Tel No:+97126654546 |Fax No:+97126654182|Email: training@cmc-me.com|www.cmc-me.com

EE043:

Practical Power Transformers:

Operation, Maintenance & Testing

Tel No:+97126654546 | Fax No:+97126654182 | Email: training@cmc-me.com | www.cmc-me.com

Training Description:

Installation of high voltage distribution and transmission equipment has increased significantly over the years due to ongoing global demand for power. As a result, the need to ensure the reliability of operation of power systems is paramount. It is critical that all personnel operating and working with such equipment have a sound knowledge of their operational requirements and maintenance.

What's Included?

- Four 50 minutes live, practical sessions with your instructor and attendees
- The full technical eBook manual for "Practical Transformers: Operation, Maintenance and Testing" which includes course slides, cases studies, calculations and practical exercises
- Four hours of additional in-depth video sessions covering many additional areas – yours to keep and watch at your convenience

Training Objectives:

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

- ✓ Have a better understanding with the fundamental theory and principles of the operation of power transformers and transformer protection
- ✓ Have an insight into the identification and application of transformer types
- ✓ Understand the power transformers, oil and oil tests and interpretation of results
- ✓ Gain skills on how to manage power transformer breakdowns to ensure minimum disruption

Training Designed for:

This course is intended for Consulting Engineers, Electrical Contractors and Inspectors, Electrical Engineers and Technicians, Power System Engineers and Technicians, Project Engineers, Tradesman Electricians, Utility Engineers.

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."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ Pre-Test
- ❖ Introduction
- ❖ Power Transformer Oil and Oil Quality
  - Oil contents: water, acidity and dissolved gas
  - Oil tests: dielectric breakdown, moisture, resistivity, interfacial tension, specific gravity, power factor, furan analysis
  - Recovery voltage measurement test
- ❖ Power Transformer Protection

- Surge protection
- Protective relaying (differential, over-current and earth fault)
- Buchholz relay and pressure relief relay
- Thermal devices and instruments (oil temperature alarm and trip, winding temperature alarm and trip)

❖ *Additional video session covered in-depth for review at any time:*

- Transformers' main functions and classification
    - Construction (shell type and core type)
    - Classification and type in relation to insulation, windings, core, cooling systems, voltage level, sizing, tank and breathing action Transformer parts

DAY TWO:

❖ Power Transformer Electrical Tests

❖ AC Tests:

- Power factor tests (insulation, oil and bushings)
- Single phase excitation current test
- Transformer turns ratio test

❖ DC Tests:

- Insulation resistance test
- Dielectric absorption test
- Polarisation index test
- Step voltage test
- Hi-pot test

DAY THREE:

❖ Auto-Transformers

- Design criteria
- Specifications

❖ Generator Transformers

- Design criteria
- Specifications

❖ *Additional video session covered in-depth for review at any time:*

- Power transformers and safety
    - How to install, operate and work with high voltage power transformers safely
    - Earthing of HV transformers

DAY FOUR:

❖ Tappings and Tap Changers

- Uses of tap changers
- Impedance variation
- Tap changer mechanisms
- On-load tap changing by reactor transition
- Divertor resistor tap changers
    - In tank type tap changers
    - Externally mounted tap changers

- Off-circuit tap changers
- Construction of tap changers
- Control of on-load tap changers
    - Master/follower control
    - Circulating current control
    - Runaway prevention
- Moving coil regulator
- The Brentford linear regulating transformer
- Preventative maintenance guidelines
- Standards applicable to tap changers C57.131-1995
- Comparison between IEEE and IEC approaches

❖ *Additional video session covered in-depth for review at any time:*

- Transformer theory
    - Electrical values and their definition in a power transformer - voltage, current, number of turns, impedance and their interrelation

DAY FIVE:

❖ Preventative Maintenance on Power Transformers
- Techniques to improve life expectancy

❖ Unit Transformers
- Design criteria
- Specifications

❖ Station Transformers
- Design criteria
- Specifications

❖ *Additional video session covered in-depth for review at any time:*
- Operation of power transformers in a power system
- Thermal performance, loading, paralleling, tap-changing, connections and vector groups

❖ Course Conclusion

❖ Post-Assessment and Evaluation

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, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

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

Training Fees:

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

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

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 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

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

Aisha Relativo - Training & Career Development Manager
aisha@cmc-me.com / training@cmc-me.com
Tel.: +971 2 665 3945 or +971 2 643 6653 | Mob.: +971 52 2954615