

Training Title

Fault Analysis in Electrical Power Systems & Networks

Training Duration

5 days

Training Certificate

Define Management Consultants Certificate of course completion will be issued to all attendees.

Training Venue and Dates

Fault Analysis in Electrical Networks	5	18-22 July	\$3300	Dubai
Fault Analysis in Electrical Power Systems	5	05-09 December	\$3,300	Dubai

Training Fees

3300 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

TRAINING OVERVIEW

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 earthing 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.

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.

COURSE 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

OUTLINE

Day One

Introduction

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

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

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

N.B

Last 2 days PCs are required for all participants or at least 1 PC for 2 Participants. If participants can bring their laptop that is appreciated as during the training relevant software might be installed

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