
Line Installers and Repairers

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Significant Points

- Line installers and repairers work outdoors; conditions can be hazardous.
- Line installers and repairers are trained on the job; employers prefer applicants with a technical knowledge of electricity and electronics.
- Employment is expected to grow about as fast as average.
- Earnings are higher than in most other occupations that do not require postsecondary education.

Nature of the Work

Vast networks of wires and cables provide customers with electrical power and communications services. Networks of electrical power lines deliver electricity from generating plants to customers. Communications networks of telephone and cable television lines provide voice, video, and other communications services. These networks are constructed and maintained by line installers and repairers.

Line installers, or *line erectors*, install new lines by constructing utility poles, towers, and underground trenches to carry the wires and cables. Line erectors 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 cranes are used 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 the poles, towers, tunnels, and trenches. While working on poles and towers, installers first use truck-mounted buckets to reach the top of the structure or physically climb the pole or tower. Next, they pull up cable from large reels mounted on trucks. The line is then set in place and pulled so that it has the correct amount of tension. Finally, line installers attach the cable to the structure using hand and hydraulic tools. When working with electrical power lines, 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 lines running on poles or towers or in trenches. They install wiring to houses and check the connection for proper voltage readings. Line installers also may install a variety of equipment. Workers on telephone and cable television lines install amplifiers and repeaters that maintain the strength of communications transmissions. Workers on electrical powerlines 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 also 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. 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 splice cables using small handtools, epoxy, or mechanical equipment. At each splice, they place insulation over the conductor and seal the splice with moistureproof covering.

Many communications networks now use fiber optic cables instead of conventional wire or metal cables. Fiber optic cables are made of hair-thin strands of glass, which convey pulses of light. These cables can carry much more information at higher speeds than can conventional cables. The higher transmission capacity of fiber optic cable has allowed communication networks to offer up-graded services, such as high-speed Internet access. 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).

Working Conditions

Line installers and repairers must climb and maintain their balance while working on poles and towers. 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. Many line installers and repairers work a 40-hour week; however, emergencies may require overtime work. For example, when severe weather damages electrical and communications lines, line installers and repairers may work long and irregular hours to restore service.

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 most hazardous jobs. High-voltage powerlines can cause electrocution, and line installers and repairers must consequently use electrically insulated protective devices and tools when working with live cables. Powerlines are typically higher than telephone and cable television lines, increasing the risk of se-



Line installers work on both telecommunications and electrical lines.

vere injury due to falls. To prevent these injuries, line installers and repairers must use fall-protection equipment when working on poles or towers.

Employment

Line installers and repairers held about 268,000 jobs in 2002. Approximately 167,000 were telecommunications line installers and repairers; the remainder were electrical powerline installers and repairers. Nearly all line installers and repairers worked for telecommunications, construction or electric power generation, transmission, and distributions companies. Approximately 9,300 line installers and repairers were self-employed.

Training, Other Qualifications, and Advancement

Line installers and repairers are trained on the job, and employers require at least a high school diploma. Employers also prefer a technical knowledge of electricity, electronics, and experience obtained through vocational/technical programs, community colleges, or the Armed Forces. Prospective employees should possess a basic knowledge of algebra and trigonometry, and mechanical ability. Customer service and interpersonal skills also are important. Because the work entails lifting heavy objects (many employers require applicants to be able to lift at least 50 pounds), climbing, and other physical activity, applicants should have stamina, strength, and coordination, and must be unafraid of heights. The ability to distinguish colors is necessary because wires and cables may be color-coded.

Many community or technical colleges offer programs in telecommunications, electronics, and/or electricity. These programs often are operated with assistance from local employers and unions. Some schools, working with local companies, offer 1-year certificate programs that emphasize hands-on field work; graduates get preferential treatment in the hiring process at companies participating in the program. More advanced 2-year associate degree programs provide students with a broader knowledge of telecommunications and electrical utilities technology through courses in electricity, electronics, fiber optics, and microwave transmission.

Electrical line installers and repairers complete formal apprenticeships or employer training programs. These are sometimes administered jointly by the employer and the union representing the workers. The unions include the International Brotherhood of Electrical Workers, the Communications Workers of America, and the Utility Workers Union of America. Apprenticeship programs last up to 5 years and combine formal instruction with on-the-job training. Government safety regulations strictly define the training and education requirements for apprentice electrical line installers.

Line installers and repairers in 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. The Society of Cable Television Engineers (SCTE) provides certification programs for line installers and repairers. Applicants for certification must be employed in the cable television industry and attend training sessions at local SCTE chapters.

Entry-level line installers may be hired as ground workers, helpers, or tree trimmers, who clear branches from telephone and power lines. 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 diploma.

Job Outlook

Overall employment of line installers and repairers is expected to grow about as fast as the average for all occupations through 2012. Much of this increase will result from growth in the construction and telecommunications industries. With the increasing competition in electrical distribution, many companies are contracting out construction of new lines. The introduction of new technologies, especially fiber optic cable, has increased the transmission capacity of telephone and cable television networks. This higher capacity has allowed the creation of new and popular services, such as high-speed Internet access. At the same time, deregulation of the telecommunications industry has reduced barriers to competition. Competition for local phone service and demand for high-speed Internet access is forcing former local telephone companies to update and modernize their networks. In some regions, underground telephone lines may be up to 50 years old and incapable of providing advanced services. Job growth also will stem from the maintenance and modernization of telecommunications networks. Besides those due to employment growth, many job openings will result from the need to replace the large number of older workers reaching retirement age.

Employment of telecommunications line installers and repairers is expected to grow about as fast as average as telephone and cable television companies expand and improve networks that provide customers with high-speed access to data, video, and graphics. Line installers and repairers will be needed not only to construct and install networks, but also to maintain the ever-growing systems of wires and cables. The average residential customer already has more than two telephone lines. Increased demand for high-speed Internet access and multiple telephone lines will require the improvement and expansion of local telephone-line networks. However, excess transmission capacity due to the overexpansion of fiber optic lines, especially long-distance lines, in recent years should significantly reduce employment demand. The need for maintenance work will be reduced by the improved reliability of fiber optic lines. The demand for additional telephone lines also will be tempered by the increasing use of wireless telephones. Wireless networks do not require as many technicians to maintain and expand their systems, a characteristic that will reduce job growth in the industry.

Little or no growth in employment of electrical powerline installers and repairers is expected through 2012. The demand for electricity has been consistently rising, driving the expansion of powerline networks, which tends to increase employment. However, industry deregulation is pushing companies to cut costs and maintenance, which tends to reduce employment. Most new jobs are expected to arise in the construction industry. Because electrical power companies have reduced hiring and training in past years, opportunities are best for workers who possess experience and training.

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 powerline installers and repairers were \$23.33 in 2002. The middle 50 percent earned between \$18.02 and \$27.43. The lowest 10 percent earned less than \$13.22, and the highest 10 percent earned more than \$32.08. Median hourly earnings in the industries employing the largest numbers of electrical powerline installers and repairers in 2002 are shown below:

Electric power generation, transmission and distribution	\$24.72
Wired telecommunications carriers	23.80
Local government	22.07
Utility system construction	17.22
Building equipment contractors	16.27

Median hourly earnings for telecommunications line installers and repairers were \$19.06 in 2002. The middle 50 percent earned between \$13.36 and \$24.70. The lowest 10 percent earned less than \$10.31, and the highest 10 percent earned more than \$27.70. Median hourly earnings in the industries employing the largest numbers of telephone and cable television line installers and repairers in 2002 are shown below:

Wired telecommunications carriers	\$24.20
Cable and other subscription programming	18.48
Cable and other program distribution	15.01
Building equipment contractors	15.00
Utility system construction	13.58

Most 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.

Related Occupations

Other workers who install and repair electrical and electronic equipment include broadcast and sound engineering technicians and radio operators, electricians, 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 some educational resources on line installer and repairer jobs, write to:

- ▶ Communications Workers of America, 501 3rd St. NW., Washington, DC 20001.
- ▶ International Brotherhood of Electrical Workers, Telecommunications Department, 1125 15th St. NW., Washington, DC 20005.

For 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>