

industries. In addition, many openings will result from the need to replace brickmasons, blockmasons, and stonemasons who retire, transfer to other occupations, or leave these trades for other reasons.

Employment of brickmasons, blockmasons, and stonemasons, like that of many other construction workers, is sensitive to changes in the economy. When the level of construction activity falls, workers in these trades can experience periods of unemployment.

Earnings

Median hourly earnings of brickmasons and blockmasons in 2000 were \$19.37. The middle 50 percent earned between \$15.00 and \$24.48. The lowest 10 percent earned less than \$11.20, and the highest 10 percent earned more than \$30.02. Median hourly earnings in the industries employing the largest number of brickmasons in 2000 are shown below:

Miscellaneous special trade contractors	\$22.87
Masonry, stonework, and plastering	19.55
Nonresidential building construction	19.02
Residential building construction	18.10

Median hourly earnings of stonemasons in 2000 were \$14.98. The middle 50 percent earned between \$10.78 and \$19.24. The lowest 10 percent earned less than \$9.09, and the highest 10 percent earned more than \$23.03.

Earnings for workers in these trades can be reduced on occasion because poor weather and downturns in construction activity limit the time they can work.

Apprentices or helpers usually start at about 50 percent of the wage rate paid to experienced workers. Pay increases as apprentices gain experience and learn new skills.

Some brickmasons, blockmasons, and stonemasons are members of the International Union of Bricklayers and Allied Craftworkers.

Related Occupations

Brickmasons, blockmasons, and stonemasons combine a thorough knowledge of brick, concrete block, stone, and marble with manual skill to erect attractive, yet highly durable, structures. Workers in other occupations with similar skills include carpet, floor, and tile installers and finishers; cement masons, concrete finishers, segmental pavers, and terrazzo workers; and plasterers and stucco masons.

Sources of Additional Information

For details about apprenticeships or other work opportunities in these trades, contact local bricklaying, stonemasonry, or marble-setting contractors; a local of the union listed above; a local joint union-management apprenticeship committee; or the nearest office of the State employment service or apprenticeship agency.

For general information about the work of brickmasons, blockmasons, or stonemasons, contact:

- ▶ International Union of Bricklayers and Allied Craftworkers, 1776 I St. NW., Washington, DC. 20006. Internet: <http://www.bacweb.org>
- ▶ International Masonry Institute, Apprenticeship and Training, 837 Buena Vista Ave., Cascade, MD 21719. Internet: <http://www.imiweb.org>

Information about the work of bricklayers also can be obtained from:

- ▶ Associated General Contractors of America, Inc., 1957 E St. NW., Washington, DC 20006. Internet: <http://www.agc.org>
- ▶ Brick Industry Association, 11490 Commerce Park Dr., Reston, VA 22091-1525. Internet: <http://www.brickinfo.org>
- ▶ National Association of Home Builders, 1201 15th St. NW., Washington, DC 20005. Internet: <http://www.nahb.com>
- ▶ National Concrete Masonry Association, 2302 Horse Pen Rd., Herndon, VA 20171-3499. Internet: <http://www.ncma.org>

Carpenters

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Significant Points

- More than one-fourth of all carpenters—the largest construction trade in 2000—were self-employed.
- Job opportunities should be excellent, in part because of the large number of job openings created by carpenters who leave the occupation each year.
- Many builders use specialty carpentry subcontractors who do one or two work activities, so versatile carpenters able to switch specialties should have the best opportunities for steady work.

Nature of the Work

Carpenters are involved in many different kinds of construction activity. They cut, fit, and assemble wood and other materials for the construction of buildings, highways, bridges, docks, industrial plants, boats, ships, and many other structures. Carpenters also build doors or brattices (ventilation walls or partitions) in underground passageways to control the proper circulation of air through these passageways and to worksites. Carpenters' duties vary by type of employer. Builders increasingly are using specialty trade contractors who, in turn, hire carpenters who specialize in just one or two activities. Some of these activities are setting forms for concrete construction; erecting scaffolding; or doing finishing work, such as installing interior and exterior trim. However, a carpenter directly employed by a general building contractor often must perform a variety of the tasks associated with new construction, such as framing walls and partitions, putting in doors and windows, building stairs, laying hardwood floors, and hanging kitchen cabinets.

Because local building codes often dictate where certain materials can be used, carpenters must know these regulations. Each carpentry task is somewhat different, but most involve the same basic steps. Working from blueprints or instructions from supervisors, carpenters first do the layout—measuring, marking, and arranging materials. They cut and shape wood, plastic, fiberglass, or drywall, using hand and power tools, such as chisels, planes, saws, drills, and sanders. They then join the materials with nails, screws, staples, or adhesives. In the final step, carpenters check the accuracy of their work with levels, rules, plumb bobs, and framing squares, and make any necessary adjustments. When working with prefabricated components, such as stairs or wall panels, the carpenter's task is somewhat simpler than above, because it does not require as much layout work or the cutting and assembly of as many pieces. Prefabricated components are designed for easy and fast installation and generally can be installed in a single operation.

Carpenters who remodel homes and other structures must be able to do all aspects of a job—not just one task. Thus, individuals with good basic overall training are at a distinct advantage, because they can switch from residential building to commercial construction or remodeling work, depending on which offers the best work opportunities.

Carpenters employed outside the construction industry perform a variety of installation and maintenance work. They may replace panes of glass, ceiling tiles, and doors, as well as repair desks, cabinets, and other furniture. Depending on the employer, carpenters install partitions, doors, and windows; change locks; and repair broken furniture. In manufacturing firms, carpenters may assist in



Some carpenters specialize in framing walls and partitions.

moving or installing machinery. (For more information on workers who install machinery, see the section on industrial machinery installation, repair, and maintenance workers elsewhere in the *Handbook*.)

Working Conditions

As in other building trades, carpentry work is sometimes strenuous. Prolonged standing, climbing, bending, and kneeling often are necessary. Carpenters risk injury working with sharp or rough materials, using sharp tools and power equipment, and working in situations where they might slip or fall. Additionally, many carpenters work outdoors, which can be uncomfortable.

Some carpenters change employers each time they finish a construction job. Others alternate between working for a contractor and working as contractors themselves on small jobs.

Employment

Carpenters, the largest group of building trades workers, held about 1.2 million jobs in 2000. One-third worked for general building contractors, 20 percent worked for special trade contractors, and 12 percent worked in heavy construction. Most of the remainder worked for manufacturing firms, government agencies, wholesale and retail establishments, or schools. More than one-fourth of all carpenters were self-employed.

Carpenters are employed throughout the country in almost every community.

Training, Other Qualifications, and Advancement

Carpenters learn their trade through on-the-job training, as well as formal training programs. Most pick up skills informally by working under the supervision of experienced workers. Many acquire skills through vocational education. Others participate in employer training programs or apprenticeships.

Most employers recommend an apprenticeship as the best way to learn carpentry. Apprenticeship programs are administered by local joint union-management committees of the United Brotherhood of Carpenters and Joiners of America, the Associated General Contractors, Inc., and the National Association of Home Builders. In addition, training programs are administered by local chapters of the Associated Builders and Contractors and by local chapters of the Associated General Contractors, Inc. These programs combine on-the-job training with related classroom instruction.

On the job, apprentices learn elementary structural design and become familiar with common carpentry jobs, such as layout, form building, rough framing, and outside and inside finishing. They also learn to use the tools, machines, equipment, and materials of the trade. Apprentices receive classroom instruction in safety, first aid, blueprint reading, freehand sketching, basic mathematics, and different carpentry techniques. Both in the classroom and on the job, they learn the relationship between carpentry and the other building trades.

Usually, apprenticeship applicants must be at least 17 years old and meet local requirements. For example, some union locals test an applicant's aptitude for carpentry. The length of the program, usually about 3 to 4 years, varies with the apprentice's skill. Because the number of apprenticeship programs is limited, however, only a small proportion of carpenters learn their trade through these programs.

Informal on-the-job training is normally less thorough than an apprenticeship. The degree of training and supervision often depends on the size of the employing firm. A small contractor specializing in homebuilding may provide training only in rough framing. In contrast, a large general contractor may provide training in several carpentry skills. Although specialization is becoming increasingly common, it is important to try to acquire skills in all aspects of carpentry and to have the flexibility to perform any kind of work.

A high school education is desirable, including courses in carpentry, shop, mechanical drawing, and general mathematics. Manual dexterity, eye-hand coordination, physical fitness, and a good sense of balance are important. The ability to solve arithmetic problems quickly and accurately also is helpful. Employers and apprenticeship committees generally view favorably any training and work experience obtained in the Armed Services or Job Corps.

Carpenters may advance to carpentry supervisor or general construction supervisor positions. Carpenters usually have greater opportunities than most other construction workers to become general construction supervisors, because carpenters are exposed to the entire construction process. Some carpenters become independent contractors. To advance, these workers should be able to estimate the nature and quantity of materials needed to properly complete a job. In addition, they must be able to accurately estimate how long a job should take to complete and what it will cost.

Job Outlook

Job opportunities for carpenters are expected to be excellent over the 2000-10 period, largely due to the numerous openings arising each year from experienced carpenters who leave this large occupation each year. In addition, many potential workers may prefer work that is less strenuous and that has more comfortable working conditions. Because there are no strict training requirements for entry, many people with limited skills take jobs as carpenters but

eventually leave the occupation because they dislike the work or cannot find steady employment. Well-trained workers will have especially favorable opportunities.

Employment of carpenters is expected to increase more slowly than the average for all occupations. Construction activity should increase in response to demand for new housing and commercial and industrial plants and the need to renovate and modernize existing structures. The demand for larger homes with more amenities and for second homes will continue to rise, especially as the baby boomers reach their peak earning years and can afford to spend more on housing. At the same time, as the number of immigrants increase and as the echo boomers (the children of the baby boomers) replace the smaller baby bust generation in the young adult age groups, the demand for manufactured housing, starter homes, and rental apartments also is expected to increase.

However, some of the demand for carpenters will be offset by expected productivity gains resulting from the increasing use of prefabricated components, such as pre-hung doors and windows and prefabricated wall panels and stairs, which can be installed very quickly. Prefabricated walls, partitions, and stairs can be lifted into place in one operation; beams—and in some cases entire roof assemblies—can be lifted into place using a crane. As prefabricated components become more standardized, builders will use them more often. In addition, improved adhesives will reduce the time needed to join materials, and lightweight, cordless pneumatic and combustion tools—such as nailers and drills—all make carpenters more efficient.

Carpenters can experience periods of unemployment because of the short-term nature of many construction projects and the cyclical nature of the construction industry. Building activity depends on many factors—interest rates, availability of mortgage funds, the season, government spending, and business investment—that vary with the state of the economy. During economic downturns, the number of job openings for carpenters declines. New and improved tools, equipment, techniques, and materials have vastly increased carpenter versatility. Therefore, carpenters with all-round skills will have better opportunities than those who can do only a few relatively simple, routine tasks.

Job opportunities for carpenters also vary by geographic area. Construction activity parallels the movement of people and businesses and reflects differences in local economic conditions. Therefore, the number of job opportunities and apprenticeship opportunities in a given year may vary widely from area to area.

Earnings

In 2000, median hourly earnings of carpenters were \$15.69. The middle 50 percent earned between \$11.99 and \$20.86. The lowest 10 percent earned less than \$9.48, and the highest 10 percent earned more than \$26.73. Median hourly earnings in the industries employing the largest numbers of carpenters in 2000 are shown below:

Masonry, stonework, and plastering	\$19.27
Nonresidential building construction	17.43
Heavy construction, except highway	16.74
Carpentry and floor work	15.51
Residential building construction	15.26

Earnings can be reduced on occasion, because carpenters lose worktime in bad weather and during recessions when jobs are unavailable.

Some carpenters are members of the United Brotherhood of Carpenters and Joiners of America.

Related Occupations

Carpenters are skilled construction workers. Workers in other skilled construction occupations include brickmasons, blockmasons, and

stonemasons; cement masons, concrete finishers, segmental pavers, and terrazzo workers; electricians; pipelayers, plumbers, pipefitters, and steamfitters; and plasterers and stucco masons.

Sources of Additional Information

For information about carpentry apprenticeships or other work opportunities in this trade, contact local carpentry contractors, locals of the union mentioned above, local joint union-contractor apprenticeship committees, or the nearest office of the State employment service or apprenticeship agency.

For information on training opportunities and carpentry in general, contact:

- Associated Builders and Contractors, 1300 N. 17th St., Suite 800, Arlington, VA 22209. Internet: <http://www.abc.org>
- Associated General Contractors of America, Inc., 1957 E St. NW., Washington, DC 20006. Internet: <http://www.agc.org>
- National Association of Home Builders, 1201 15th St. NW., Washington, DC 20005. Internet: <http://www.nahb.com>
- United Brotherhood of Carpenters and Joiners of America, 101 Constitution Ave. NW., Washington, DC 20001. Internet: <http://www.necarpenters.org/ubc.htm>

Carpet, Floor, and Tile Installers and Finishers

(O*NET 47-2041.00, 47-2042.00, 47-2043.00, 47-2044.00)

Significant Points

- Almost half of all carpet, floor, and tile installers and finishers are self-employed, compared with fewer than 1 in 5 of all construction trades and related workers.
- Most workers learn on the job.
- Carpet installers, the largest specialty, should have the best job opportunities.
- Carpet, floor, and tile installers and finishers are less sensitive to fluctuations in construction activity than are other construction trades workers.

Nature of the Work

Carpet, tile, and other types of floor coverings not only serve an important basic function in buildings, but their decorative qualities also contribute to the appeal of the buildings. Carpet, floor, and tile installers and finishers lay these floor coverings in homes, offices, hospitals, stores, restaurants, and many other types of buildings. Tile also is installed on walls and ceilings.

Before installing carpet, *carpet installers* first inspect the surface to be covered to determine its condition and, if necessary, correct any imperfections that could show through the carpet or cause the carpet to wear unevenly. They must measure the area to be carpeted and plan the layout, keeping in mind expected traffic patterns and placement of seams for best appearance and maximum wear.

When installing wall-to-wall carpet without tacks, installers first fasten a tackless strip to the floor, next to the wall. They then install the padded cushion or underlay. Next, they roll out, measure, mark, and cut the carpet, allowing for 2 to 3 inches of extra carpet for the final fitting. Using a device called a “knee kicker,” they position the carpet, stretching it to fit evenly on the floor and snugly against each wall and door threshold. They then rough cut the excess carpet. Finally, using a power stretcher, they stretch the carpet, hooking it to the tackless strip to hold it in place. The installer then finishes the edges using a wall trimmer.