير الأحمال الكهربائية.
- فهم الإجراءات ومنطق كل طريقة لتقدير الأحمال الكهربائية.

## الحضور

تهدف الدورة للمهندسين والمهندسين حديثي التخرج، المهندسين الميدانيين الموقع، مهندسي الصيانة والفنيين