

apprenticeship agency, local electrical contractors or firms that employ maintenance electricians, or local union-management electrician apprenticeship committees. This information may also be available from local chapters of the Independent Electrical Contractors, Inc.; the National Electrical Contractors Association; the Home Builders Institute; the Associated Builders and Contractors; and the International Brotherhood of Electrical Workers.

For general information about the work of electricians, contact:

- ▶ Independent Electrical Contractors, Inc., 2010-A Eisenhower Ave., Alexandria, VA 22314. Internet: <http://www.ieci.org>
- ▶ National Electrical Contractors Association (NECA), 3 Metro Center, Suite 1100, Bethesda, MD 20814. Internet: <http://www.necanet.org>
- ▶ International Brotherhood of Electrical Workers (IBEW), 1125 15th St. NW., Washington, DC 20005. Internet: <http://www.ibew.org>
- ▶ Associated Builders and Contractors, 1300 N. 17th St., Arlington, VA 22209. Internet: <http://www.abc.org>
- ▶ National Association of Home Builders, 1201 15th St. NW., Washington, DC 20005. Internet: <http://www.nahb.org>

Elevator Installers and Repairers

(O*NET 47-4021.00)

Significant Points

- Workers learn the trade through 4 to 5 years of on-the-job training and classroom instruction.
- Elevator installers and repairers have one of the highest rates of union membership.
- Job opportunities are expected to be limited in this small occupation; prospects should be best for those with postsecondary education in electronics.

Nature of the Work

Elevator installers and repairers—also called *elevator constructors* or *elevator mechanics*—assemble, install, and replace elevators, escalators, dumbwaiters, moving walkways, and similar equipment in new and old buildings. Once the equipment is in service, they maintain and repair it as well. They also are responsible for modernizing older equipment.

To install, repair, and maintain modern elevators, which are almost all electronically controlled, elevator installers and repairers must have a thorough knowledge of electronics, electricity, and hydraulics. Many elevators are controlled with microprocessors, which are programmed to analyze traffic conditions in order to dispatch elevators in the most efficient manner. With these computer controls, it is possible to get the greatest amount of service with the least number of cars.

When installing a new elevator, installers and repairers begin by studying blueprints to determine the equipment needed to install rails, machinery, car enclosures, motors, pumps, cylinders, and plunger foundations. Once this has been done, they begin equipment installation. Working on scaffolding or platforms, installers bolt or weld steel rails to the walls of the shaft to guide the elevator.

Elevator installers put in electrical wires and controls by running tubing, called conduit, along a shaft's walls from floor to floor. Once it is in place, mechanics pull plastic-covered electrical wires through the conduit. They then install electrical components and related devices required at each floor and at the main control panel in the machine room.

Installers bolt or weld together the steel frame of an elevator car at the bottom of the shaft; install the car's platform, walls, and doors;

and attach guide shoes and rollers to minimize the lateral motion of the car as it travels through the shaft. They also install the outer doors and door frames at the elevator entrances on each floor.

For cabled elevators, these workers install geared or gearless machines with a traction drive wheel that guides and moves heavy steel cables connected to the elevator car and counterweight. (The counterweight moves in the opposite direction from the car and balances most of the weight of the car to reduce the weight that the elevator's motor must lift.) Elevator installers also install elevators in which a car sits on a hydraulic plunger that is driven by a pump. The plunger pushes the elevator car up from underneath, similar to a lift in an auto service station.

Installers and repairers also install escalators. They put in place the steel framework, the electrically powered stairs, and the tracks and install associated motors and electrical wiring. In addition to elevators and escalators, they also may install devices such as dumbwaiters and material lifts—which are similar to elevators in design—as well as moving walkways, stair lifts, and wheelchair lifts.

The most highly skilled elevator installers and repairers, called “adjusters,” specialize in fine-tuning all the equipment after installation. Adjusters make sure that an elevator is working according to specifications, such as stopping correctly at each floor within a specified time. Once an elevator is operating properly, it must be maintained and serviced regularly to keep it in safe working condition. Elevator installers and repairers generally do preventive maintenance—such as oiling and greasing moving parts, replacing worn parts, testing equipment with meters and gauges, and adjusting equipment for optimal performance. They also troubleshoot and may be called in to do emergency repairs.

A service crew usually handles major repairs—for example, replacing cables, elevator doors, or machine bearings. This may require the use of cutting torches or rigging equipment—tools an elevator repairer normally would not carry. Service crews also do major modernization and alteration work, such as moving and replacing electrical motors, hydraulic pumps, and control panels.

Elevator installers and repairers usually specialize in installation, maintenance, or repair work. Maintenance and repair workers generally need more knowledge of electricity and electronics than installers do, because a large part of maintenance and repair work is troubleshooting. Similarly, adjusters need a thorough knowledge of electricity, electronics, and computers to ensure that newly installed elevators operate properly.



Elevator installers need a working knowledge of electricity, electronics, and hydraulics.

Working Conditions

Most elevator installers and repairers work a 40-hour week. However, overtime is required when essential elevator equipment must be repaired, and some workers are on 24-hour call. Unlike most elevator installers, workers who specialize in elevator maintenance are on their own most of the day and typically service the same elevators periodically.

Elevator installers lift and carry heavy equipment and parts, and may work in cramped spaces or awkward positions. Potential hazards include falls, electrical shock, muscle strains, and other injuries related to handling heavy equipment. Because most of their work is performed indoors in buildings under construction or in existing buildings, elevator installers and repairers lose less worktime due to inclement weather than do other construction trades workers.

Employment

Elevator installers and repairers held about 23,000 jobs in 2000. Most were employed by special trade contractors. Others were employed by field offices of elevator manufacturers, wholesale distributors, small-elevator maintenance and repair contractors, government agencies, or businesses that do their own elevator maintenance and repair.

Training, Other Qualifications, and Advancement

Most elevator installers and repairers apply for their jobs through a local of the International Union of Elevator Constructors. Applicants for trainee positions must be at least 18 years old, have a high school diploma or equivalent, and pass an aptitude test. Good physical condition and mechanical aptitude also are important.

Elevator installers and repairers learn their trade in a program administered by local joint educational committees representing the employers and the union. These programs, through which the trainee learns everything from installation to repair, combine on-the-job training with classroom instruction in blueprint reading, electrical and electronic theory, mathematics, applications of physics, and safety. In nonunion shops, workers may complete training programs sponsored by independent contractors.

Generally, trainees or helpers must complete a 6-month probationary period. After successful completion, they work toward becoming fully qualified within 4 to 5 years. To be classified as a fully qualified elevator installer or repairer, union trainees must pass a standard examination administered by the National Elevator Industry Educational Program. Most States and cities also require elevator installers and repairers to pass a licensing examination.

Most trainees or helpers assist experienced elevator installers and repairers. Beginners carry materials and tools, bolt rails to walls, and assemble elevator cars. Eventually, trainees learn more difficult tasks such as wiring, which requires knowledge of local and national electrical codes.

High school courses in electricity, mathematics, and physics provide a useful background. As elevators become increasingly sophisticated, workers may find it necessary to acquire more advanced formal education—for example, in postsecondary technical school or junior college—with an emphasis on electronics. Workers with more formal education usually advance more quickly than their counterparts.

Many elevator installers and repairers also receive training from their employers or through manufacturers to become familiar with a company's particular equipment. Retraining is very important to keep abreast of technological developments in elevator repair. In fact, union elevator installers and repairers typically receive continual

training throughout their careers, through either correspondence courses, seminars, or formal classes. Although voluntary, this training greatly improves one's chances for promotion.

Some installers may receive further training in specialized areas and advance to mechanic-in-charge, adjuster, supervisor, or elevator inspector. Adjusters, for example, may be picked for their position because they possess particular skills or are electronically inclined. Other workers may move into management, sales, or product design jobs.

Job Outlook

Job opportunities are expected to be somewhat limited in this small occupation. A large proportion of elevator installer and repairer jobs are unionized and involve a significant investment in training. As a result, workers tend to stay in this occupation for a long time. This investment in training, as well as good benefits and relatively high wages, results in fewer openings due to turnover, thus reducing job opportunities. Job prospects should be best for those with postsecondary education in electronics.

Employment of elevator installers and repairers is expected to increase about as fast as the average for all occupations through the year 2010. Job growth is related to the growth of nonresidential construction, such as commercial office buildings and stores that have elevators and escalators, which is expected to increase about as fast as the average over the 2000-10 period. The need to continually update and modernize old equipment, including improvements in appearance and the installation of increasingly sophisticated equipment and computerized controls, also should add to the demand for elevator installers and repairers.

Because it is desirable that equipment always be kept in good working condition, economic downturns will have less of an effect on employment of elevator installers and repairers than on other construction trades.

Earnings

Median hourly earnings of elevator installers and repairers were \$22.78 in 2000. The middle 50 percent earned between \$16.38 and \$27.38. The lowest 10 percent earned less than \$11.19, and the top 10 percent earned more than \$33.23. In 2000, median hourly earnings in the miscellaneous special trade contractors industry were \$23.29.

In addition to free continuing education, elevator installers and repairers receive basic benefits enjoyed by most other workers.

Elevator installers and repairers have one of the highest rates of union membership, about 9 out of 10. Most elevator installers and repairers belong to the International Union of Elevator Constructors.

Related Occupations

Elevator installers and repairers combine electrical and mechanical skills with construction skills, such as welding, rigging, measuring, and blueprint reading. Other occupations that require many of these skills are boilermakers; electricians; electrical and electronics installers and repairers; industrial machinery installation, repair, and maintenance workers; sheet metal workers; and structural and reinforcing iron and metal workers.

Sources of Additional Information

For further details about opportunities as an elevator installer and repairer, contact elevator manufacturers, elevator repair and maintenance contractors, a local of the International Union of Elevator Constructors, or the nearest local public employment service office.