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## MV Power Cable Testing Training

Contact us Today for a FREE quotation to deliver this course at your company's location.

<https://www.electricityforum.com/onsite-training-rfq>

Since power cables are used extensively by most electric utilities and industrial, commercial and institutional power users, many people are interested in learning more about how cable systems are designed, and to what standards and how to properly size and specify power cable and then how to test and maintain aging power cable systems.

The Electricity Forum is offering a forum that will cover all of the critical aspects of power cables.

This course will cover the components that make up a medium voltage cable as well as the characteristics of each component in the cable. Several types of cable insulations are reviewed along with the benefits of each type. We will update delegates on the latest design innovations in power cable technology and the evolving standards surrounding the manufacture of power cable. Cable fault location and routine testing will be covered. You will learn about some of the latest methods in condition assessment testing, and cable rejuvenation and cable life extension.

Power cables come in all sorts of types, sizes and material construction components,

depending on the cable application. Actually, there are various kinds of joint and termination ends and especially these accessories play a major influence on cable network reliability.

This course provides insight into how to accurately determine the remaining lifespan of your cable through Life Cycle Analysis techniques, with a minimal amount of time and resources. Special attention will be paid to the effectiveness of diagnostic procedures.

#### **After Attending, You Will Learn:**

- Design Parameters and Construction Materials
- Types of Cable and Cable Insulation Materials
- Asset Management, Aging, and Remaining Life Cycle Analysis
- Cable Testing and Failure Analysis

#### **WHO SHOULD ATTEND**

- Electric Utility Engineering and Maintenance Personnel
- Industrial, Commercial, Institutional Electrical Engineering and Maintenance Personnel
- Electrical Consulting Engineers
- Electrical Design Engineers

#### **STUDENTS RECEIVE**

- FREE 100-Page Digital Wire And Cable Handbook (Value \$20)
- \$100 Coupon Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.4 Continuing Education Unit (CEU) Credits
- FREE Magazine Subscription (Value \$25.00)
- Course Materials In Paper Format

## **COURSE OUTLINE**

### **DAY ONE**

This presentation will discuss the major trends in modern power cable design and manufacture, with an emphasis on Canadian standards and manufacturing techniques to increase the life and effectiveness of medium voltage power cable.

The following issues will be discussed:

- Possible Causes of Premature Cable Failure
- Major Quality Improvements
- Canadian Cable Standards and Specifications
- Material Selection
- Insulation Compounds Specified
- EPR Suggestions for Long Life Cable
- Metallic Shielding
- Moisture Barriers
- Increased Use of Cable Jackets
- Most Widely Specified 15-35 kV Cable Constructions

### **Power Cable Design and Construction - Low voltage up to 2000 V**

- Extruded Polymer
- Voltage rating
- Conductor- solid, stranding, conductivity, temperature, AL, and Cu
- Insulation- Thermoplastic, Thermoset, common used insulation, PVC, XLPE, EPR, temperature, physical,
- Chemical characteristics
- Metallic Shield

- Binder Tape
- Inner jacket,
- Armour
- Outer jacket
- Color coding

### **Cable Sizing and Specifying**

- Cable sizing techniques using the Canadian Electrical Code
- Derating factors for various temperatures
- Underground installations for industrial, commercial, and mining applications

### **Power Cable Applications for Different Installations**

- Utility
- Industrial
- Commercial
- Institutional

### **Cable Installations**

- Indoor
- outdoor,
- Cable pulling in conduit
- Cables in trays

### **Multiconductor cable for Control and Instrument applications**

### **Wire and Cable Size**

- What is the AWG definition
- What is the mm<sup>2</sup> definition

## **DAY TWO**

### **Understanding Power Cable Deterioration**

- Electrical Treeing
- Water Treeing
- Thermal Problems

### **Review of Latest Testing Methods**

- DC Hi-Pot Testing
- AC Hi-Pot Testing
- VLF Testing
- Tangent Delta (TD)
- Partial Discharge Testing

### **Very Low Frequency (VLF) AC Technology**

- Power cable testing history
- New cable designs developed
- Problems found with DC testing
- Something new needed – VLF developed
- What is VLF – How is it designed - Why VLF
- Applications, advantages, huge industry impact

- Test standards - Worldwide acceptance
- Designs and models available

### **VLF Withstand/Proof Testing**

- Defining the test: withstand vs. diagnostic
- Why – When – Where
- Model Selection
- Applications: when, where, results expectations, follow-up
- Performing the test: using the testing standards, connections, procedures

### **Diagnostic Cable Testing Using VLF**

- Diagnostic vs. withstand testing
- Advantages and disadvantages of diagnostic testing
- Purpose of diagnostic testing – cable quality data revealed
- Two Methods used: Tangent Delta and Partial Discharge

### **VLF Tan Delta Cable Diagnostic testing**

- Explanation of test technology – physics
- How to perform test: VLF needed and TD instrument
- Interpreting results, planning future action
- Limitations of test - physical and interpretive

### **VLF Partial Discharge Diagnostic Testing**

- Explanation of test technology – physics
- How to perform test: VLF needed and PD detection instr.

- Interpreting results, planning future action
- Limitations of test - physical and interpretive
- TD and/or PD Testing. Which, when, why, where, etc?

### **Summary**

- Summary of Withstand, TD, and PD testing.
- Differences in results revealed, ease of use, availability, cost, etc and when to use which technology. PowerPoint of all VLF, TD, PD models

### **Review of expectations Questions and Answers**

### **COURSE TIMETABLE**

#### **Both days:**

Start: 8:00 a.m.

Coffee Break: 10:00 a.m.

Lunch: 12:00 noon

Restart: 1:15 p.m.

Finish: 4:30 p.m.

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