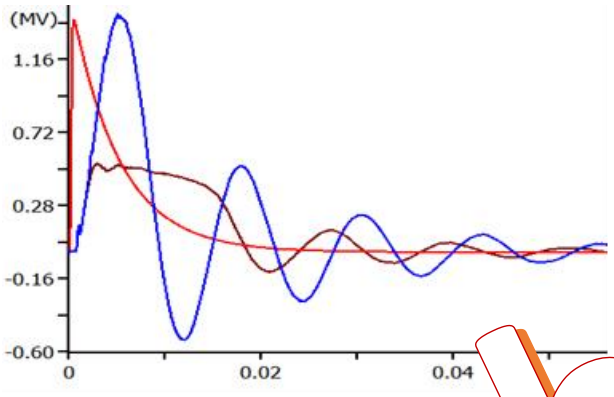
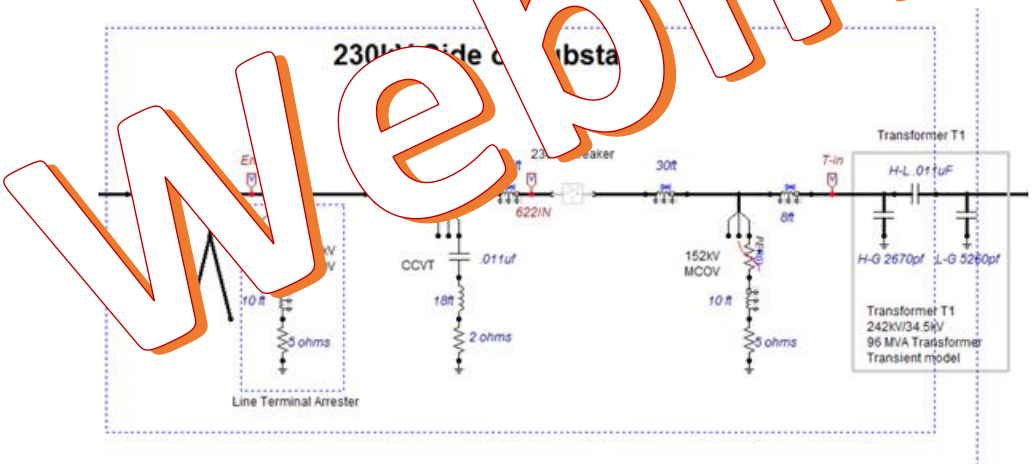
ArresterWorks

Insulation Coordination Fundamentals Using Transient Software



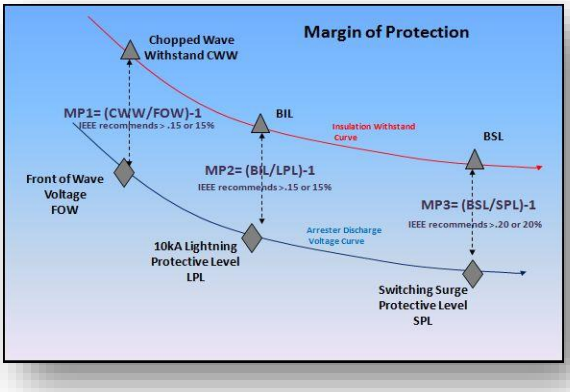


Webinar

Dates:	**April 27, May 4, 11, 18 and June 1, 2017**
Start Time:	**9am EDT**
Session Duration:	**2 hours**
Meeting Software:	**Go-To-Meeting**

Insulation Coordination Fundamentals Using Transient Software

This is an 11hr webinar separated into two and three hour sessions. The sessions are separated by ≈ a week. If only one or two attendees are involved, the session times can be adjusted.



What Attendees Will Learn

- **Insulation Coordination Fundamentals**
  Types of Studies and Objectives
- **Surge fundamentals**: Lightning Surges, Switching Surges, rates of rise issues, MTBF
- **Transient models**
  Arresters, Transformers, Insulators, Conductors, Transmission Lines, Bus Work
- **Basics of Station Modeling**
  Converting one line drawings to models
- **Basics of Line modeling and tower modeling**
- **Margin of protection fundamentals** along with insulation coordination fundamentals
- **One of the following three studies will be completed**
  - Station Study Using ATP
  - Distribution System using ATP
  - Transmission Line Study Using ATP

CEU Credits for 11 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. 2-3hour time slots once a week for 5 weeks.
4. Time to do homework between sessions.

Materials

Each attendee will receive an

1. Several transient models that can be used for future studies
2. Numerous Excel Based Tools that can be used in studies.

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.

Fee: $799 USD paid at registration

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. During his tenure at Cooper Power System Jonathan served as Engineering Manager for 13 years as well as Arrester Marketing Manager for 7 years.

In 2007 Jonathan, along with business and life partner Deborah Limburg started up Arrester Works 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 Convenor of the IEEE High Voltage Arrester Test Standard Working Group.

Jonathan can be contacted at
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Insulation Coordination Fundamentals Using Transient Software

Introduction and Overview

Chapter 1: Insulation Coordination Fundamentals - 2hr

- Insulation
- Surges
- Lightning
- Switching
- Arresters
- Traveling Wave Phenomena
- Types of Studies
- Margin of Protection
- Homework

Chapter 2: System fundamentals Relative to Surges - 2 hrs

- Self-Restoring Insulators
- Flashover
- Power Frequency Withstand
- BIL(U90) and CFO(U50)
- Non-Self-Restoring Insulation
- BIL
- Recommended Margin of Protection

- Breakers
- Power Frequency Traveling Wave
- Prestrike or Restrike Surges
- Transformers
- Cables
- Transmission Lines
- Bus
- Lead Length
- Separation Distance
- Ground Resistance
- Shielding of Transmission lines
- Magnitude of Surges based on sources and system configurations
- Homework

Chapter 3: Arrester Fundamentals Relative to Insulation Coordination - 2 hrs

- Arrester MCOV-Uc
- Arrester Energy Ratings
- Inductance of Arrester
- VI Curve of Arrester
- Arrester Datasheets
- Effect of Ground
- Lead Inductances
- Transformer Models
- Breaker Studies
- Homework

Chapter 4: Using ATP and ATP Draw for transient studies - 2 hrs

- Fundamentals of ATP
- License
- Forum
- Arrester Models
- Transformer Models
- Cable Models
- Bus Models
- Breaker Models
- Transient Sources
- Simple Transient Study
- Homework

One of the next 3 chapters will be completed and two are optional.

Chapter 5: Substation Insulation Coordination Studies - 3 hrs

- Review Homework from Chapter 4
- Basic Principles
- Breaker Protection
- Example Study Using ATP
- Generator Stations
- Homework

Chapter 6: Distribution Insulation Coordination Studies - 3 hrs (optional)

- Review Homework from Chapter 5
- Windfarms
- Residential
- Industrial
- Lines and Distribution Transformers
- Homework

Chapter 7: Transmission Line Insulation Coordination Studies - 3 hrs (optional)

- Review Homework from Chapter 6
- Model without shielding
- Model with Shielding
- Insulator Flashover
- Grounding
- Finding the Critical Flashover Current
- Determine the outage rate based on Critical Current
- Homework