Cable Splicing and Terminating, MV

4.5 Days, 3.2 CEUs

Solid dielectric power cable systems are subject to higher voltages than ever before. Inadequate installation and testing of cable splices and terminations is the number one cause of failure (IEEE Std 493-2007 Table 10-33). Yet over the last few decades, cable splicing as a profession has declined as multi-crafting and departmental merges have made it just a function among many. Proper installation of cable splices and terminations drastically improves the lifetime of cables, and prevents damage to downstream equipment and nearby personnel.

This hands-on course is intended for new or experienced electricians and technicians that install, maintain, repair or troubleshoot 5-35 kV solid dielectric power cables.

The student should have some field experience and basic knowledge of AC/DC electricity.

Lab and Classroom Attire

AVO is committed to the personal safety of each participant and requires safety glasses, long pants and ANSI rated “safety-toe” work shoes for lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open-toe shoes and shorts are not considered appropriate attire for the classroom.

Learning Objectives:

To receive 3.2 CEUs, the participant must attend 4.5 days of class (32 contact hours) and attain a minimum average grade of 80% (overall grade will consist of 50% lab and 50% final exam). Upon completion of this course and lab practice, the participant will demonstrate that he/she is able to:

- Explain medium voltage cable components and construction.
- Identify applications of different cable types including marine, offshore, mining, underground (URD) and tech.
- Prepare cable for splicing utilizing hand tools, abrasives and solvents.
- Install taped, molded and heat shrink splices on tape-shielded and jacketed concentric (JCN) cables.
- Install taped, cold shrink, heat shrink and molded elbow terminations.
- Utilize a high potential tester for performing withstand tests on assembled splices.
- Identify the causes of splice and termination failures.
- Explain procedures for buried, duct and tray installation and relevant OSHA safety requirements.

SCOPE

Day 1* (7 contact hours)

I. Introduction (0.5 hours)
   A. Schedule
   B. Course outline

II. Medium Voltage Splicing and Termination (1 hour)
   A. Material Technology
   B. Human Factors in Splicing
   C. Safety for Technicians
   D. Safety Rules
   AM Break

III. Types, Application and Manufacture of Medium Voltage Cables (1.5 hours)
   A. Cable Types
   B. Application of Medium Voltage Cable
   C. Manufacturing of Medium Voltage Cable

IV. Medium Voltage Cable Components (3 hours)
   A. Conductor
   Lunch
   B. Insulation
   C. Insulation Shield System
   D. Bedding Tape
   E. Jacket
   PM Break
   F. How Solid Dielectric Cables are Made

V. Cable Installation and Handling (1 hour)
   A. Safety
   B. Environmental Protection

*Class scheduling times may vary based on discussions and size of class
Day 2 (7 contact hours)
V. Cable Installation and Handling (cont’d) (3.5 hr)
   A. Application of Tapes
   B. Making a Splice
AM Break
   C. Corona
   D. Soldering
   E. Torch Safety Precautions
Lunch
   F. Heat Shrink Splice
   G. Molded Splice Installation
PM Break
   H. Cable Splicing Labs
      1. Tape Splice
      2. Cold Shrink
      3. Heat Shrink

Day 3 (7 contact hours)
VII. Cable Splicing (7 hrs)
   A. Classifi cation of Terminations
   B. Stress Control
AM Break
   C. External Leakage Insulation
   D. Basic Impulse Level
Lunch
   E. Seal to the External Environment
   F. Hand Taped Termination
   G. Terminating URD Cable
PM Break
   H. Cable Termination Labs
      1. Tape Term
      2. Cold Shrink Term
      3. Molded Elbow
      4. Heat Shrink Term

Day 4 (7 contact hours)
VIII. Cable Terminations (7 hours)
   A. Classification of Terminations
   B. Stress Control
AM Break
   C. External Leakage Insulation
   D. Basic Impulse Level
   E. Seal to the External Environment
Lunch
   F. Hand Taped Termination
   G. Terminating URD Cable
PM Break
   H. Cable Termination Labs
      1. Tape Term
      2. Cold Shrink Term
      3. Molded Elbow
      4. Heat Shrink Term

Day 5 (Half day) (4 contact hours)
IX. Cable Testing (3 hours)
   A. Testing Safety
   B. DC Withstand
AM Break
   C. VLF Withstand
   D. VLF Withstand Test Lab

X. Conclusion (1 hour)
   A. Review
   B. Test

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