# Line Installers and Repairers

(O*NET 49-9051.00, 49-9052.00)

### Significant Points

- Earnings are higher than in most other occupations that do not require postsecondary education.
- A growing number of retirements should create very good job opportunities, especially for electrical power-line installers and repairers.
- Line installers and repairers often work outdoors, and conditions can be hazardous.
- Most line installers and repairers require several years of long-term on-the-job training.

## Nature of the Work

Line installers and repairers work on the vast networks of wires and cables that provide customers with electrical power and voice, video and data communications services. *Electrical power-line installers and repairers*, also called *line erectors*, install and maintain the networks of powerlines that go from generating plants to the customer. *Telecommunications line installers and repairers* install and repair the lines and cable that provide such services as cable television, telephone service, and the Internet to residential and commercial customers.

All line installers construct new lines by erecting utility poles and towers, or digging underground trenches, to carry the wires and cables. They may use a variety of construction equipment, including digger derricks, trenchers, cable plows, and borers. Digger derricks are trucks equipped with augers and cranes. Workers use augers to dig holes in the ground and use cranes to set utility poles in place. Trenchers and cable plows are used to cut openings in the earth for the laying of underground cables. Borers, which tunnel under the earth, are used to install tubes for the wire without opening a trench in the soil.

When construction is complete, line installers string cable along poles and towers or through tunnels and trenches. While working on poles and towers, installers use truck-mounted buckets to elevate themselves to the top of the structure, but sometimes they have to physically climb the pole or tower. Next, they pull up cable from large reels mounted on trucks, set the line in place, and pull up the slack so that it has the correct amount of tension. Finally, line installers attach the cable securely to the structure using hand and hydraulic tools. When working with electrical powerlines, installers bolt or clamp insulators onto the poles before attaching the cable. Underground cable is laid directly in a trench, pulled through a tunnel, or strung through a conduit running through a trench.

Other installation duties include setting up service for customers and installing network equipment. To set up service, line installers string cable between the customers' premises and the nearest lines running on poles or towers or in trenches. They connect wiring to houses and check the connection for proper voltage readings. Line installers also may install a variety of network equipment. When setting up telephone and cable television lines, they install amplifiers and repeaters that maintain the strength of communications transmissions. When running electrical powerlines, they install and replace transformers, circuitbreakers, switches, fuses, and other equipment to control and direct the electrical current.

In addition to installation, line installers and repairers are responsible for maintenance of electrical, telecommunications, and cable television lines. Workers periodically travel in trucks, helicopters, and airplanes to visually inspect the wires and cables. Sensitive monitoring equipment can automatically detect malfunctions on the network, such as loss of current flow. When line repairers identify a problem, they travel to the location of the malfunction and repair or replace defective cables or equipment.

Bad weather or natural disasters can cause extensive damage to networks of lines. Line installers and repairers must respond quickly to these emergencies to restore critical utility and communications services. This can often involve working outdoors in adverse weather conditions.

Installation and repair work may require splicing, or joining together, separate pieces of cable. Each cable contains numerous individual wires; splicing the cables together requires that each wire in one piece of cable be joined to another wire in the matching piece. Line installers join these wires and the surrounding cables using small hand tools, epoxy (an especially strong glue), or mechanical equipment. At each splice, they place insulation over the conductor and seal the splice with moistureproof covering. At some companies, specialized *cable splicing technicians* perform splices on larger lines.

Telecommunications networks are in the process of replacing older conventional wire or metal cables with new fiber optic cables. Fiber optic cables are made of hair-thin strands of glass, which convey pulses of light. These cables carry much more information at higher speeds than conventional cables. Splicing fiber optic cable requires specialized equipment that carefully slices, matches, and aligns individual glass fibers. The fibers are joined by either electrical fusion (welding) or a mechanical fixture and gel (glue).

The work performed by electrical power-line installers and telecommunications line installers and is quite similar, but there are some differences. Working with powerlines requires specialized knowledge of transformers, electrical power distribution systems, and substations. In contrast, working with telecommunications lines requires specialized knowledge of fiber optics and telecommunications switches and routers.

***Work environment.*** Line installers and repairers must climb and maintain their balance while working on poles and towers.

*Line installers and repairers wear safety gear to protect themselves from electrical current.*

**Projections data from the National Employment Matrix**

| Occupational Title | SOC Code | Employment, 2006 | Projected employment, 2016 | Change, 2006-16 | |
|---|---|---|---|---|---|
| | | | | Number | Percent |
| Line installers and repairers | 49-9050 | 275,000 | 290,000 | 16,000 | 6 |
| Electrical power-line installers and repairers | 49-9051 | 112,000 | 120,000 | 8,100 | 7 |
| Telecommunications line installers and repairers | 49-9052 | 162,000 | 170,000 | 7,500 | 5 |

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

They lift equipment and work in a variety of positions, such as stooping or kneeling. Their work often requires that they drive utility vehicles, travel long distances, and work outdoors under a variety of weather conditions.

Line installers and repairers encounter serious hazards on their jobs and must follow safety procedures to minimize potential danger. They wear safety equipment when entering utility holes and test for the presence of gas before going underground. Electric powerline workers have the more hazardous jobs. High-voltage powerlines can instantly electrocute a worker who comes in contact with a live cable, so line installers and repairers must use electrically insulated protective devices and tools when working with such cables. Powerlines are typically higher than telephone and cable television lines, increasing the risk of severe injury due to falls. To prevent these injuries, line installers and repairers must use fall-protection equipment when working on poles or towers.

Since line installers and repairers fix damage from storms, they may be asked to work long and irregular hours. They can expect frequently to be on-call and work overtime. When performing normal maintenance and constructing new lines, line installers work more normal hours.

## Training, Other Qualifications, and Advancement

Most line installers and repairers require several years of long-term on-the-job training and some classroom work to become proficient. Formal apprenticeships are common.

***Education and training.*** Line installers and repairers usually need at least a high school diploma. Employers look for people with basic knowledge of algebra and trigonometry and good reading and writing skills. Some also prefer to hire people with technical knowledge of electricity or electronics obtained through vocational programs, community colleges, or the Armed Forces.

Programs in telecommunications, electronics, or electricity, many of which are operated with assistance from local employers and unions, are offered by many community or technical colleges. Some programs work with local companies to offer 1-year certificates that emphasize hands-on field work. More advanced 2-year associate degree programs provide students with a broader knowledge of the technology used in telecommunications and electrical utilities. They offer courses in electricity, electronics, fiber optics, and microwave transmission. Employers often prefer to hire graduates of these programs for line installer and repairer jobs.

Line installers and repairers receive most of their training on the job. Electrical line installers and repairers often must complete formal apprenticeships or other employer training programs. These programs, which can last up to 5 years, combine on-the-job training with formal classroom courses and are sometimes administered jointly by the employer and the union representing the workers. Unions include the International Brotherhood of Electrical Workers, the Communications Workers of America, and the Utility Workers Union of America. Government safety regulations strictly define the training and education requirements for apprentice electrical line installers.

Line installers and repairers working for telephone and cable television companies receive several years of on-the-job training. They also may attend training or take online courses provided by equipment manufacturers, schools, unions, or industry training organizations.

***Other qualifications.*** Line installers and repairers must be able to read instructions, write reports, and solve problems. If they deal directly with customers, they also must have good customer service skills. They should also be mechanically inclined and like working with computers and new technology.

Physical fitness is important because they must be able to climb, lift heavy objects (many employers require applicants to be able to lift at least 50 pounds), and do other physical activity that requires stamina, strength, and coordination. Line installers and repairers often must work at a considerable height above the ground so they cannot be afraid of heights. Normal ability to distinguish colors is necessary because wires and cables may be color-coded. In addition, they often need a commercial driver's licenses to operate company-owned vehicles, so a good driving record is important.

***Certification and advancement.*** Entry-level line installers may be hired as ground workers, helpers, or tree trimmers, who clear branches from telephone and powerlines. These workers may advance to positions stringing cable and performing service installations. With experience, they may advance to more sophisticated maintenance and repair positions responsible for increasingly larger portions of the network. Promotion to supervisory or training positions also is possible, but more advanced supervisory positions often require a college degree.

Advancement for telecommunications line installers is also made easier by earning certifications—formal recognition by a respected organization of one's knowledge of current technology. The Society of Cable Television Engineers (SCTE), for example, offers certification programs for line installers and repairers employed in the cable television industry. Candidates for certification can attend training sessions at local SCTE chapters.

## Employment

Line installers and repairers held about 275,000 jobs in 2006. Approximately 162,000 were telecommunications line installers and repairers; the remainder were electrical power-line installers and repairers. Nearly all line installers and repairers worked for

telecommunications companies, including both cable television distribution and telecommunications companies; construction contractors; or electric power generation, transmission, and distribution companies.

Approximately 6,100 line installers and repairers were self-employed. Many of these were contractors employed by the telecommunications companies to handle customer service problems and installations.

## Job Outlook

Employment of line installers and repairers is projected to grow more slowly than average, but retirements are expected to create very good job opportunities for new workers, particularly for electrical power-line installers.

***Employment change.*** Overall employment of line installers and repairers will grow 6 percent between 2006 and 2016, slower than the average for all occupations. Growth will reflect an increasing demand for electricity and telecommunications services as the population grows. However, productivity gains—particularly in maintaining these networks—will keep employment growth slow.

Employment of telecommunications line installers and repairers will grow more slowly than the average for all occupations. As the population expands, installers will be needed to lay the wiring for new developments and provide new telecommunications and cable television services. Additionally, old copper wiring will need to be replaced with fiber optic cable, also requiring more installers. The fiber optic lines will allow companies to give customers high-speed access to data, video, and graphics. Fiber optic lines allow for greater amounts of data to be transmitted through the cables at a faster rate. Fiber optic lines are expected to be more reliable in the long run, however, so they will require fewer workers.

Growth of wireless communications will also slow job increases for line installers and repairers in the long run. More households are switching to wireless delivery of their communications, video, and data services. Although wireless networks use lines to connect cellular towers to central offices, they do not require as many line installers to maintain and expand their systems. Satellite television providers—another major portion of the wireless communications industry—will also reduce demand for wire-based phone, Internet, and cable TV.

Employment of electrical power-line installers and repairers is expected to grow about as fast as the average for all occupations. Despite consistently rising demand for electricity, power companies will cut costs by shifting more work to outside contractors and hire fewer installers and repairers. Most new jobs for electrical power-line installers and repairers are expected to arise among contracting firms in the construction industry.

***Job prospects.*** Very good job opportunities are expected, especially for electrical power-line installers and repairers. A growing number of retirements will create many job openings.

## Earnings

Earnings for line installers and repairers are higher than those in most other occupations that do not require postsecondary education. Median hourly earnings for electrical power-line installers and repairers were $24.41 in May 2006. The middle 50 percent earned between $18.73 and $28.90. The lowest 10 percent earned less than $13.96, and the highest 10 percent earned more than $34.20. Median hourly earnings in the industries employing the largest numbers of electrical power-line installers and repairers in May 2006 are shown below:

| | |
|---|---|
| Electric power generation, transmission, and distribution | $25.90 |
| Wired telecommunications carriers | 24.82 |
| Local government | 23.06 |
| Building equipment contractors | 22.04 |
| Utility system construction | 19.29 |

Median hourly earnings for telecommunications line installers and repairers were $22.25 in May 2006. The middle 50 percent earned between $15.56 and $28.40. The lowest 10 percent earned less than $11.88, and the highest 10 percent earned more than $32.80. Median hourly earnings in the industries employing the largest numbers of telecommunications line installers and repairers in May 2006 are shown below:

| | |
|---|---|
| Wired telecommunications carriers | $27.61 |
| Building equipment contractors | 17.89 |
| Cable and other subscription programming | 17.72 |
| Cable and other program distribution | 17.45 |
| Utility system construction | 15.41 |

Many line installers and repairers belong to unions, principally the Communications Workers of America, the International Brotherhood of Electrical Workers, and the Utility Workers Union of America. For these workers, union contracts set wage rates, wage increases, and the time needed to advance from one job level to the next.

Good health, education, and vacation benefits are common in the occupation.

## Related Occupations

Other workers who install and repair electrical and electronic equipment include electricians; power plant operators, distributors, and dispatchers; and radio and telecommunications equipment installers and repairers.

## Sources of Additional Information

For more details about employment opportunities, contact the telephone, cable television, or electrical power companies in your community. For general information and educational resources on line installer and repairer jobs, contact:

➤ Communications Workers of America, 501 3rd St.NW., Washington, DC 20001.
Internet: **http://www.cwa-union.org/jobs**

➤ National Joint Apprenticeship and Training Center (NJATC), 301 Prince Georges Blvd., Suite D, Upper Marlboro MD 20774.
Internet: **http://www.njatc.org**

For information on training and professional certifications for those already employed by cable telecommunications firms, contact:

➤ Society of Cable Telecommunications Engineers, Certification Department, 140 Phillips Rd., Exton, PA 19341-1318. Internet: **http://www.scte.org**