

ELECTRICAL (OUTSIDE) LINE WORKER

APPENDIX A

O*NET CODE 49-9051.00

This training outline is a minimum standard for Work Processes and Related Instruction. Changes in technology and regulations may result in the need for additional on-the-job or classroom training.

WORK PROCESSES

Approximate Hours

A. Tools, Equipment and Safety	400
1. Reading blueprints and specifications.	
2. Assembling tools and equipment. Use of proper power and hand tools, equipment.	
3. Inspection and maintenance of personal protective equipment.	
4. Hauling, loading and unloading as required for job at site.	
5. Installation of protective devices when working with live conductors.	
6. Setting up and maintenance of traffic control to keep public away from the working area. Review customer safety requirements. Develop safety program and conduct safety meetings. Review applicable OSHA safety standards, obtain and review material safety data sheets for hazardous materials on the job.	
7. Building right-of-way roads to work site, building stream crossing and/or a landing at site to accommodate digging and setting equipment.	
8. Administering first aid and/or CPR to injured victims, performing emergency rescue techniques.	
9. Obtain clearances, such as for digging.	
B. Set Towers, Poles and Construction of Other Devices to Hold Electrical Wiring	2000
1. Transportation of poles or towers to site.	
2. Construction and installation of guy wires if determined to be needed.	

3. Clearing right-of-way for line.
4. Assembly of tower structures on ground for installation on pole. Assemble tower on ground and erect on footers.
5. Digging holes for poles or towers, using power equipment or hand tools, such as shovels, spoons, spades and digging bars.
6. Setting poles at the proper depth; proper alignment of pole.
7. Backfilling hole with dirt; tamping the ground around pole.
8. Installation of ground wires on poles. Installation of ground rods and connection of ground wire. Megger ground resistance.
9. Measuring and marking the correct place to drill holes for installation of crossarms; installation of braces for crossarms when needed.
10. Location and staking line for new tower construction.
11. Preparation and installation of footing for tower.
12. Pouring of concrete for foundations.

C. Establishing Work Position for Maintenance and Repairing Overhead Distribution or Transmission Lines 300

1. Inspection of pole for unsafe condition before climbing.
2. Climbing pole or using bucket truck to reach distribution.
3. Setting up tools and equipment; installation of ground and insulation devices on the line before beginning work.
4. Floating wire out with hot sticks or arms to establish a work area.

D. Stringing New Wire or Maintenance Old Wire 1000

1. Inspection of old wire for problems or possible new wire.
2. Installation of travelers or stringing blocks, installation of pulling rope, installation of traveling, truck, and equipment grounds.
3. Positioning insulated protective devices on energized conductors close to new conductors being installed.
4. Determination of length of wire pulls; setting up pulling and tensioning devices, checking of tension. Set up of communications and guard structures if needed. Pulling in new wire; setting of proper sag.
5. Securing wire by deadening or clipping.

6. Splicing wire as necessary.
7. Installation of temporary or permanent jumpers on wire as needed.
8. Installation of fiber optic cable.

E. Installation and Maintenance of Insulators 300

1. Preparation of insulator for installation by cleaning.
2. Inspection of insulators for defects and replace if necessary.
3. Selection of appropriate insulators for voltage.
4. Securing conductors to new insulator using tie wire or shoes.

F. Installation and Maintenance of Transformers and Other Equipment 1000

1. Selection of transformers based on proper primary and secondary voltage rating, kVA rating, polarity, and impedance.
2. Determination of correct transformer connection; proper fuse rating.
3. Securing transformers by drilling holes in the pole or crossarm. Removal of old transformer. Installation of new one.
4. Positioning of lightning protection devices to protect transformer. Installation of disconnectors, voltage regulators, capacitors and sectionalizers.

G. Installation, Repair and Maintenance of Underground Electrical Distribution System 1000

1. Following design of distribution layout of the underground system.
2. Construction of manholes for present and future needs.
3. Laying out of trenches to hold the conduit.
4. Calculating the necessary bends, saddles and offsets needed for the installation of conduit. Cutting and bending to fit the necessary shape.
5. Digging, grading and leveling trenches for the conduits. Installation of raceway supports and laying out of conduit in the trenches with spacers as needed.

6. Installation of conduit using connectors, swab clean, secure and reinforce.
7. Pouring concrete over the conduit in the trenches, backfilling trench with dirt or other materials.
8. Installation of fault indicators and transformers.
9. Pulling and splicing of cable by hand or machine; tagging to identify and ground cable.
10. Installation of stress cones, potheads and/or anodes.
11. Testing and hipot cable. Troubleshoot system using radar, thumping or arch reflection.
12. Installation of fiber optic cable.

H. Assembly and Erection of Substation 300

1. Laying out trenches.
2. Preparation of concrete footings.
3. Assembling and welding together steel, aluminum or wooden parts to structure.
4. Installation and setting of transformers, including adding oil or gas. Installation of other equipment such as insulators, circuit breakers and switches, capacitors, disconnect switches, high-voltage fuses and voltage regulators.
5. Grounding structure to grounding field; hipots the conductors and equipment.
6. Grading yard and covering with gravel.
7. Establishing fences, gates and warning signs.

I. Installation, Maintenance and Repair of Traffic or Train Signals and Outdoor Lighting 500

1. Digging hole for lighting base.
2. Forming base for pole, assemble with steel reinforcement. Pouring concrete, backfilling, and compacting.
3. Assembling poles and other hardware including lighting fixture or traffic light.
4. Setting and leveling of pole. Attaching anchor bolts.
5. Cutting sensor loops in the asphalt; placing sensors in road.
6. Establishing control cabinets, program signal controller. Connecting and testing power.

J. Trimming Tree

200

1. Proper use of safety devices and equipment.
2. Examination and pruning of tree.
3. Application of paint and/or herbicides, fungicides, and pesticides for protection of tree wound.
4. Disposal of brush and branches.

Approximate Total Hours 7000

Apprenticeship work processes are applicable only to training curricula for apprentices in approved programs. Apprenticeship work processes have no impact on classification determinations under Article 8 or 9 of the Labor Law. For guidance regarding classification for purposes of Article 8 or 9 of the Labor Law, please refer to <https://dol.ny.gov/public-work-and-prevailing-wage>

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APPENDIX B

RELATED INSTRUCTION

Safety and Health

1. General (4 hours, 1st year)
2. Trade Safety (12 hours)
3. OSHA 10-Hour Construction Course – if required for Public Work
4. CPR (4 hours per year)
5. First Aid (6.5 hours minimum every 3 years)
6. Sexual Harassment Prevention Training – must comply with section 201-g of the Labor Law

Blueprint Reading and Sketching

1. Elementary Blueprint for Lineman
2. Blueprint Reading and Sketching for Lineman
3. Electrical Circuit Diagrams

Mathematics

1. Fundamentals of Mathematics
2. Mathematics for Lineman
3. Estimating for Lineman

Fundamentals of Lineman Construction

Trade Theory and Science

1. A.C. Fundamentals
2. D.C. Fundamentals
3. Electrical Measurement
4. Electrical Materials
5. Circuit Theory
6. Fiber Optic
7. Magnetism
8. Resistance

9. Transformer Connections
10. Motor Controls
11. Inductive Reactance
12. Capacitive Reactance
13. Radio Fundamentals
14. National Electrical Safety Code (NESC)
15. Local, State and Federal Electrical Codes

Crane Operations

1. Hoisting
2. Chains
3. Sheaves
4. Hand Signaling
5. Machine Maintenance and Operation
6. Types of Cranes (Crawler, Automotive, Mobile, Electric Driven, Walkways and Platforms, Telescopic Boom, Hydraulic, Wire Rope)
7. Operation of Controls
8. Bucket Truck
9. Booms (Jib, Regular, Stiff)

Types of Devices

1. Mechanical
2. Ratchet Wheels
3. Universal Joints
4. Square
5. Square Jaw Clutch
6. Differentials

Safety

1. Proper Security of Cranes
2. Disengagement of Crane
3. Electrical Wires
4. Safe Operation of Trucks

Capacity Charts

Wire Ropes

1. How to Cut
2. Threading
3. Lacing
4. Reeving
5. Pulling
6. Eye Splicers
7. Thimble Splices
8. Slings
9. Shackles and other fittings

Industrial History and Labor Relations

Other Related Courses as needed

A minimum of 144 hours of Related Instruction is required for each Apprentice for each year.

Appendix B topics are approved by New York State Education Department.