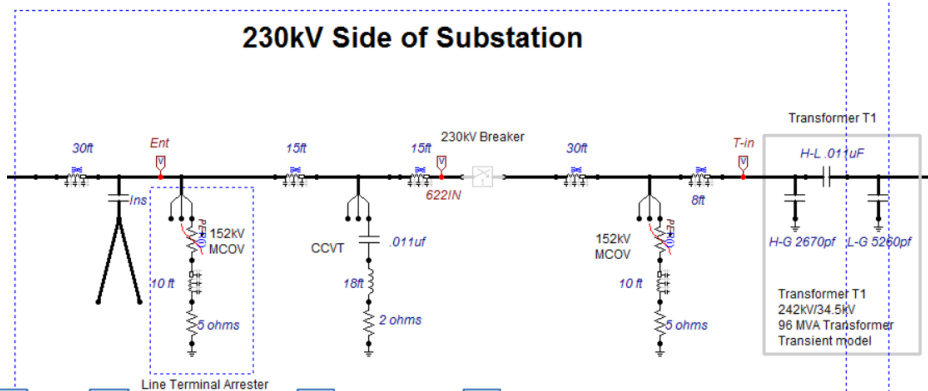
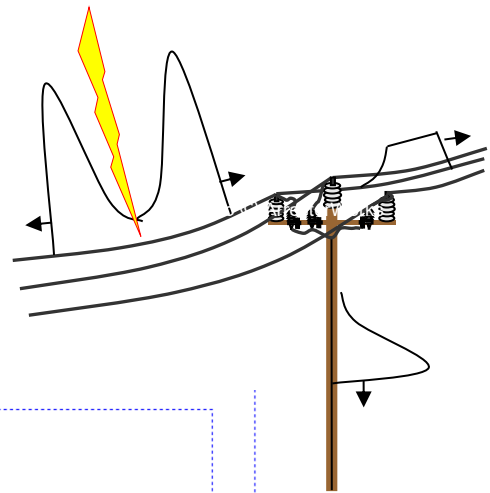
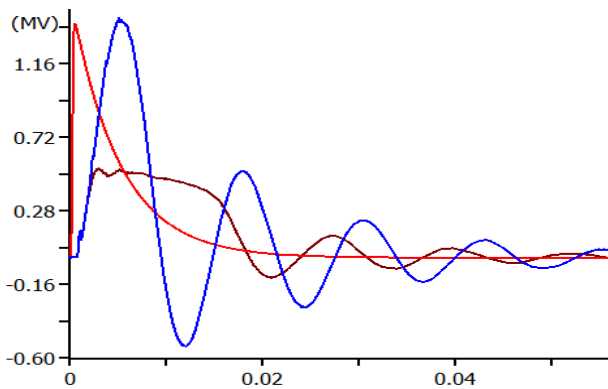


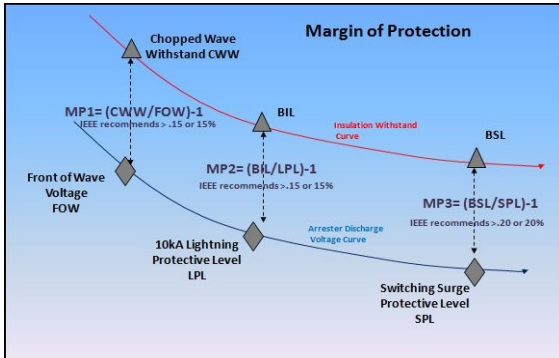
Insulation Coordination Fundamentals Using ATP and ATPDraw



Webinar

Webinar Overview

This is a 10-hr. online seminar consisting of five two-hour sessions. The sessions will be conducted over consecutive weeks. The session times will be established based on optimum time for attendees.



What Attendees Will Learn

- **Insulation Coordination Fundamentals**
- **How to Use ATP, ATPDraw and XY-Plot**
- **Surge fundamentals:** lightning, switching, faults, ferroresonance, line drops, and others
- **The difference between arrester types:** Station, transmission line, distribution, secondary, liquid immersed, elbow, riser pole, and more
- **What the ratings of an arrester really mean** and how to get data for ATP from manufacturers datasheets
- **Margin of protection fundamentals** along with insulation coordination fundamentals

The following three Studies will be completed

- Station Study Using ATP
- Distribution System using ATP
- Transmission Line Study Using ATP

CEU Credits for 10 hrs are given to those interested

Prerequisite

1. All students should have working ATP, ATPDraw and XY-Plot packages installed on their computers. Or your own transient software package to run simulations on.
2. Fast Internet line that can handle video conferencing.
3. 2-hour time slots once a week for 5 weeks
4. Time to do homework between sessions.

Materials

Each attendee will receive an

1. Insulation Coordination a pdf copy of the presentations.
2. Several transient models that can be used for future studies
3. Numerous Excel Based Tools that can be used in studies.
4. All sessions are recorded and available to participants after the session.

Who Should Attend

- Anyone wishing to learn how to run an insulation coordination study using ATP and ATPDraw software.
- Anyone wishing to learn insulation coordination principles and has access to other simulation software that can run transient analysis.

Instructor

Jonathan Woodworth, Consulting Engineer, ArresterWorks, started his career at Fermi National Accelerator Laboratory in Batavia, IL after receiving his bachelor's degree in Electronic Engineering from The Ohio Institute of Technology in 1972. As an Engineering Physicist at Fermi Lab, he was an integral member of the high energy particle physics team in search of the elusive quark. In 1979 he joined the design engineering team at McGraw Edison (later Cooper Power Systems) in Olean, NY. Returning to school after many years in industry, Jonathan received his MBA from St. Bonaventure University in 1995. Jonathan was employed for 28 years at Cooper Power System where he served as Engineering Manager for 13 years. Additionally, he held the position of Arrester Marketing Manager for 7 years.



In 2007 Jonathan along with business and life partner Deborah Limburg started up ArresterWorks, a surge protecting consultancy that serves the surge protection industry worldwide.

Jonathan is very active in the IEEE and IEC standard associations previously serving as Chair of the Surge Protective Devices Committee of IEEE PES, Past Chair of the NEMA High Voltage Arrester Section, and currently Co-Convener of the IECTC37 MT4 committee responsible for IEC Arrester Standards and Convener of the IEEE High Voltage Arrester Test Standard Working Group.

Jonathan can be contacted at jwoodworth@arresterworks.com

Insulation Coordination Webinar Outline

Introduction and Overview

Chapter 1: Insulation Coordination

Fundamentals - 2hr

- Definition of Insulation Coordination
- Examples of Studies
- Types of Studies
- System Fundamentals Relative to Insulation Coordination
 - System Components
 - Traveling Waves
 - Tower and Station Grounding
 - Corona
 - Surge Steepness
 - Clearances
 - Separation Distance Concept
 - Physical Dimensions
 - Ground Flash Density
 - Over Head Ground Wire
 - Line Impedance and Coupling
- Homework

Chapter 2: Surge, Insulator and Arrester

Fundamentals - 2 hrs

- Surge Fundamentals
 - Lightning Surge
 - Switching Surge
 - Back Flash Surge
- Insulation Fundamentals
 - Self-Restoring Insulators
 - Strike Distance
 - Creepage Distance
 - BIL(U90)
 - CFO(U50)
 - Non-Self-Restoring Insulation
 - Flashover
 - Back Flashover
 - Power Frequency Withstand
 - BSL
- Surge Arrester Fundamentals
 - Arrester MCOV-Uc
 - Arrester Energy Ratings
 - Inductance of Arrester
 - VI Curve of Arrester
 - Arrester Datasheets
 - Effect of Ground
 - Lead Inductances
- Homework

Chapter 3: Substation Insulation Coordination

Study Fundamentals - 2 hrs

- Defining/Collecting Input Data
- Define Reliability Targets
- Clarify Assumptions
- Calculate Incoming Surge Rate of Rise
- Create and Verify Model
- Determine Worst Case Operational Scenarios
- Run Scenarios
- Calculate Margins of Protection
- Run Open Breaker Scenario if applicable
- Homework

Chapter 4: Line Study Fundamentals - 2 hrs

- Defining/Collecting Input Data
- Define Reliability Targets
 - BFR
 - SFFOR
- Create and Verify Model
 - Insulator
 - Arrester
 - Tower and Ground
- Determine Critical Current
- Run Scenarios
- Calculate Outage Rates
- Homework

Chapter 5: Case Studies - 2 hrs

- Review Homework from Chapter 4
- Distribution Transformer Protection
- URD Cable Protection
 - End points
 - Sheath Protection
- Papermill Study Example
- Second Look at BFR of Transmission lines