

High Voltage Maintenance

Cost: \$3499.00

City & Prov	Dates	Code
Winnipeg, MB	Feb 27, 2012 - Mar 02, 2012	OR12006
Edmonton, AB	Apr 16, 2012 - Apr 20, 2012	OR12011
Calgary, AB	May 14, 2012 - May 18, 2012	OR12014
Saskatoon, SK	Jun 11, 2012 - Jun 15, 2012	OR12016
Richmond, BC	Sep 10, 2012 - Sep 14, 2012	OR12024

Personnel responsible for High Voltage equipment and systems will learn predictive and preventative maintenance skills through a detailed analysis of their own installations through case studies of common and catastrophic failures.

A large selection of testing instruments will be on hand as will be a comprehensive array of functional test specimens. Participants will be involved in a combination of classroom and hands-on labs which they can then apply to their own facilities testing and maintenance programs.

Whether they be at a management or maintenance level the large majority of prior participants indicate this curriculum has recouped it's cost in less than 90 days.

Who Should Attend:

Electricians, Technicians, Line Worker, Generator Mechanics, Metering Specialists and any other worker who's daily duties involve the maintenance of HV and related systems.

INSULATION

Objective: Describe insulation materials and the methods to quickly and accurately diagnose their insulation quality.

SUBTOPICS:

- Describe The Qualities Of Good Insulation And Factors Affecting Deterioration
- Describe The Methods Of Testing Insulation And Interpretation Of Test Results
- Currents That Flow Through Insulation
- Current responses
- Insulation resistance readings
- When and why insualtion degrades
- What happens when insulation deteriorates
- When and why insulation tests should be carried out
- Types of insulation tests
- Diagnostic insulation test
- Test voltage
- Insulation resistance standards

- Temperature correction
- Conversion factor chart
- Explanation of meters and meggers
- Short time / spot test
- Test methods
- Test equipment
- Test results
- High voltage insulators

CABLES

Objective: Describe cable construction and the methods to splice or terminate the various types of cable.

SUBTOPICS:

- Describe the construction of shielded and non-shielded cable
- Termination of cables
- Describe the methods of testing cables and interpretation of test results
- Basic types of cable insulation
- Cable splicing
- Cable faults and problems
- Types of cables, cable shields and cable failure
- Why you would shield a cable

POWER TRANSFORMERS

Objective: Describe the function and operation of transformers.

SUBTOPICS:

- Different types of power transformers
- Interpret nameplate data
- Describe protection system
- Describe construction of power transformers
- Demonstrate proper method of taking oil samples
- Describe maintenance procedures testing and schedule
- Review safety procedures critical to power transformers

INSTRUMENT TRANSFORMERS

Objective: Describe IT operation and application.

SUBTOPICS:

- Describe CT operation and application
- Explain the purpose of IT's in metering
- Review safety procedures critical to IT's
- Explain testing of IT's

DISCONNECTS

Objective: Describe the function of disconnects.

SUBTOPICS:

- Describe the various types of disconnect
- Explain maintenance on disconnects
- Review safety procedures critical to disconnects

SWITCHGEAR

Objective: Identify various types of switchgear.

SUBTOPICS:

- Describe the operation of switchgear
- Describe tests that can be done on switchgear
- Explain switchgear maintenance and schedule
- Review safety procedures critical to switchgear

BREAKERS

Objective: Describe circuit breaker operation.

SUBTOPICS:

- Review safety procedures critical to breakers
- List the correct steps for removal and restoration of a circuit breaker
- Describe the operation of electrically operated circuit breaker controls
- Describe the operation of breaker mechanisms
- Explain maintenance on ACB's, OCB's, ABB's, SF6 and VCB's and schedule

FUSES

Objective: Explain the function of fuses.

SUBTOPICS:

- Describe the various types of fuses
- Review safety procedures critical to fuses
- List the correct steps for removal and restoration of fuses

RELAYS

Objective: Define the principles and operation of protective devices.

SUBTOPICS:

- Describe power system disturbances
- Describe the protective functions of various relays
- Interpret relay flags and deduce probable cause

CO-ORDINATION

Objective: Define the principles of co-ordination of protective devices.

SUBTOPICS:

- Explain the process of co-ordination
- Interpret time/current curves

STARTERS

Objective: Explain the operation of high voltage starters.

SUBTOPICS:

- Describe various types of starters
- List types of motor protection
- Explain test procedures for starters
- Review safety procedures critical to starters

MOTORS

Objective: Explain the operation of high voltage motors.

SUBTOPICS:

- Describe various types of motors
- Explain test procedures for motors
- Explain motor maintenance and schedule
- Review safety procedures critical to starters

CAPACITORS

Objective: Explain the operation of high voltage capacitors.

SUBTOPICS:

- Describe various types of capacitor installations
- Explain test procedures for capacitors
- Review safety procedures critical to capacitors

GENERATORS

Objective: Explain the operation of high voltage generators.

SUBTOPICS:

- Describe the operation of various types of generators
- Explain test procedures for generators
- Explain generator maintenance and schedule
- Review safety procedures critical to generators

EMERGENCY SYSTEMS

Objective: Explain the operation of various high voltage back-up systems.

SUBTOPICS:

- Describe various types of emergency systems: batteries, transfers, ties, temporary etc.
- Explain test procedures for operation of these systems
- Explain maintenance and schedule for emergency systems
- Review critical safety procedures

"...a wealth of information to be learned."

- **Steve Dawson, Electrician - Campbell & Kennedy.**

"...valuable teaching on the proper use of HV test equipment, what test equipment to use and the reading we should see while doing so in a safe manner."

- **Neil Guyat, Operations Supervisor - Smith & Long Ltd.**

"Very good. The instructor was knowledgeable and willing to answer questions."

- **Fred Broder, Owner - Broder Electric.**

"This was a valuable interpretation of control circuits, grounding and motor starters. I would recommend this course to other electricians. It had excellent content and the instructor was very knowledgeable."

- **Mark Capron, Shell Canada Ltd**

"All of the information from this course is applicable. I would suggest it for all electricians and it helps that the instructor had worked on all the high voltage equipment before. Personal experience helped this course a lot."

- **Rob Birtles, Shell Canada Ltd.**

"The course covered a lot of material directly related to my job and I would recommend it to anyone doing this kind of industrial work."

- **Damien Power, Cornerbrook Pulp and Paper**

"I found this course highly beneficial, as it gave me a better understanding of relay protection, current calculation and breakers. The instructor gave excellent real world examples on faults and maintenance so I would recommend others to take this course."

- **Robert Aucoin, Cornerbrook Pulp and Paper**

"This course was well worth it. The direction on how to accomplish certain tasks will be very useful."

- **Dan Carnelli, Cancarb Ltd**

"Good course, teaching the value of using proper testing to maintain and troubleshoot. Lots of information that many electricians don't know or have forgotten"

- **Alain Charron, Syncrude**