

Applications of PSCAD & Transient Studies



Course attendees have the opportunity to enhance their learning and understanding of PSCAD™ through Manitoba Hydro International (MHI)'s comprehensive training programs, which include practical case studies and interactive hands-on workshops.

Course Description

This course will cover the fundamental phenomena applicable to the study electromagnetic transients in electrical networks. A number of applications areas such as AC transients, fault and protection, transformer saturation, wind energy, FACTS, distributed generation, and power quality, as well as other power systems topics will be discussed with practical examples serving to illustrate the subject. Several case studies will be applied in detail to highlight practical situations encountered by engineers in the field.

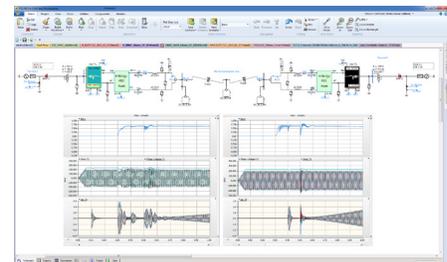
Course attendees will be able to experiment with the case studies in an interactive hands-on workshop environment using the PSCAD Simulation software. Attendees can request coverage of specific topics or phenomena of interest. No previous experience with the PSCAD™ software is required.

Who should attend?

This course is intended for practicing engineers, graduate students, and researchers in power systems and power electronics, who are interested in developing an in-depth understanding of the modern tools available for the analysis of transient events in the network. The course is intended for PSCAD users as well as introductory users.

Course Methodology

The training will be conducted using a presentation format by the instructor with interactions (questions and answers) with course attendees. The presentations will be followed by hands-on tutorials where the participants will develop practical cases to further reinforce the concepts presented. The detailed course materials and the example cases used in the tutorials portion will be provided for future follow-up and study.



Course attendees will receive hands-on experience using PSCAD simulation software



Course attendees will cover a variety of topics and would be able to experiment in the workshop



Course Topics

1. Fundamental theory of transient simulation:

- Representation of power system components and control system elements
- Selection of the simulation time step
- Studies that require simulation tools
- Advance features of PSCAD for fast and accurate
- solutions

2. Overview of the models and examples available in PSCAD

3. Creating a simulation case using PSCAD

4. Electromagnetic Transient Studies:

- Transient Overvoltage (TOV) studies:
- Line energizing
- Capacitor bank back-to-back switching, selection of in-rush and out-rush reactors
- Breaker re-strike
- Transient recovery voltage (TRV) across breakers

5. Transformers:

- In-rush energizing
- Representing different core types Network resonance
- Unbalanced loading
- Ferroresonance

6. Faults and Protection:

- Preparing events such as the occurrence of a fault
- DC offset in fault current, the rate of decay and its influence on CT saturation, and relay mal-operation
- Automated generation of a large number of fault waveforms in COMTRADE format for real time relay testing
- Detailed current transformer (CT) saturation models

7. Induction Machines:

- Induction motors starting, including flicker and voltage dip problems.
- Induction generators in wind applications (doubly fed connection and controls)

8. Power Electronic & FACTS Devices

- Active filters
- SVC
- STATCOM

9. Generators:

- Controls including governors, exciters, and power system stabilizer (PSS)
- Sub-synchronous resonance (SSR) issues and modeling

10. Power Quality:

- Voltage dips, swells, and interruptions
- Voltage fluctuation
- Arc furnace loads

Course Particulars

Instructor

Course instruction will be provided by transmission line experts. CVs available upon request.

Classroom Size

By striving to keep classroom sizes small, there is ample opportunity for questions and discussions among the students and the instructor.

Training Location

Courses can be provided at MHI's Winnipeg location, or an instructor can provide training at client's desired location.

A minimum enrolment is required. Attendees will be notified two weeks prior to commencement if the course is cancelled.

Manitoba Hydro International Ltd. is a world leader in power system simulation innovation and applied engineering solutions. As the developers of the world-renowned PSCAD™/EMTDC™ software, we recognize the importance of collaborative partnerships and technologies in the global power industry.

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Accessible formats available upon request.

