

HVDC Controls & Project Management



Course attendees will cover a variety of topics and will be able to enhance their learning and understanding by experimenting in the workshop.

Course Description

This three or four-and-a-half day course covers the fundamentals of HVDC transmission in electrical networks, including HVDC transmission system concepts, components, equipment and their characteristics and their controls. Project Management concepts required for HVDC/SVC and Facts technologies are presented. When applicable, the concepts presented are reinforced with several PSCAD™ simulation workshops. Case studies will be applied to highlight practical situations encountered by engineers in the field.

Who should attend?

This course is intended for practicing engineers, graduate students, and researchers in power systems and power electronics, who are interested in HVDC transmission and controls, as well as developing an in-depth understanding of the modern tools available for the analysis of transient events in the network. Previous experience and knowledge of PSCAD is not required.

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 perform tests further reinforcing 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.

Learning Objectives

HVDC past present and future

- HVDC terminology, equipment and configurations

HVDC Line Current Commutated (LLC) HVDC

- Theory of Operation with PSCAD tutorial Examples

HVDC Voltage Source Converter (VSC) HVDC

- Theory of Operation with PSCAD tutorial Examples
- HVDC Project Management
- Discussion on organization and issues involved with HVDC projects

HVDC Project Operating and Maintenance Issues

- Discussion on practical O&M issues for an HVDC system

HVDC Station Profiles (Illustrative examples of existing HVDC projects)



MHI is dedicated to hosting training courses that help to develop an in-depth understanding of the modern tools available for the analysis of transient events in the network, power systems, power electronics, and HVDC transmission and controls.

As leading experts in the field of HVDC, we offer comprehensive training courses as well as global services for HVDC transmission.



- Dorsey, Eddy Country, Blackwater, Dubal, McNeil, Manitoba Hydro, Basslink, Lamar, Itapua and others.

- Electrode design and interface effects
- Equivalence of AC system for PSCAD/RTDS study

Course Topics

- Introduction to Manitoba Hydro International
- Different HVDC configurations
- Fundamentals of converter operation
- Fundamentals of DC control
- Fundamentals of HVDC system control
- Development of HVDC current controller
- HVDC system disturbances, fault clearing and protection
- Converter behaviour with respect to the connected AC system
- Harmonics, filters and reactive power supply
- HVDC system stability
- HVDC protection systems
- AC system controls integration
- HVDC project deployment and management
- HVDC controls reliability and maintenance
- Hierarchy of HVDC controls
- HVDC owners project organization structure
- HVDC specifications and procurement

Optional Topics

- Voltage Sourced Converter (VSC)
- Static VAR Compensator (SVC)
- Interface points between the AC and DC system
- System level controls (Remedial action systems)
- HVDC line fault location
- HVDC project life issues

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.

For courses at a client's location:

- A workbook with tutorial examples, PSCAD software and a temporary license(s) for use during the course will be provided.
- We require that the client arranges for use of a training room, computers for the students, a VCD (LCD) projector, and a large whiteboard.

For courses at MHI's Winnipeg office:

- A computer, workbook with tutorial examples, PSCAD software and a temporary license for use during the course will be provided.
- Lunches are provided on site during training days.
- Hotel accommodations and local travel are the responsibility of the student. Contact us for a list of local accommodations.

A minimum enrolment is required. Students 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.

pscad.com

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Accessible formats available upon request.