



## Transformer Operational Principles, Selection & Troubleshooting

| Date                | Venues  | (\$)Fees | Book your seat               |
|---------------------|---------|----------|------------------------------|
| 07 Jul -11 Jul 2024 | Salalah | 2900     | <a href="#">Register Now</a> |

### Introduction

Power and distribution transformers are among the most important and most expensive components of power systems, their failure can be very costly and dangerous for other major equipment and personnel alike besides imposing extraordinarily high costs on the electrical installation. The utilization of oil-filled and dry type transformers are increasingly visible due to their outstanding characteristics

The design and operation of any transformer must fulfill certain requirements in order to withstand the electric, thermal and mechanical stresses during its service life. Tests and maintenance of transformers according to the relevant standards are intended to ensure that a transformer passing them will give trouble-free service for many years under the conditions it is likely to experience after its installation.

#### This seminar will highlight:

- Design and construction details
- Selection methodology for dry type and oil-filled transformers
- Maintenance and commissioning procedures
- Troubleshooting checklists and failure analysis techniques
- Testing, diagnostics and monitoring technologies

### Objectives

#### At the end of this seminar, you will learn to:

- Describe the various classifications and types of transformer
- Appreciate the importance of transformer maintenance
- Analyse the various transformer test results
- Classify the transformer cooling methods
- Recognise the merits of transformer designs

### Training Methodology

Each seminar participant will receive a copy of the comprehensive seminar notes. The presenter will outline and discuss the topics using computer displays, videos and PowerPoint presentation. The seminar is designed to have an interactive format to maximize delegate participation. Questions and answers are encouraged throughout and at the daily sessions. Needs-Based case-studies and examples will be discussed in problem solving workshop sessions. This gives participants the opportunity to discuss with other delegates and the presenter their specific problems and appropriate solutions.

### Organizational Impact

## **Upon completion of the seminar the organizational impact would be:**

- Technical training and up-skilling to improve and realise the full potential of a competent workforce
- Productivity increase through minimisation of project time acceptance/design and testing
- Identification for opportunities of improvements due to deep understanding of the presented state-of-the-art maintenance technologies
- Networking of personnel with technology leaders and other engineers
- Attitude change of workforce, as continuous follow up of new technologies and their up taking could otherwise create workforce with high resistance to change due to lack of understanding
- Ensure safety practices are adhered when carrying out electrical installation activities

## **Personal Impact**

### **On successful completion of this seminar delegates will be able to:**

- Understand the principles of operation and construction of the various types of transformer
- Identify the different components in the transformers
- Appreciate the testing and maintenance procedures for transformers
- Be familiar with construction of the transformer, transformer winding connections and cooling systems
- Recognize the effects of transformer off-load and on-load tap changers
- Comprehend site acceptance tests for newly installed transformers

## **Who Should Attend?**

The technicians and maintenance staff will be able to comprehend the types, construction, operations, function of transformers. This will enable them to carry out effective maintenance activities

### **This seminar is suitable to a wide range of professionals but will greatly benefit:**

- Electrical engineers
- Maintenance technicians
- Electrical supervisors
- Engineering professionals
- Managers of the electrical engineering department

## **SEMINAR OUTLINE**

### **DAY 1**

#### **Introduction, General Principles and Classification**

- General classification and types of transformer
- Transformer windings, interconnection of windings and tertiary windings
- Parallel operation of transformers and paralleling requirements
- Standards for transformers, types and requirements
- Transformer tapplings and connections
- Ability to withstand short Circuit, impedance Percentage and sound level
- Case studies and workshop discussion

### **DAY 2**

#### **Transformer Constructional Details**

- Transformer oil, characteristics, oil oxidation and breakdown voltage,
- Effect of oil expansion, breathing action, Buchholz relay, explosion vents
- Instrument transformers
- Transformers for Industrial Applications
- Internal and external cooling of transformers
- Construction and details of transformer Cooling systems
- Case studies and Workshop Discussion

## DAY 3

### Transformer Features and Thermal Performance

- Thermal performance and cyclic rating of transformers
- Transformer electromagnetic forces radial and axial
- Transformer winding and core construction
- Transformer tanks, radiators and tank Losses
- Sound and noise levels in transformers
- Gas insulated transformers
- Case studies and Workshop Discussion

## DAY 4


### Transformer Operation and Maintenance

- Distribution voltage adjustment, off-load and on-load tap changing
- Earth fault and over-current protection of distribution transformers
- Transformer components maintenance
- Condition based maintenance for transformers
- Guidelines on how to care for your distribution transformer
- Remote monitoring of transformers
- Case studies and Workshop Discussion


## DAY 5

### Transformer Testing and Troubleshooting

- Troubleshooting transformer faults
- Site acceptance tests
- Transformer routine tests
- Measurement of winding resistance and voltage ratio
- Insulation resistance tests
- Manufacturer and transformer type tests
- Partial discharge tests and accuracy of test reports
- Wrap up session, questions and answers

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