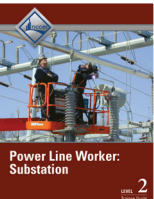


**L2 POWER LINE WORKER: SUBSTATION**

**LEVEL 2**



**Curriculum Notes**

- 180 Hours
- Published: 2012
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at [www.nccer.org/irc](http://www.nccer.org/irc).

**PAPERBACK ISBN**  
 Trainee Guide: \$99.99 **978-0-13-295343-6**

**MODULES**

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

**Introduction to Substations (10 Hours)**

ISBN 978-0-13-296779-2

(Module ID 82201-12) Provides an overview of the different types and functions of substations. Identifies the various voltage classes and introduces the primary equipment and components found in substations. Safe work practices and access issues related to substations are presented, as well as an introduction to one-line diagrams.

**Managing Electrical Hazards (12.5 Hours)**

ISBN 978-0-13-294869-2

(Module ID 26501-12; from *Electrical, Second Edition*) Introduces electrical hazards in the workplace and describes how to avoid them. Explains how to analyze and document shock and arc flash hazards, and how to plan and conduct work around them. Includes examples of how to complete an energized electrical work permit, and how to select the specialized personal protective equipment required for electrical work.

**Alternating Current and Three-Phase Systems**

(17.5 Hours)

ISBN 978-0-13-274259-7

(Module ID 80201-12; from *Power Line Worker: Distribution Level Two*) Introduces the development of both single- and three-phase alternating current. Analyzes the relationship of AC phases and introduces key components used to refine AC power. Discusses the operation of transformers and introduces advanced AC concepts such as reactive power and the power factor.

**Conductors and Cables (10 Hours)**

ISBN 978-0-13-296780-8

(Module ID 82202-12) Identifies the many types, sizes, and applications of conductors and cables. Fiber-optic cable is also introduced. Reviews the use of cable drawings and schedules. Provides coverage of the methods of routing cables underground in the substation environment.

**Cable Tray (7.5 Hours)**

ISBN 978-0-13-266136-2

(Module ID 26207-11; from *Electrical Level Two, Seventh Edition*) Focuses on NEC® installation requirements for cable tray, including cable installations.

**Conduit Bending (15 Hours)**

ISBN 978-0-13-266133-1

(Module ID 26204-11; from *Electrical Level Two, Seventh Edition*) Covers bends in conduit up to 6 inches. Focuses on mechanical, hydraulic, and electrical benders.

**Conductor Installations (10 Hours)**

ISBN 978-0-13-266135-5

(Module ID 26206-11; from *Electrical Level Two, Seventh Edition*) Covers the transportation, storage, and setup of cable reels; methods of rigging; and procedures for complete cable pulls in raceways and cable trays.

**Conductor Terminations and Splicing (7.5 Hours)**

ISBN 978-0-13-266137-9

(Module ID 26208-11; from *Electrical Level Two, Seventh Edition*) Describes methods of terminating and splicing conductors, including preparing and taping conductors.

**Grounding Systems (12.5 Hours)**

ISBN 978-0-13-296782-2

(Module ID 82203-12) Describes the purpose and arrangement of grounding systems installed beneath a substation. Covers the materials of construction and the approaches to reliable ground system connections. Introduces safety concerns and precautions associated with substation and grounding grid expansion.

**Grades (15 Hours)**

ISBN 978-0-13-292311-8

(Module ID 22106-12; from *Heavy Equipment Operations Level One*) Introduces the concept of preparing graded surfaces using heavy equipment. Covers identification of construction stakes and interpretation of marks on each type of stake. Describes the process for grading slopes.

**Concrete Work (35 Hours)**

ISBN 978-0-13-296783-9

(Module ID 82204-12) Provides comprehensive coverage of concrete pouring and finishing techniques. Includes detailed information on concrete types and their uses. Form layout and construction, along with basic surveying skills, is presented. Also provides detailed coverage of rebar types and their common geometric forms.

**Mechanical Construction Methods and Materials**

(17.5 Hours)

ISBN 978-0-13-296784-6

(Module ID 82205-12) Covers the diverse types of substation structures and their composition. Identifies components commonly supported by structures and the various bus forms and materials of construction. Includes thorough coverage of threaded fasteners along with mechanical torquing tools and procedures.

**Intermediate Rigging (10 Hours)**

ISBN 978-0-13-266181-2

(Module ID 38201-11; from *Intermediate Rigger, Second Edition*) Describes basic procedures for using various slings in hitches and calculating sling stress. Introduces tools and equipment used for the lateral movement of loads without a crane. Trainees learn how to reeve block and tackle, invert loads with hoists, and drift a load between two hoists.

**L3 POWER LINE WORKER: SUBSTATION**

**LEVEL 3**

**Curriculum Notes**

- 167.5 Hours
- Published: 2012
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at [www.nccer.org/irc](http://www.nccer.org/irc).

**PAPERBACK ISBN**  
 Trainee Guide: \$99.99 **978-0-13-294866-1**

**MODULES**

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

**Temporary Grounding (15 Hours)**

ISBN 978-0-13-604738-4

(Module ID 40308-09; from *Industrial Maintenance E&I Level Three*) Covers the methods used to eliminate or reduce electrical shock hazards to personnel working on electrical equipment.

**Advanced Drawing Reading (20 Hours)**

ISBN 978-0-13-296791-4

(Module ID 82301-12) Covers the drawings typically associated with substations and the skills needed for their interpretation. Provides detailed instruction on elementary, schematic, and general component arrangement drawings. Wiring diagrams and drawing schedules are also covered.

**Medium- and High-Voltage Equipment Installation**

(25 Hours)

ISBN 978-0-13-296792-1

(Module ID 82302-12) Presents the typical installation procedures for primary substation components. Identifies the common and unique factors related to the proper installation of transformers, circuit breakers, capacitors, reactors, bus systems, and insulators. A discussion of corona and how proper installation techniques can prevent it is also included.

**Control House (20 Hours)**

ISBN 978-0-13-296793-8

(Module ID 82303-12) Provides an overview of the substation control house and its function in the substation. The components and protective systems generally contained within a control house are examined, including the essential DC power systems and emergency power supplies. Coverage of racking systems and their layout is also included.

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