Power System Analysis with EasyPower
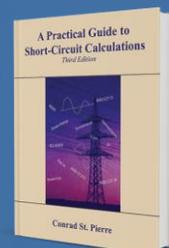
October 24-26, 2017
Portland OR

DoubleTree by Hilton Portland

State-of-the-Art Power System Analysis Software

FREE Book – "A Practical Guide to Short-Circuit Calculations" by Conrad St. Pierre with registration - **$125 Value**

Power System Analysis with EasyPower - 1.8 CEUs

EasyPower, the industry leader in electrical power analysis software, is pleased to announce a new hands-on seminar covering the basics of electrical power systems and the key fundamentals of power system design, evaluation, and analysis. Starting with basic concepts and progressing through system analysis, the emphasis is on gaining practical understanding of electrical power systems and equipment as typically found in actual systems.

This three-day seminar is intended for engineers and managers seeking a better understanding of issues related to electrical power systems and for engineers seeking a review of electrical power systems. The seminar is applicable for all types of electrical power systems including commercial, industrial, and electric utilities.

Each attendee will be provided with a training copy of EasyPower to use during the seminar and a comprehensive training manual. EasyPower models and analysis capability will be used throughout the seminar however, prior knowledge or experience with EasyPower is NOT necessary.

Tuesday, October 24, 2017 - 7:30 a.m. to 4:30 p.m.
Wednesday, October 25, 2017 - 8 a.m. to 4:30 p.m.
Thursday, October 26, 2017 - 8 a.m. to 4:30 p.m.

Key topics to be covered will include:

Power System Fundamentals
Review the basics of ac power systems and common terminology including:
- Current, Voltage, Power
- AC Systems – Real Power, Reactive Power, Power Factor
- Per Unit System

Transformer Basics
Transformers are the key components in most power systems. We will cover the basics of transformers from a practical perspective.
- Basics of Operation
- Winding Configurations
- Ratings
- Impedance
- Losses

Symmetrical Components
We will give an overview of this key analytical technique and why it is still used today, 100 years after being invented. We will also give a practical explanation of commonly encountered terminology, such as "zero sequence."
- History
- Sequence Quantities
- Sequence Impedances for Common Equipment
- How EasyPower uses Symmetrical Components

System Grounding Fundamentals
The "black art" of grounding will be explained – focusing mainly on various methods of system grounding and the pros and cons of high resistance and low resistance grounding.
- Equipment Grounding vs. System Grounding
- Equipment Grounding and Bonding
- Electrical System Grounding
- Methods and History of System Grounding
- Ground Fault Protection

Short Circuits Calculations and Transients
Predicting short circuit current is important for evaluating the adequacy of your equipment as well as the starting point for all arc flash energy calculations. We'll discuss the nature of short circuit events including meaning of symmetrical and asymmetrical fault currents.
- "Faults" vs. "Short Circuits"
- Nature of Short Circuit Events
- Short Circuit Calculation Basics
- Symmetrical and Asymmetrical Currents
- Types of Short Circuits
- Motor Contributions
- Short Circuit Calculations in EasyPower

**Short Circuit Ratings of Equipment**
All electrical equipment must be able to withstand the short circuit currents that they may be subjected to. This seminar will cover the ratings for common electrical equipment and how they are tested. We will also look at how the ANSI and IEC requirements for short circuit calculations and ratings.
- Why We Need Short Circuit Ratings
- Standards – ANSI & IEC
- ANSI C37 Short Circuit Calculations
- ANSI Calculation Procedures
- Equipment Short Circuit Ratings vs. Test Standards
- Equipment Duty Calculations in EasyPower

Protective Device Coordination and Time-Current Curves
We will discuss the basics of coordination and selectivity as well as explaining how to understand Time-Current Curves—even how to create them.
- Coordination Principles
- Overcurrent Devices
- Other Protective Devices
- Coordination Study Basics
- Coordination vs. Protection and Arc Flash
- Time Current Curve Basics
- Coordination in EasyPower
- Auto Coordination in EasyPower
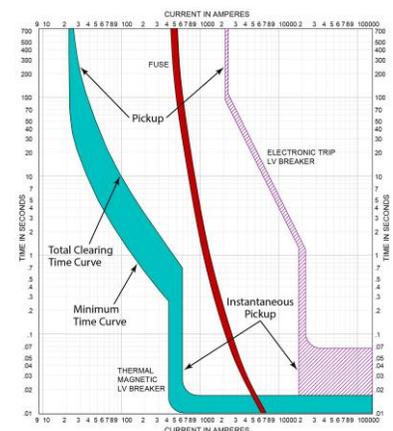
Equipment Protection
What are the basic requirements and goals for protection of electrical equipment and systems? What are legal requirements and what are guidelines?
- Basic Requirements
- Codes
- Standards
- Protection Boundaries for Common Equipment Including Transformers
- EasyPower Smart Design

Low Voltage Protective Equipment
We will discuss the commonly used protective devices including ground fault protection.
- Molded Case Breakers
- Low Voltage Power Circuit Breakers
- Fuses
- Phase vs. Ground Fault Protection
- NEC Requirements for Ground Fault Protection
- How "Current-Limiting" Devices Work
- NEC Requirements for Coordinated Systems

- Series Rating vs. Series Coordination

Medium-Voltage Protective Devices
We'll learn the basics of medium and high-voltage equipment and why they are much different than low voltage protective devices.
- Fuses—Expulsion vs. Current-Limiting
- Circuit Breakers
- Circuit Switchers
- Reclosers
- Protective Relays—Common Types and Applications
- Phase vs. Ground
- Current Transformers
- Coordination Time Intervals

Coordination Workshop
Taking what we've learned regarding coordination and protection, we will work through an example of how to develop protective device settings and review coordination for a typical low voltage substation.

Practical Arc Flash Reduction Options
We'll discuss pros and cons of common methods employed for the reduction of arc flash energy.
- Maintenance Mode
- Differential Relays
- Zone Selective Interlocking
- Fast Bus Tripping
- Fuses vs. Breakers
- Equipment and Device Upgrades

Modeling Electrical Systems
How a system is modeled depends on how the model will be used. We will cover what needs to be in your system model for the following tasks:
- Short Circuit Calculations
- Equipment Duty Calculations
- Power Flow
- Protective Device Coordination
- Arc Flash Calculations
- Harmonic Analysis
- Dynamic Stability

Power Flow
We will look at how power flow analysis can be used to get a better understanding of how a system is performing under a variety of "normal" operating conditions. We'll also look at how power flow analysis and load calculations are different but work together in evaluating a system.
- Basic Concepts of Power Flow Modeling
- Power Flow Modeling vs. NEC Load Calculations
- Design vs. Analysis
- NEC Load Calculations in EasyPower
- Nature of Power Flow in AC Systems
- Modeling Different Load Conditions
- Sources of Load Data
- Adjusting Scaling Factors to Match Data
- Voltage Regulation
- Local Generation
- Generator and Source Modeling Options

- Power Flow Modeling and Analysis in EasyPower
- Using Scenario Manager

Lodging & Transportation
Attendees are responsible for lodging and transportation to the seminar. For your convenience, EasyPower has reserved a block of rooms at the DoubleTree by Hilton Portland (where the seminar will be taking place) and will be available for a room rate of $185.00 per night (plus applicable state and local taxes) for seminar attendees, through September 23, 2017. Contact the DoubleTree by Hilton Portland for reservations and mention "EasyPower" to receive our discount or use the link below to our personalized room reservations web page.

The hotel offers complimentary self-parking. Max light rail from the airport to the hotel is $2.50 and takes approximately 20 minutes.

DoubleTree by Hilton Portland
1000 NE Multnomah
Portland, Oregon 97232
Phone: 503-281-6111
http://doubletree.hilton.com/en/dt/groups/personalized/R/RLLC-DT-ER7-20171023/index.jhtml

As you arrange your travel, please note the seminar starts at 7:30 a.m. on Tuesday morning and ends at 4:30 p.m. on Thursday. Class begins at 8 a.m. on Wednesday and Thursday.

Computer Requirements
This is a practical, hands-on seminar; you will need to bring your laptop. On Wednesday before the seminar (October 18), you will be supplied with and required to install a temporary copy of EasyPower® training software on your laptop using a download link; this will require admin rights are enabled on your laptop and you must have access to the Internet. We require that you use the training software so you will have access to all the features available within EasyPower.

If you are a current EasyPower user with your own license on your laptop, you may opt to uninstall your company's copy of EasyPower, or simply plan to reinstall upon completion of the seminar. The seminar copy of EasyPower will not override or affect any other types of software on the laptop; however, if you have a personal copy of EasyPower installed, it may affect some of those files. If any device library changes have been made to your personal copy, you will need to archive your device library before installing the training copy of EasyPower. You will not need your hardware key for the seminar.

Minimum System Requirements
- Operating System: 32/64-bit versions of Windows® Server 2008, Server 2012, or Windows 7, 8, or 10
- CPU: Intel®-based computer with dual-core or higher processor
- RAM: 512 MB (2 GB recommended)
- Monitor: 1280 x 1024 or higher resolution monitor and video adapter
- Hard Disk: 1 GB disk space
- Mouse: Microsoft mouse or other compatible pointing device with spin wheel

Refreshments
EasyPower will provide a continental breakfast, lunch, afternoon snack and beverages throughout the seminar. If you have special dietary requirements, please let us know by October 17.

COURSE INFORMATION

Dates and Location: October 24 – 26, 2017 at DoubleTree by Hilton - Portland in Portland, Oregon
Registration will close October 17, 2017

FREE Book with registration – "A Practical Guide to Short-Circuit Calculations" by Conrad St. Pierre with seminar registration. **$125 Value**

How to register: On the web at www.easypower.com/training

Course Description	*Dates*	*Price Per Person*		
		Without Current Maintenance*	*With Current Maintenance Discount**	*With Premium Maintenance Discount**
Power System Analysis with EasyPower	October 24 – 26, 2017	$ 1,300.00	$ 1,170.00	$ 1,040.00

Transportation and hotel room reservations are the responsibility of the attendee. Please contact the hotel directly for room reservations. Reserve by September 23, 2017 to receive the EasyPower group discount.

***EasyPower users with up-to-date maintenance or premium maintenance will receive the discounted rate on seminar registration. You will also qualify for the training discount if you purchase EasyPower within seven days following the seminar. Discounts will be applied at time of registration.

Substitutions and cancellations are allowed at no additional charge if EasyPower is notified prior to the registration closing date of October 17. Substitutions after the registration closing will incur a $100 administrative fee to cover the costs of course material and certificate replacements. For any cancellation received after the registration closing date, the attendee will incur a $400 administrative fee. No refund or seminar transfer will be issued without cancellation notice provided to training@easypower.com.

NOTE: No audio recording, video recording or photography is allowed during training sessions.

Interested in training at your facility? Contact us for a customized proposal for onsite training at your location!

Contact our training department at 503-655-5059 ext 40 between 7 a.m. and 4 p.m. PST with your training questions, or email training@easypower.com.