



EE217: Fault Analysis in Transformers





Training Description:

This course teaches practical electrical troubleshooting and is concerned with the calculation of fault currents in electrical power systems. Short-circuit currents are associated with large amounts of very destructive energy and therefore calculations must be made to ensure that the short-circuit ratings of equipment are adequate to cater for these high currents. Accurate assessment of these currents is also essential for determining the settings of the system protection devices.

This course includes the preparation of the system for analysis, by manual calculation and by the use of computer analysis. Participants will be introduced to the various fault analysis software programs.

This course will discuss:

- Identification of causes of electrical faults
- Understanding three phase short circuit currents
- Recognition of unsymmetrical faults in transformers
- Representation of unsymmetrical faults in a power system
- Manual and software assisted of fault currents

Training Objective:

By the end of the training, participants will be able to:

- ✓ Understand the various types of fault currents
- ✓ Determine the causes of overcurrent and short circuit current
- ✓ Explain differences between symmetrical and unsymmetrical faults
- ✓ Analyse the common faults in a power system
- ✓ Interpret manual calculation verses software aided fault current calculations

Training Designed for:

This course is intended for all levels of personnel in an Electrical Installation. It will enable them to identify the causes and apply analysis of electrical faults in a power system. It is suitable to a wide range of technical professionals most especially the Electricians, Electrical Supervisors, Plant Electricians, Operations & Maintenance Engineers, Supervisors & Technicians and Maintenance Technicians.

Training Program:

FIVE DAYS:

- ❖ Pre-Test
- ❖ Introduction to Fault Analysis
 - Source of fault current in an electrical installation
 - Common fault statistics of electrical equipment
 - Short-circuit rating of equipment
 - Selecting the correct switchgear rating for fault duties
 - Overview of per-unit system and one line diagrams
 - Sources of impedance data for all items of plant
- ❖ Three-phase Short-circuit Currents
 - Review - Summary – Discussion





- Manual calculation of three-phase short-circuit current
- Industrial systems and fault current analysis
- Tutorial - based on attendees' plant
- Cables subjected to short-circuit currents
- Compliance with regulations
- ❖ **Unsymmetrical Fault Conditions**
 - Overview of symmetrical components and faults
 - Consideration of various fault types
 - Sequence networks
 - Consideration of phase shift in two-winding transformers
 - Consideration of earth impedance
 - Consideration of three-winding transformers
- ❖ **Representation of Unsymmetrical Faults in Power Systems**
 - Review - summary - discussion
 - Fault diagrams of electrical equipment
 - Interconnected sequence networks
 - Special considerations with reference to limitation of earth fault current
 - Demonstration examples based on industrial power systems
 - Introduction to fault current analysis software
- ❖ **Computer based Calculation of Faults**
 - Introduction to a scaled down fault analysis software
 - Common network faults
 - Industrial standards namely ANSI, NEC & NFPA 70 compliance
 - Case studies of faults in a high voltage network
 - Case study of faults in a low voltage network
 - Q&A and wrap up session
- ❖ **Course Conclusion**
- ❖ **Post-Test and Evaluation**

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request".

Please note that the above topics can be amended as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test





Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

For training registrations or in-house enquiries, please contact:

Aisha Relativo: aisha@cmc-me.com

Tel.: +971 2 665 3945 or +971 2 643 6653 | Mob.: +971 52 2954615

Training & Career Development Department

