Training Title

FAULT ANALYSIS IN ELECTRICAL NETWORKS

Training Duration

5 days

Training Venue and Dates

REF EE012	Fault Analysis in Electrical Networks	5	16 - 20 March 2020	$6,500	London, UK

In any of the 5 star hotels. The exact venue will be intimated once finalized.

Training Fees

6,500 US$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

TRAINING OVERVIEW

TRAINING INTRODUCTION

The continuity of Electrical Power Supply is very important to the consumers especially for industrial sector, where curtail of electrical power supply is costly.
Electrical systems are subjected to several external & internal influences like weather conditions, lightning phenomenon, pollution, insulation failure, temperature rise, etc., these influences cause abnormal operational condition, which could lead to voltage and frequency variations and feeder trips, brown out or black out of electrical system, and sometimes, may lead to equipment damage or system failure.

Performance and characteristics of electrical system configurations are vital factor in reducing or increasing the effect of faults on the system as earthling system, switch gear, protective relays, active and reactive power generation, etc.

This course discusses electrical system faults and elements of the system that affect its behavior during the fault. The cause also will suggest measures to mitigate the problems that would arise.
Many utilities need this course which studies the influences of the above mentioned events on the electrical networks and their affect on the continuity of electrical power supply and how mitigate these problems.

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TRAINING OBJECTIVES

By the end of the course participants will be able to:
Explain the models for generators during a fault and be able to use the models to calculate the fault current at any point in time for a fault applied to the terminal of a generator.
Perform design calculations for choosing a circuit breaker for a system experiencing a balanced three-phase fault at any location.
Describe the advantage of using symmetrical components to analyse unbalanced system operation
Convert between phase values and symmetrical component values.

Draw sequence networks for a given three-phase system for fault analysis.

Analyse unbalanced power systems using symmetrical components

WHO SHOULD ATTEND?

This course is intended for Engineers & supervisors who work in transmission, distribution, maintenance, operation, control and analysis of Utilities & Industrial Electrical Networks.

TRAINING METHODOLOGY

A highly interactive combination of lecture and discussion sessions will be managed to maximize the amount and quality of information, knowledge and experience transfer. The sessions will start by raising the most relevant questions, and motivate everybody finding the right answers. The attendants will also be encouraged to raise more of their own questions and to share developing the right answers using their own analysis and experience. All attendees receive a course manual as a reference.
This interactive training workshop includes the following training methodologies

- **30% Lectures**
- **30% Workshops and work presentation**
- **20% Group Work& Practical Exercises**
- **20% Videos& General Discussions**

COURSE OUTLINE

Day One

Introduction

- **importance of continuity of electrical supply**
- **Power system components.**
  - **o Causes of faults**
  - **o Type of faults.**

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System Grounding

- **Generation units**
- **Power transformers**
- **Transmission lines**
- **Distribution system**
- **Arrangement of grounding in power system**

Day Two

Factors Effect the Fault Current Contribution & Continuity of Supply Relation between substation equipment connection and the fault contribution Transformers

- **Vector groups**
- **Parallel transformers with different vector groups**
- **Grounding transformers (zigzag t., 3wdg.t.,..)**
- **Common & separate grounding resistance (high & low value) for number of parallel transformers.**

Day Three

Fault Calculations

- **System configurations**
- **Per unit values.**
- **Symmetrical components**
- **Symmetrical & unsymmetrical fault calculations.**
- **Short circuit level.**
- **Effect of induction machines on short circuit level.**
- **Rupture capacity of circuit breaker.**
- **Methods, to reduce the short circuit level.**
- **Peak current limiters.**
- **Numerical examples.**

Day Four

- **Over view of protection system**
- **Protection components:**
  - **Current transformers,**
  - **Voltage transformers,**
  - **Relays and circuit breakers.**
- **Coordination between over current relays for a given system.**

Day Five

- **Distance and differential relays**
- **Transmission line protection**

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- **Transformer protection.**
- **Generator protection.**

Note:

Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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